

**CPC****COOPERATIVE PATENT CLASSIFICATION****G06F**

**ELECTRICAL DIGITAL DATA PROCESSING** (computers in which a part of the computation is effected hydraulically or pneumatically G06D; optically G06E; self-contained input or output peripheral equipment G06K; impedance networks using digital techniques H03H)

**NOTE**

In this subclass, the following terms or expressions are used with the meaning indicated:

- "handling" includes processing or transporting of data;
- "data processing equipment" means an association of an electric digital data processor classifiable under group [G06F 7/00](#), with one or more arrangements classifiable under groups [G06F 1/00](#) to [G06F 5/00](#) and [G06F 9/00](#) to [G06F 13/00](#).

**WARNING**

[C2012.08]

The following IPC groups are not used in the CPC classification scheme. Subject matter covered by these groups is classified in the following CPC groups:

[G06F 3/18](#) covered by [G06F 3/00](#), [G06K 11/00](#)

[G06F 7/04](#) covered by [G06F 7/02](#)

[G06F 9/302](#)-[G06F 9/318](#) covered by [G06F 9/30](#)

- [G06F 9/40](#) covered by [G06F 9/4425](#) and subgroups- [G06F 9/42](#) covered by [G06F 9/4426](#) and subgroups- [G06F 9/45](#) covered by [G06F 8/41](#) and subgroups

**G06F 1/00**

**Details of data-processing equipment not covered by groups [G06F 3/00](#) to [G06F 13/00](#)**, { e.g. cooling, packaging or power supply specially adapted for computer application (security arrangements for protecting computers or computer systems against unauthorised activity [G06F 21/00](#))}

**G06F 1/02**

- Digital function generators {(evaluating functions by calculating only [G06F 7/544](#), [G06F 7/60](#); generating sawtooth or staircase waveforms [H03K 4/00](#))}

**G06F 1/022**

- [N: Waveform generators, i.e. devices for generating periodical functions of time, e.g. direct digital synthesizers ([G06F 1/025](#), [G06F 1/03](#) take precedence)

**G06F 1/025**

- for functions having two-valued amplitude, e.g. Walsh functions {(generation of pulse trains in general [H03K 3/00](#))}

**G06F 1/0255**

- {Walsh or analogous functions}

**G06F 1/03**

- working, at least partly, by table look-up ([G06F 1/025](#) takes precedence)]

**NOTE**

In order to be classified in this group, the table must contain function values of the desired or an intermediate function, not merely coefficients.

**G06F 1/0307**

- {Logarithmic or exponential functions ([G06F 1/0314](#), [G06F 1/035](#) take precedence)}

- G06F 1/0314 . . . {the table being stored on a peripheral device, e.g. papertape, drum}
- G06F 1/0321 . . . {Waveform generators, i.e. devices for generating periodical functions of time, e.g. direct digital synthesizers ([G06F 1/0314](#), [G06F 1/035](#) take precedence)}
- G06F 1/0328 . . . . {in which the phase increment is adjustable, e.g. by using an adder-accumulator}
- G06F 1/0335 . . . . . {the phase increment itself being a composed function of two or more variables, e.g. frequency and phase}
- G06F 1/0342 . . . . {for generating simultaneously two or more related waveforms, e.g. with different phase angles only}
- G06F 1/035 . . . Reduction of table size {([G06F 1/0314](#) takes precedence)}
- G06F 1/0353 . . . . {by using symmetrical properties of the function, e.g. using most significant bits for quadrant control}
- G06F 1/0356 . . . . {by using two or more smaller tables, e.g. addressed by parts of the argument}
  
- G06F 1/04 . . Generating or distributing clock signals or signals derived directly therefrom
- G06F 1/06 . . Clock generators producing several clock signals {([G06F 1/08](#) to [G06F 1/14](#) take precedence)}
- G06F 1/08 . . Clock generators with changeable or programmable clock frequency
- G06F 1/10 . . Distribution of clock signals {e.g. skew}
- G06F 1/105 . . . {in which the distribution is at least partially optical}
- G06F 1/12 . . Synchronisation of different clock signals {provided by a plurality of clock generators}
- G06F 1/14 . . Time supervision arrangements, e.g. real time clock
  
- G06F 1/16 . . Constructional details or arrangements ([instrument details G12B](#))
- G06F 1/1601 . . { Constructional details related to the housing of computer displays, e.g. of CRT monitors, of flat displays (constructional details related to flat displays integrated in a portable computer, e.g. laptop, handheld computer [G06F 1/1637](#); constructional details related to television receivers [H04N 5/64](#))}
- G06F 1/1603 . . . {Arrangements to protect the display from incident light, e.g. hoods}
- G06F 1/1605 . . . {Multimedia displays, e.g. with integrated or attached speakers, cameras, microphones}
- G06F 1/1607 . . . {Arrangements to support accessories mechanically attached to the display housing ([G06F 1/1603](#), [G06F 1/1605](#) take precedence)}
- G06F 1/1609 . . . . {to support filters or lenses}
- G06F 1/1611 . . . . {to support document holders}
- G06F 1/1613 . . { for portable computers (cooling arrangements therefor [G06F 1/203](#); constructional details or arrangements for pocket calculators, electronic agendas or books [G06F 15/0216](#); constructional details of portable telephone sets: with several bodies [H04M 1/0202](#))}
- G06F 1/1615 . . . { with several enclosures having relative motions, each enclosure supporting at least one I/O or computing function (constructional details of portable telephones comprising a plurality of mechanically joined movable body parts [H04M 1/0206](#))}
- G06F 1/1616 . . . . { with folding flat displays, e.g. laptop computers or notebooks having a clamshell configuration, with body parts pivoting to an open position around an axis parallel to the plane they define in closed position}
- G06F 1/1618 . . . . . { the display being foldable up to the back of the other housing with a

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|             |       | single degree of freedom, e.g. by 360° rotation over the axis defined by the rear edge of the base enclosure} [1012]   |
| G06F 1/162  | ..... | { changing, e.g. reversing, the face orientation of the screen with a two degrees of freedom mechanism, e.g. for folding into tablet PC like position or orienting towards the direction opposite to the user to show to a second user}  |
| G06F 1/1622 | ....  | { with enclosures rotating around an axis perpendicular to the plane they define or with ball-joint coupling, e.g. PDA with display enclosure orientation changeable between portrait and landscape by rotation with respect to a coplanar body enclosure }  |
| G06F 1/1624 | ....  | { with sliding enclosures, e.g. sliding keyboard or display}   |
| G06F 1/1626 | ...   | { with a single-body enclosure integrating a flat display, e.g. Personal Digital Assistants [PDAs]}  |
| G06F 1/1628 | ...   | {Carrying enclosures containing additional elements, e.g. case for a laptop and a printer}   |
| G06F 1/163  | ...   | {Wearable computers, e.g. on a belt}   |
| G06F 1/1632 | ...   | {External expansion units, e.g. docking stations}  |
| G06F 1/1633 | ...   | { Constructional details or arrangements of portable computers not specific to the type of enclosures covered by groups <a href="#">G06F 1/1615</a> to <a href="#">G06F 1/1626</a> }   |
| G06F 1/1635 | ..... | { Details related to the integration of battery packs and other power supplies such as fuel cells or integrated AC adapter (details of mounting batteries in general <a href="#">H01M 2/1022</a> )}  |
| G06F 1/1637 | ..... | { Details related to the display arrangement, including those related to the mounting of the display in the housing (constructional details related to the housing of computer displays in general <a href="#">G06F 1/1601</a> )}  |
| G06F 1/1639 | ..... | { the display being based on projection}   |
| G06F 1/1641 | ..... | { the display being formed by a plurality of foldable display components ( <a href="#">G06F 1/1647</a> takes precedence)}  |
| G06F 1/1643 | ..... | { the display being associated to a digitizer, e.g. laptops that can be used as penpads (touchpads integrated in a laptop or similar computer <a href="#">G06F 1/169</a> ; secondary touch screen <a href="#">G06F 1/1692</a> ; details related to the relative motion of the display enclosure with respect to the body enclosure; e.g. to move between laptop and tablet PC configuration <a href="#">G06F 1/1615</a> )}   |
| G06F 1/1645 | ..... | { the display being suitable to be used in combination with an external overhead projector}  |
| G06F 1/1647 | ..... | { including at least an additional display ( <a href="#">G06F 1/1692</a> takes precedence)}  |
| G06F 1/1649 | ..... | { the additional display being independently orientable, e.g. for presenting information to a second user}   |
| G06F 1/165  | ..... | { the additional display being small, e.g. for presenting status information}  |
| G06F 1/1652 | ..... | { the display being flexible, e.g. mimicking a sheet of paper, or rollable}  |
| G06F 1/1654 | ..... | { the display being detachable, e.g. for remote use}   |
| G06F 1/1656 | ..... | { Details related to functional adaptations of the enclosure, e.g. to provide protection against EMI, shock, water, or to host detachable peripherals like a mouse or removable expansions units like PCMCIA cards, or to provide access to internal components for maintenance or to removable storage supports like CDs or DVDs, or to mechanically mount accessories (mounting of accessories to a computer display <a href="#">G06F 1/1607</a> ; display hoods <a href="#">G06F 1/1603</a> ; cooling arrangements for portable computers <a href="#">G06F 1/203</a> )} |

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| G06F 1/1658 | ..... | { related to the mounting of internal components, e.g. disc drive or any other functional module}  |
| G06F 1/166  | ..... | { related to integrated arrangements for adjusting the position of the main body with respect to the supporting surface, e.g. legs for adjusting the tilt angle}   |
| G06F 1/1662 | ....  | { Details related to the integrated keyboard}  |
| G06F 1/1664 | ..... | { Arrangements for ergonomically adjusting the disposition of keys of the integrated keyboard }  |
| G06F 1/1666 | ..... | { Arrangements for reducing the size of the integrated keyboard for transport, e.g. foldable keyboards, keyboards with collapsible keys ( <a href="#">G06F 1/1664</a> takes precedence)}   |
| G06F 1/1667 | ..... | { Arrangements for adjusting the tilt angle of the integrated keyboard independently from the main body ( <a href="#">adjusting the tilt angle integrally with the main body G06F 1/166</a> )}   |
| G06F 1/1669 | ..... | { Detachable keyboards}  |
| G06F 1/1671 | ..... | { Special purpose buttons or auxiliary keyboards, e.g. retractable mini keypads, keypads or buttons that remain accessible at closed laptop ( <a href="#">G06F 1/1666</a> takes precedence)}   |
| G06F 1/1673 | ..... | { Arrangements for projecting a virtual keyboard}  |
| G06F 1/1675 | ....  | { Miscellaneous details related to the relative movement between the different enclosures or enclosure parts which could be adopted independently from the movement typologies specified in <a href="#">G06F 1/1615</a> and subgroups}   |
| G06F 1/1677 | ..... | { for detecting open or closed state or particular intermediate positions assumed by movable parts of the enclosure, e.g. detection of display lid position with respect to main body in a laptop, detection of opening of the cover of battery compartment}   |
| G06F 1/1679 | ..... | { for locking or maintaining the movable parts of the enclosure in a fixed position, e.g. latching mechanism at the edge of the display in a laptop or for the screen protective cover of a PDA ( <a href="#">G06F 1/1681</a> takes precedence)}   |
| G06F 1/1681 | ..... | { Details related solely to hinges ( <a href="#">hinge details related to the transmission of signals or power are classified in G06F 1/1683</a> )}  |
| G06F 1/1683 | ..... | { for the transmission of signal or power between the different housings, e.g. details of wired or wireless communication, passage of cabling}   |
| G06F 1/1684 | ....  | { Constructional details or arrangements related to integrated I/O peripherals not covered by groups <a href="#">G06F 1/1635</a> to <a href="#">G06F 1/1675</a> }  |
| G06F 1/1686 | ..... | { the I/O peripheral being an integrated camera}   |
| G06F 1/1688 | ..... | { the I/O peripheral being integrated loudspeakers}  |
| G06F 1/169  | ..... | { the I/O peripheral being an integrated pointing device, e.g. trackball in the palm rest area, mini-joystick integrated between keyboard keys, touch pads or touch stripes ( <a href="#">G06F 1/1643</a> takes precedence; <a href="#">constructional details of pointing devices G06F 3/033</a> ; <a href="#">joysticks in general G05G 9/047</a> )} |
| G06F 1/1692 | ..... | { the I/O peripheral being a secondary touch screen used as control interface, e.g. virtual buttons or sliders}  |
| G06F 1/1694 | ..... | { the I/O peripheral being a single or a set of motion sensors for pointer control or gesture input obtained by sensing movements of the portable computer}  |
| G06F 1/1696 | ..... | { the I/O peripheral being a printing or scanning device}  |
| G06F 1/1698 | ..... | { the I/O peripheral being a sending/receiving arrangement to establish a cordless communication link, e.g. radio or infrared link, integrated cellular  |

- phone (details of antennas disposed inside a computer [H01Q 1/2266](#))}
- G06F 1/18 .. Packaging or power distribution {(for electrical apparatus in general [H05K](#), [H02J](#))}
- G06F 1/181 ... {Enclosures (for electric apparatus in general [H05K 5/00](#); for portable computers [G06F 1/1613](#))}
- G06F 1/182 ..... { with special features, e.g. for use in industrial environments; grounding or shielding against radio frequency interference (RFI) or electromagnetic interference (EMI) (in general [H05K 9/00](#))}
- G06F 1/183 ... {Internal mounting support structures, e.g. for printed circuit boards (in general [H05K 7/1422](#)), internal connecting means (for buses [G06F 13/409](#))}
- G06F 1/184 ..... { Mounting of motherboards (in general [H05K 7/1429](#))}
- G06F 1/185 ..... { Mounting of expansion boards (in general [H05K 7/1417](#))}
- G06F 1/186 ..... { Securing of expansion boards in correspondence to slots provided at the computer enclosure (in general [H05K 7/1402](#))}
- G06F 1/187 ..... { Mounting of fixed and removable disk drives (constructional details of disk drives housings in general [G11B 33/00](#))}
- G06F 1/188 ..... { Mounting of power supply units (power supply for computers, per se [G06F 1/26](#))}
- G06F 1/189 ... {Power distribution}
- G06F 1/20 .. Cooling means
- G06F 1/203 ... {for portable computers, e.g. for laptops}
- G06F 1/206 ... {comprising thermal management}
- G06F 1/22 . Means for limiting or controlling the pin/gate ratio
- G06F 1/24 . Resetting means (micro-programme loading [G06F 9/24](#); restoration from data faults [G06F 11/00](#))
- G06F 1/26 . Power supply means, e.g. regulation thereof (for memories [G11C](#); { regulation in general [G05F](#)})
- G06F 1/263 .. {Arrangements for using multiple switchable power supplies, e.g. battery and AC ([G06F 1/30](#) takes precedence)}
- G06F 1/266 .. {Arrangements to supply power to external peripherals either directly from the computer or under computer control, e.g. supply of power through the communication port, computer controlled power-strips}
- G06F 1/28 .. Supervision thereof, e.g. detecting power-supply failure by out of limits supervision
- G06F 1/30 .. Means for acting in the event of power-supply failure or interruption, e.g. power-supply fluctuations (for resetting only [G06F 1/24](#); involving the processing of data-words [G06F 11/00](#))
- G06F 1/305 ... {in the event of power-supply fluctuations}

### **WARNING**

Not complete, see also [G06F 1/30](#)

- G06F 1/32 .. Means for saving power
- G06F 1/3203 ... {Power Management, i.e. event-based initiation of power-saving mode}
- G06F 1/3206 ..... { Monitoring a parameter, a device or an event triggering a change in power modality}
- G06F 1/3209 ..... { Monitoring remote activity, e.g. over telephone line, network connection}

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| G06F 1/3212 | ..... | { Monitoring battery level, i.e. power saving action initiated when battery voltage goes below a certain level}      |
| G06F 1/3215 | ..... | { Monitoring of peripheral devices}  |
| G06F 1/3218 | ..... | { of display devices}  |
| G06F 1/3221 | ..... | { of disk drive devices}   |
| G06F 1/3225 | ..... | { of memory devices}   |
| G06F 1/3228 | ..... | { Monitoring task completion, e.g. by use of idle timer, STOP command, WAIT command}                                 |
| G06F 1/3231 | ..... | { Monitoring user presence or absence}   |
| G06F 1/3234 | ..... | { Action, measure or step performed to reduce power consumption}   |
| G06F 1/3237 | ..... | { Power saving by disabling clock generation or distribution}  |
| G06F 1/324  | ..... | { Power saving by lowering clock frequency}  |
| G06F 1/3243 | ..... | { Power saving in micro controller unit}   |
| G06F 1/3246 | ..... | { Power saving by software initiated power-off}  |
| G06F 1/325  | ..... | { Power saving in peripheral device}   |
| G06F 1/3253 | ..... | { Power saving in bus}   |
| G06F 1/3256 | ..... | { Power saving in optical drive}   |
| G06F 1/3259 | ..... | { Power saving in cursor control device, e.g. mouse, joystick, trackball}  |
| G06F 1/3262 | ..... | { Power saving in digitizer or tablet}   |
| G06F 1/3265 | ..... | { Power saving in display device}  |
| G06F 1/3268 | ..... | { Power saving in hard disk drive}   |
| G06F 1/3271 | ..... | { Power saving in keyboard}  |
| G06F 1/3275 | ..... | { Power saving in memory, e.g. RAM, cache}   |
| G06F 1/3278 | ..... | { Power saving in modem or I/O interface}  |
| G06F 1/3281 | ..... | { Power saving in PCMCIA card}   |
| G06F 1/3284 | ..... | { Power saving in printer}   |
| G06F 1/3287 | ..... | { Power saving by switching off individual functional units in a computer system, i.e. selective power distribution} |
| G06F 1/329  | ..... | { Power saving by task scheduling}   |
| G06F 1/3293 | ..... | { Power saving by switching to a less power consuming processor, e.g. sub-CPU}                                       |
| G06F 1/3296 | ..... | { Power saving by lowering supply or operating voltage}  |

**G06F 3/00**      **Input arrangements for transferring data to be processed into a form capable of being handled by the computer; Output arrangements for transferring data from processing unit to output unit, e.g. interface arrangements** (typewriters [B41J](#); conversion of physical variables [F15B 5/00](#), [G01](#); image acquisition [G06T 1/00](#), [G06F 9/00](#); coding, decoding or code conversion in general [H03M](#) ; transmission of digital information [H04L](#); { in regulating or control systems [G05B](#)})

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| G06F 3/002 | .  | [N: Specific input/output arrangements not covered by <a href="#">G06F 3/02</a> to <a href="#">G06F 3/16</a> , e.g. facsimile, microfilm (facsimile per se <a href="#">H04N 1/00</a> ; viewers photographic printing <a href="#">G03B</a> ; electrography, magnetography <a href="#">G03G</a> ; other optical apparatus <a href="#">G02B 27/00</a> ) |
| G06F 3/005 | .. | {Input arrangements through a video camera}  |
| G06F 3/007 | .  | { Digital input from or digital output to memories of the shift register type, e.g. magnetic   |

bubble memories, CCD memories (magnetic bubble memories per se [G11C 19/08](#),  
CCD memories per se [G11C 19/28](#))}

- G06F 3/01 . Input arrangements or combined input and output arrangements for interaction between user and computer ([G06F 3/16](#) takes precedence)
- G06F 3/011 .. { Arrangements for interaction with the human body, e.g. for user immersion in virtual reality (for handicapped people in general [A61F 4/00](#); robot control [B25J](#); tactile signalling [G08B](#); blind teaching [G09B 21/00](#); for electrophonic musical instruments [G10H 1/344](#); electronic switches characterised by the way in which the control signals are generated [H03K 17/94](#))}
- G06F 3/012 ... { Head tracking input arrangements}
- G06F 3/013 ... { Eye tracking input arrangements ([G06F 3/015](#) takes precedence)}
- G06F 3/014 ... { Hand-worn input/output arrangements, e.g. data gloves}
- G06F 3/015 ... { Input arrangements based on nervous system activity detection, e.g. brain waves (EEG) detection, electromyograms (EMG) detection, electrodermal response detection}
- G06F 3/016 .. { Input arrangements with force or tactile feedback as computer generated output to the user}
- G06F 3/017 .. { Gesture based interaction, e.g. based on a set of recognized hand gestures (interaction based on gestures traced on a digitiser [G06F 3/048A3G](#))}
- G06F 3/018 .. { Input/output arrangements for oriental characters}
- G06F 3/02 .. Input arrangements using manually operated switches, e.g. using keyboards or dials (keyboard switches per se [H01H 13/70](#); electronic switches characterised by the way in which the control signals are generated [H03K 17/94](#))
- G06F 3/0202 ... { Constructional details or processes of manufacture of the input device}
- G06F 3/0205 .... { Lever arrangements for operating keyboard cursor control keys in a joystick-like manner}
- G06F 3/0208 .... { Arrangements for adjusting the tilt angle of a keyboard, e.g. pivoting legs (for keyboards integrated in a laptop computer [G06F 1/1667](#))}
- G06F 3/021 .... { Arrangements integrating additional peripherals in a keyboard, e.g. card or barcode reader, optical scanner}
- G06F 3/0213 ..... { Arrangements providing an integrated pointing device in a keyboard, e.g. trackball, mini-joystick (for pointing devices integrated in a laptop computer [G06F 1/169](#); joysticks [G05G 9/047](#); constructional details of pointing devices [G06F 3/033](#))}
- G06F 3/0216 .... { Arrangements for ergonomically adjusting the disposition of keys of a keyboard (for keyboards integrated in a laptop computer [G06F 1/1664](#))}
- G06F 3/0219 .... { Special purpose keyboards}
- G06F 3/0221 .... { Arrangements for reducing keyboard size for transport or storage, e.g. foldable keyboards, keyboards with collapsible keys ([G06F 3/0216](#) takes precedence; for keyboards integrated in a laptop computer [G06F 1/1666](#))}
- G06F 3/0224 .... { Key guide holders}
- G06F 3/0227 ... { Cooperation and interconnection of the input arrangement with other functional units of a computer ([G06F 3/023](#) to [G06F 3/037](#) take precedence)}
- G06F 3/023 .. Arrangements for converting discrete items of information into a coded form, e.g. arrangements for interpreting keyboard generated codes as alphanumeric codes, operand codes or instruction codes (coding in connection with keyboards or like devices in general [H03M 11/00](#))}
- G06F 3/0231 .... { Cordless keyboards}

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| G06F 3/0232  | ....  | { Manual direct entries, e.g. key to main memory}   |
| G06F 3/0233  | ....  | { Character input methods}  |
| G06F 3/0234  | ..... | { using switches operable in different directions}  |
| G06F 3/0235  | ..... | { using chord techniques ( <a href="#">G06F 3/0234</a> takes precedence)}   |
| G06F 3/0236  | ..... | { using selection techniques to select from displayed items}  |
| G06F 3/0237  | ..... | { using prediction or retrieval techniques}   |
| G06F 3/0238  | ....  | { Programmable keyboards (key guide holders <a href="#">G06F 3/0224</a> )}  |
| G06F 3/027   | ....  | for insertion of decimal point {(display of decimal point <a href="#">G06F 3/1407</a> ;<br>complete desk- top or hand- held calculators <a href="#">G06F 15/02</a> )}   |
| G06F 3/03  | ..    | Arrangements for converting the position or the displacement of a member into a coded form  |
| G06F 3/0304  | ...   | { Detection arrangements using opto-electronic means (constructional details of pointing devices not related to the detection arrangement using opto-electronic means <a href="#">G06F 3/033</a> and subgroups; optical digitisers <a href="#">G06F 3/042</a> )}  |
| <b><u>WARNING</u></b>  |       |   |
| Groups <a href="#">G06F 3/0304</a> and <a href="#">G06F 3/0317</a> are not complete, pending a reorganisation. See also <a href="#">G06F 3/042</a> and subgroups |       |   |
| G06F 3/0308  | ....  | { comprising a plurality of distinctive and separately oriented light emitters or reflectors associated to the pointing device, e.g. remote cursor controller with distinct and separately oriented LEDs at the tip whose radiations are captured by a photo-detector associated to the screen}   |
| G06F 3/0312  | ....  | { for tracking the rotation of a spherical or circular member, e.g. optical rotary encoders used in mice or trackballs using a tracking ball or in mouse scroll wheels (tracking relative movement in co-operation with a regularly or irregularly patterned surface, e.g. as in optical mice <a href="#">G06F 3/0317</a> ;<br>constructional details of scroll or thumb-wheels <a href="#">G06F 3/033L</a> ; optical rotary encoders <a href="#">G01D 5/3473</a> ; thumb wheel switches <a href="#">H01H 19/001</a> )} |
| G06F 3/0317  | ....  | { in co-operation with a patterned surface, e.g. absolute position or relative movement detection for an optical mouse or pen positioned with respect to a coded surface}   |
| G06F 3/0321  | ..... | { by optically sensing the absolute position with respect to a regularly patterned surface forming a passive digitiser, e.g. pen optically detecting position indicative tags printed on a paper sheet (constructional details of pen-shaped pointing devices <a href="#">G06F 3/033P2</a> , <a href="#">G06F 3/033P3</a> , <a href="#">G06F 3/037</a> )}   |
| G06F 3/0325  | ....  | { using a plurality of light emitters or reflectors or a plurality of detectors forming a reference frame from which to derive the orientation of the object, e.g. by triangulation or on the basis of reference deformation in the picked up image}  |
| G06F 3/033   | ...   | Pointing devices displaced or positioned by the user, e.g. mice, trackballs, pens or joysticks; Accessories therefor {(constructional details of joysticks <a href="#">G05G 9/047</a> ; arrangement for interfacing a joystick to a computer <a href="#">G06F 3/038</a> )}  |
| G06F 3/0334  | ....  | { Foot operated pointing devices}   |
| G06F 3/0338  | ....  | with detection of limited linear or angular displacement of an operating part of the device from a neutral position, e.g. isotonic or isometric joysticks   |
| G06F 3/0346  | ....  | with detection of the device orientation or free movement in a 3D space, e.g. 3D mice, 6-DOF [six degrees of freedom] pointers using gyroscopes, accelerometers or tilt-sensors   |

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| G06F 3/0354  | ....  | with detection of 2D relative movements between the device, or an operating part thereof, and a plane or surface, e.g. 2D mice, trackballs, pens or pucks  |
| G06F 3/03541 | ..... | { Mouse/trackball convertible devices, in which the same ball is used to track the 2D relative movement}   |
| G06F 3/03542 | ..... | { Light pens for emitting or receiving light}  |
| G06F 3/03543 | ..... | { Mice or pucks ( <a href="#">G06F 3/03541</a> takes precedence)}  |
| G06F 3/03544 | ..... | { having dual sensing arrangement, e.g. two balls or two coils used to track rotation of the pointing device}  |
| G06F 3/03545 | ..... | { Pens or stylus}  |
| G06F 3/03546 | ..... | { using a rotatable ball at the tip as position detecting member}  |
| G06F 3/03547 | ..... | { Touch pads, in which fingers can move on a surface}  |
| G06F 3/03548 | ..... | { Sliders, in which the moving part moves in a plane}  |
| G06F 3/03549 | ..... | { Trackballs ( <a href="#">G06F 3/03541</a> takes precedence)}   |
| G06F 3/0362  | ....  | with detection of 1D translations or rotations of an operating part of the device, e.g. scroll wheels, sliders, knobs, rollers or belts  |
| G06F 3/037   | ....  | using the raster scan of a cathode-ray tube (CRT) for detecting the position of the member, e.g. light pens cooperating with CRT monitors  |
| G06F 3/038   | ....  | Control and interface arrangements therefor, e.g. drivers or device-embedded control circuitry   |
| G06F 3/0383  | ..... | { Signal control means within the pointing device}   |
| G06F 3/0386  | ..... | { for light pen}   |
| G06F 3/039   | ....  | Accessories therefor, e.g. mouse pads ( <a href="#">furniture aspects A47B 21/00</a> )   |
| G06F 3/0395  | ..... | { Mouse pads}  |
| G06F 3/041   | ...   | Digitisers, e.g. for touch screens or touch pads, characterized by the transducing means   |
| G06F 3/0412  | ....  | {Integrated displays and digitisers}   |
| G06F 3/0414  | ....  | { using force sensing means}   |
| G06F 3/0416  | ....  | {Control and interface arrangements for touch screen}{WARNING: Not complete, see <a href="#">G06F 3/048A3</a> }  |
| G06F 3/0418  | ..... | { for error correction or compensation, e.g. parallax, calibration, alignment}   |
| G06F 3/042   | ....  | by opto-electronic means {(pens detecting optically their absolute position with respect to a coded surface <a href="#">G06F 3/0317</a> )}   |
| G06F 3/0421  | ..... | { by interrupting or reflecting a light beam, e.g. optical touch-screen}   |
| G06F 3/0423  | ..... | { using sweeping light beams, e.g. using rotating or vibrating mirror}   |
| G06F 3/0425  | ..... | { using a single imaging device like a video camera for tracking the absolute position of a single or a plurality of objects with respect to an imaged reference surface, e.g. video camera imaging a display or a projection screen, a table or a wall surface, on which a computer generated image is displayed or projected ( <a href="#">tracking a projected light spot to determine a position on a display surface G06F 3/0386</a> )} |
| G06F 3/0426  | ..... | { tracking fingers with respect to a virtual keyboard projected or printed on the surface ( <a href="#">virtual keyboards on touch screens G06F 3/048A3T</a> )}  |
| G06F 3/0428  | ..... | { by sensing at the edges of the touch surface the interruption of optical paths, e.g. an illumination plane, parallel to the touch surface which may be virtual ( <a href="#">sensing beam interruptions in a planar beam grid of an optical touch-screen G06F 3/0421</a> )}  |
| G06F 3/043   | ....  | using propagating acoustic waves   |

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| G06F 3/0433 | ..... | { in which the acoustic waves are either generated by a movable member and propagated within a surface layer or propagated within a surface layer and captured by a movable member} |
| G06F 3/0436 | ..... | { in which generating transducers and detecting transducers are attached to a single acoustic waves transmission substrate}   |
| G06F 3/044  | ....  | by capacitive means   |
| G06F 3/045  | ....  | using resistive elements, e.g. single continuous surface or two parallel surfaces put in contact  |
| G06F 3/046  | ....  | by electromagnetic means  |
| G06F 3/047  | ....  | using sets of wires, e.g. crossed wires   |
| G06F 3/048  | ..    | Interaction techniques based on graphical user interfaces [GUI]   |

**NOTE**

This group covers subject matter where the focus is placed on the way the user can interact with the displayed data. The mere presence of a standard GUI in the context of the disclosure of a specific software application or a specific device capable of processing data related to its specific function, should be in general classified in the appropriate subclasses related to those software applications or specific devices.

In this group, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its groups, which is considered to represent information of interest for search, should be classified in each of those groups.

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| G06F 3/0481  | ...   | based on specific properties of the displayed interaction object or a metaphor-based environment, e.g. interaction with desktop elements like windows or icons, or assisted by a cursor's changing behaviour or appearance  |
| G06F 3/04812 | ..... | { interaction techniques based on cursor appearance or behaviour being affected by the presence of displayed objects, e.g. visual feedback during interaction with elements of a graphical user interface through change in cursor appearance, constraint movement or attraction/repulsion with respect to a displayed object (interaction techniques based on cursor behaviour involving tactile or force feedback <a href="#">G06F 3/016</a> )} |
| G06F 3/04815 | ..... | { Interaction with three-dimensional environments, e.g. control of viewpoint to navigate in the environment}  |
| G06F 3/04817 | ..... | { using icons (graphical programming languages using iconic symbols <a href="#">G06F 8/34</a> )}  |
| G06F 3/0482  | ..... | interaction with lists of selectable items, e.g. menus  |
| G06F 3/0483  | ..... | interaction with page-structured environments, e.g. book metaphor   |
| G06F 3/0484  | ...   | for the control of specific functions or operations, e.g. selecting or manipulating an object or an image, setting a parameter value or selecting a range   |
| G06F 3/04842 | ..... | { Selection of a displayed object ( <a href="#">G06F 3/0482</a> takes precedence)}  |
| G06F 3/04845 | ..... | { for image manipulation, e.g. dragging, rotation}  |
| G06F 3/04847 | ..... | { Interaction techniques to control parameter settings, e.g. interaction with sliders, dials}   |
| G06F 3/0485  | ..... | Scrolling or panning  |
| G06F 3/04855 | ..... | { Interaction with scrollbars}  |
| G06F 3/0486  | ..... | Drag-and-drop   |

- G06F 3/0487 . . . using specific features provided by the input device, e.g. functions controlled by the rotation of a mouse with dual sensing arrangements, or of the nature of the input device, e.g. tap gestures based on pressure sensed by a digitiser
- G06F 3/0488 . . . . using a touch-screen or digitiser, e.g. input of commands through traced gestures
- G06F 3/04883 . . . . . { for entering handwritten data, e.g. gestures, text}
- G06F 3/04886 . . . . . { by partitioning the screen or tablet into independently controllable areas, e.g. virtual keyboards, menus ([G06F 3/04883](#) takes precedence)}
- G06F 3/0489 . . . . using dedicated keyboard keys or combinations thereof
- G06F 3/04892 . . . . . { Arrangements for controlling cursor position based on codes indicative of cursor displacements from one discrete location to another, e.g. using cursor control keys associated to different directions or using the tab key (arrangements for controlling cursor position based on coordinate signals [G06F 3/038](#))}
- G06F 3/04895 . . . . . { Guidance during keyboard input operation, e.g. prompting (help systems [G06F 9/4446](#))}
- G06F 3/04897 . . . . . { Special input arrangements or commands for improving display capability}
  
- G06F 3/05 . . . . . Digital input using the sampling of an analogue quantity at regular intervals of time, { input from a/d converter or output to d/a converter}(analogue- digital conversion per se [H03M 1/00](#); sampling per se [H03K 17/00](#); sample- and- hold arrangements per se [G11C 27/02](#))
  
- G06F 3/06 . . . . . Digital input from or digital output to record carriers, { e.g. RAID, emulated record carriers, networked record carriers (recording or reproducing devices per se [G11B](#); error detection, error correction, monitoring per se regarding storage systems [G06F11](#); accessing or addressing within memory systems or architectures [G06F12](#); information retrieval [G06F 17/30](#))}
  
- G06F 3/0601 . . . . . { Dedicated interfaces to storage systems}
- G06F 3/0602 . . . . . { specifically adapted to achieve a particular effect}
- G06F 3/0604 . . . . . { Improving or facilitating administration, e.g. storage management}
- G06F 3/0605 . . . . . { by facilitating the interaction with a user or administrator}
- G06F 3/0607 . . . . . { by facilitating the process of upgrading existing storage systems}
- G06F 3/0608 . . . . . { Saving storage space on storage systems}
- G06F 3/061 . . . . . { Improving I/O performance}
- G06F 3/0611 . . . . . { in relation to response time}
- G06F 3/0613 . . . . . { in relation to throughput}
- G06F 3/0614 . . . . . { Improving the reliability of storage systems}
- G06F 3/0616 . . . . . { in relation to life time, e.g. increasing Mean Time Between Failures (MTBF)}
- G06F 3/0617 . . . . . { in relation to availability}
- G06F 3/0619 . . . . . { in relation to data integrity, e.g. data losses, bit errors}
- G06F 3/062 . . . . . { Securing storage systems}
- G06F 3/0622 . . . . . { in relation to access}
- G06F 3/0623 . . . . . { in relation to content}
- G06F 3/0625 . . . . . { Power saving in storage systems}
- G06F 3/0626 . . . . . { Reducing size or complexity of storage systems}

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| G06F 3/0628 | ...   | { making use of a particular technique}  |
| G06F 3/0629 | ..... | { Configuration or reconfiguration of storage systems}   |
| G06F 3/0631 | ..... | { by allocating resources to storage systems}  |
| G06F 3/0632 | ..... | { by initialisation or re-initialisation of storage systems}   |
| G06F 3/0634 | ..... | { by changing the state or mode of one or more devices}  |
| G06F 3/0635 | ..... | { by changing the path, e.g. traffic rerouting, path reconfiguration}  |
| G06F 3/0637 | ..... | { Permissions}   |
| G06F 3/0638 | ....  | { Organizing or formatting or addressing of data}  |
| G06F 3/064  | ..... | { Management of blocks}  |
| G06F 3/0641 | ..... | { De-duplication techniques}   |
| G06F 3/0643 | ..... | { Management of files}   |
| G06F 3/0644 | ..... | { Management of space entities, e.g. partitions, extents, pools}   |
| G06F 3/0646 | ....  | { Horizontal data movement in storage systems, i.e. moving data in between storage devices or systems}                         |
| G06F 3/0647 | ..... | { Migration mechanisms}  |
| G06F 3/0649 | ..... | { Lifecycle management}  |
| G06F 3/065  | ..... | { Replication mechanisms}  |
| G06F 3/0652 | ..... | { Erasing, e.g. deleting, data cleaning, moving of data to a wastebasket}  |
| G06F 3/0653 | ....  | { Monitoring storage devices or systems}   |
| G06F 3/0655 | ....  | { Vertical data movement, i.e. input-output transfer; data movement between one or more hosts and one or more storage devices} |
| G06F 3/0656 | ..... | { Data buffering arrangements}   |
| G06F 3/0658 | ..... | { Controller construction arrangements}  |
| G06F 3/0659 | ..... | { Command handling arrangements, e.g. command buffers, queues, command scheduling}   |
| G06F 3/0661 | ..... | { Format or protocol conversion arrangements}  |
| G06F 3/0662 | ....  | { Virtualisation aspects}  |
| G06F 3/0664 | ..... | { at device level, e.g. emulation of a storage device or system}   |
| G06F 3/0665 | ..... | { at area level, e.g. provisioning of virtual or logical volumes}  |
| G06F 3/0667 | ..... | { at data level, e.g. file, record or object virtualisation}   |
| G06F 3/0668 | ...   | { adopting a particular infrastructure}  |
| G06F 3/067  | ....  | { Distributed or networked storage systems, e.g. storage area networks [SAN], network attached storage [NAS]}                  |
| G06F 3/0671 | ....  | { In-line storage system}  |
| G06F 3/0673 | ..... | { Single storage device}   |
| G06F 3/0674 | ..... | { Disk device}   |
| G06F 3/0676 | ..... | { Magnetic disk device}  |
| G06F 3/0677 | ..... | { Optical disk device, e.g. CD-ROM, DVD}   |
| G06F 3/0679 | ..... | { Non-volatile semiconductor memory device, e.g. flash memory, one time programmable memory [OTP]}                             |
| G06F 3/068  | ..... | { Hybrid storage device}   |
| G06F 3/0682 | ..... | { Tape device}   |
| G06F 3/0683 | ..... | { Plurality of storage devices}  |

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| G06F 3/0685 | ..... | { Hybrid storage combining heterogeneous device types, e.g. hierarchical storage, hybrid arrays}  |
| G06F 3/0686 | ..... | { Libraries, e.g. tape libraries, jukebox}  |
| G06F 3/0688 | ..... | { Non-volatile semiconductor memory arrays}   |
| G06F 3/0689 | ..... | { Disk arrays, e.g. RAID, JBOD}   |
| G06F 3/08   | ..    | from or to individual record carriers, e.g. punched card, { memory card, integrated circuit (IC) card, smart card (record carriers for use with machines and with at least a part designed to carry digital markings <a href="#">G06K 19/00</a> ; coded identity card or credit card with a coded signal <a href="#">G07F 7/10</a> )} |
| G06F 3/09   | .     | Digital output to typewriters   |
| G06F 3/12   | .     | Digital output to print unit, { e.g. line printer, chain printer}(digital output to typewriter <a href="#">G06F 3/09</a> ; printing of alphanumeric characters <a href="#">G06K 15/02</a> )   |
| G06F 3/1201 | ..    | { Dedicated interfaces to print systems}  |
| G06F 3/1202 | ...   | { specifically adapted to achieve a particular effect}  |
| G06F 3/1203 | ....  | { Improving or facilitating administration, e.g. print management}  |
| G06F 3/1204 | ..... | { resulting in reduced user or operator actions, e.g. presetting, automatic actions, using hardware token storing data}   |
| G06F 3/1205 | ..... | { resulting in increased flexibility in print job configuration, e.g. job settings, print requirements, job tickets}  |
| G06F 3/1206 | ..... | { resulting in increased flexibility in input data format or job format or job type}  |
| G06F 3/1207 | ..... | { resulting in the user being informed about print result after a job submission}   |
| G06F 3/1208 | ..... | { resulting in improved quality of the output result, e.g. print layout, colours, workflows, print preview}   |
| G06F 3/1209 | ..... | { resulting in adapted or bridged legacy communication protocols, e.g. emulation, protocol extension}   |
| G06F 3/121  | ....  | { Facilitating exception or error detection and recovery, e.g. fault, media or consumables depleted}  |
| G06F 3/1211 | ....  | { Improving printing performance}   |
| G06F 3/1212 | ..... | { achieving reduced delay between job submission and print start}   |
| G06F 3/1213 | ..... | { at an intermediate node or at the final node}   |
| G06F 3/1214 | ..... | { at the submitting node}   |
| G06F 3/1215 | ..... | { achieving increased printing speed, i.e. reducing the time between printing start and printing end}   |
| G06F 3/1217 | ..... | { achieving reduced idle time at the output device or increased asset utilization}  |
| G06F 3/1218 | ....  | { Reducing or saving of used resources, e.g. avoiding waste of consumables or improving usage of hardware resources}  |
| G06F 3/1219 | ..... | { with regard to consumables, e.g. ink, toner, paper}   |
| G06F 3/122  | ..... | { with regard to computing resources, e.g. memory, CPU}   |
| G06F 3/1221 | ..... | { with regard to power consumption}   |
| G06F 3/1222 | ....  | { Increasing security of the print job}   |
| G06F 3/1223 | ...   | { specifically adapted to use a particular technique}   |
| G06F 3/1224 | ....  | { Client or server resources management}  |

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| G06F 3/1225 | ..... | { Software update, e.g. print driver, modules, plug-ins, fonts}   |
| G06F 3/1226 | ..... | { Discovery of devices having required properties}  |
| G06F 3/1227 | ..... | { Printer definition files}   |
| G06F 3/1228 | ..... | { Printing driverless or using generic drivers}   |
| G06F 3/1229 | ....  | { Printer resources management or printer maintenance, e.g. device status, power levels}  |
| G06F 3/123  | ..... | { Software or firmware update, e.g. device firmware management}   |
| G06F 3/1231 | ..... | { Device related settings, e.g. IP address, Name, Identification}   |
| G06F 3/1232 | ..... | { Transmitting printer device capabilities, e.g. upon request or periodically}  |
| G06F 3/1234 | ..... | { Errors handling and recovery, e.g. reprinting ( <a href="#">G06F 3/1261</a> takes precedence)}  |
| G06F 3/1235 | ..... | { caused by end of consumables, e.g. paper, ink, toner}   |
| G06F 3/1236 | ....  | { Connection management}  |
| G06F 3/1237 | ....  | { Print job management}   |
| G06F 3/1238 | ..... | { Secure printing, e.g. user identification, user rights for device usage, unallowed content, blanking portions or fields of a page, releasing held jobs}       |
| G06F 3/1239 | ..... | { Restricting the usage of resources, e.g. usage or user levels, credit limit, consumables, special fonts}  |
| G06F 3/124  | ..... | { Parallel printing or parallel ripping}  |
| G06F 3/1241 | ..... | { Dividing a job according to job requirements, e.g. black/white and colour pages, covers and body of books, tabs}  |
| G06F 3/1242 | ..... | { Image or content composition onto a page}   |
| G06F 3/1243 | ..... | { Variable data printing, e.g. document forms, templates, labels, coupons, advertisements, logos, watermarks, transactional printing, fixed content versioning} |
| G06F 3/1244 | ..... | { Job translation or job parsing, e.g. page banding}  |
| G06F 3/1245 | ..... | { by conversion to intermediate or common format}   |
| G06F 3/1246 | ..... | { by handling markup languages, e.g. XSL, XML, HTML}  |
| G06F 3/1247 | ..... | { by conversion to printer ready format}  |
| G06F 3/1248 | ..... | { by printer language recognition, e.g. PDL, PCL, PDF}  |
| G06F 3/125  | ..... | { Page layout or assigning input pages onto output media, e.g. imposition}  |
| G06F 3/1251 | ..... | { for continuous media, e.g. web media, rolls}  |
| G06F 3/1252 | ..... | { for sheet based media}  |
| G06F 3/1253 | ..... | { Configuration of print job parameters, e.g. using UI at the client}   |
| G06F 3/1254 | ..... | { Automatic configuration, e.g. by driver}  |
| G06F 3/1255 | ..... | { Settings incompatibility, e.g. constraints, user requirements vs. device capabilities}  |
| G06F 3/1256 | ..... | { User feedback, e.g. print preview, test print, proofing, pre-flight checks}   |
| G06F 3/1257 | ..... | { by using pre-stored settings, e.g. job templates, presets, print styles}  |
| G06F 3/1258 | ..... | { by updating job settings at the printer}  |
| G06F 3/1259 | ..... | { Print job monitoring, e.g. job status}  |

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| G06F 3/126  | ..... | { Job scheduling, e.g. queuing, determine appropriate device}   |
| G06F 3/1261 | ..... | { by using alternate printing}  |
| G06F 3/1262 | ..... | { by grouping or ganging jobs}  |
| G06F 3/1263 | ..... | { based on job priority, e.g. re-arranging the order of jobs, e.g. the printing sequence}   |
| G06F 3/1264 | ..... | { by assigning post-processing resources}   |
| G06F 3/1265 | ..... | { Printing by reference, e.g. retrieving document/image data for a job from a source mentioned in the job}  |
| G06F 3/1267 | ..... | { Job repository, e.g. non-scheduled jobs, delay printing}  |
| G06F 3/1268 | ..... | { Job submission, e.g. submitting print job order or request not the print data itself}   |
| G06F 3/1269 | ..... | { by broadcasting server}   |
| G06F 3/127  | ..... | { by using hot folders, e.g. folder for which print settings or print data management rules are set in advance}   |
| G06F 3/1271 | ..... | { Job submission at the printing node, e.g. creating a job from a data stored locally or remotely ( <a href="#">G06F 3/1238</a> takes precedence)}  |
| G06F 3/1272 | ..... | { Digital storefront, e.g. e-ordering, web2print, submitting a job from a remote submission screen}   |
| G06F 3/1273 | ..... | { Print job history, e.g. logging, accounting, tracking}  |
| G06F 3/1274 | ..... | { Deleting of print job}  |
| G06F 3/1275 | ....  | { Print workflow management, e.g. defining or changing a workflow, cross publishing}  |
| G06F 3/1276 | ..... | { within a printer driver, e.g. driver resides either on a server or on a client}   |
| G06F 3/1277 | ..... | { using filter pipeline, e.g. outside the driver, adding traps}   |
| G06F 3/1278 | ...   | { specifically adapted to adopt a particular infrastructure}  |
| G06F 3/1279 | ....  | { Controller construction, e.g. aspects of the interface hardware}  |
| G06F 3/128  | ....  | { Direct printing, e.g. sending document file, using memory stick, printing from a camera}  |
| G06F 3/1281 | ....  | { Multi engine printer devices, e.g. one entity having multiple output engines}   |
| G06F 3/1282 | ....  | { High volume printer device}   |
| G06F 3/1284 | ....  | { Local printer device}   |
| G06F 3/1285 | ....  | { Remote printer device, e.g. being remote from client or server}   |
| G06F 3/1286 | ..... | { via local network}  |
| G06F 3/1287 | ..... | { via internet}   |
| G06F 3/1288 | ..... | { in client-server-printer device configuration}  |
| G06F 3/1289 | ..... | { in server-client-printer device configuration, e.g. the server does not see the printer}  |
| G06F 3/129  | ..... | { in server-printer device-client configuration, e.g. print flow goes from server to printer and then bidirectional from printer to client, i.e. the client does not communicate with the server} |
| G06F 3/1291 | ....  | { Pool of printer devices: self-managing printing devices in a network, e.g. without a server}  |
| G06F 3/1292 | ....  | { Mobile client, e.g. wireless printing}  |
| G06F 3/1293 | ..    | {Printer information exchange with computer}  |
| G06F 3/1294 | ...   | {Status or feedback related to information exchange}  |

- G06F 3/1295 . . . {Buffering means}
- G06F 3/1296 . . {Printer job scheduling or printer resource handling (**Allocation of resources to tasks G06F 9/46A2**)}
- G06F 3/1297 . . {Printer code translation, conversion, emulation, compression; Configuration of printer parameters}
- G06F 3/1298 . . . {Printer language recognition, e.g. programme control language, page description language}
  
- G06F 3/13 . . Digital output to plotter; { Cooperation and interconnection of the plotter with other functional units}
  
- G06F 3/14 . . Digital output to display device; { Cooperation and interconnection of the display device with other functional units}(control of display in general G09G; arrangements for producing a permanent visual presentation of the output data [G06K 15/00](#))
- G06F 3/1407 . . { General aspects irrespective of display type, e.g. determination of decimal point position, display with fixed or driving decimal point, suppression of non-significant zeros}
- G06F 3/1415 . . { with means for detecting differences between the image stored in the host and the images displayed on the displays}
- G06F 3/1423 . . { controlling a plurality of local displays, e.g. CRT and flat panel display}
- G06F 3/1431 . . . {using a single graphics controller}
- G06F 3/1438 . . . {using more than one graphics controller}
- G06F 3/1446 . . . {display composed of modules, e.g. video walls}
- G06F 3/1454 . . {involving copying of the display data of a local workstation or window to a remote workstation or window so that an actual copy of the data is displayed simultaneously on two or more displays, e.g. teledisplay}
- G06F 3/1462 . . . {with means for detecting differences between the image stored in the host and the images displayed on the remote displays}
- G06F 3/147 . . using display panels
- G06F 3/1475 . . . {with conversion of CRT control signals to flat panel control signals, e.g. adapting the palette memory}
- G06F 3/153 . . using cathode-ray tubes
  
- G06F 3/16 . . Sound input; Sound output (conversion of speech into digital information or vice versa [G10L](#))
- G06F 3/162 . . { Interface to dedicated audio devices, e.g. audio drivers, interface to CODECs}
- G06F 3/165 . . { Management of the audio stream, e.g. setting of volume, audio stream path}
- G06F 3/167 . . { Audio in a user interface, e.g. using voice commands for navigating, audio feedback}
  
- G06F 5/00**            **Methods or arrangements for data conversion without changing the order or content of the data handled (by coding or decoding [H03M](#))**
  
- G06F 5/01 . . for shifting, e.g. justifying, scaling, normalising {(digital stores in which the information is moved stepwise, e.g. shift-registers [G11C 19/00](#); digital stores in which the information circulates [G11C 21/00](#))}
- G06F 5/012 . . {in floating-point computations}
- G06F 5/015 . . {having at least two separately controlled shifting levels, e.g. using shifting matrices ([G06F 5/012](#) takes precedence)}

- G06F 5/017 .. {using recirculating storage elements}
- G06F 5/06 . for changing the speed of data flow, i.e. speed regularising{or timing, e.g. delay lines, FIFO buffers; over- or underrun control therefor; [G06F 7/78](#) takes precedence}
- G06F 5/065 .. {Partitioned buffers, e.g. allowing multiple independent queues, bidirectional FIFO`s}
- G06F 5/08 .. having a sequence of storage locations, the intermediate ones not being accessible for either enqueue or dequeue operations, e.g. using a shift register{[G06F 5/065](#) takes precedence; shift registers per se [G11C 19/00](#)}
- G06F 5/085 ... {in which the data is recirculated}
- G06F 5/10 .. having a sequence of storage locations each being individually accessible for both enqueue and dequeue operations, e.g. using random access memory{[G06F 5/065](#) takes precedence}
- G06F 5/12 ... Means for monitoring the fill level; Means for resolving contention, i.e. conflicts between simultaneous enqueue and dequeue operations
- G06F 5/14 .... for overflow or underflow handling, e.g. full or empty flags
- G06F 5/16 .. Multiplexed systems, i.e. using two or more similar devices that are alternately accessed for enqueue and dequeue operations, e.g. ping pong buffers

**G06F 7/00**      **Methods or arrangements for processing data by operating upon the order or content of the data handled (logic circuits [H03K 19/00](#))**

- G06F 7/02 . Comparing digital values ([G06F 7/06](#), {[G06F 7/22](#);}[G06F 7/38](#) take precedence; information retrieval [G06F 17/30](#); comparing pulses [H03K 5/22](#))
- G06F 7/023 .. {adaptive, e.g. self learning}
- G06F 7/026 .. {Magnitude comparison, i.e. determining the relative order of operands based on their numerical value, e.g. window comparator}

**WARNING**

Not complete. For documents published before July 1970 see also [G06F 7/02](#)

- G06F 7/06 . Arrangements for sorting, selecting, merging or comparing data on individual record carriers (sorting of postal letters [B07C](#); conveying record carriers from one station to another [G06K 13/02](#))
- G06F 7/08 .. Sorting, i.e. grouping record carriers in numerical or other ordered sequence according to the classification of at least some of the information they carry (by merging two or more sets of carriers in ordered sequence [G06F 7/16](#))
- G06F 7/10 .. Selecting, i.e. obtaining data of one kind from those record carriers which are identifiable by data of a second kind from a mass of ordered or randomly-distributed record carriers
- G06F 7/12 ... with provision for printing-out a list of selected items
- G06F 7/14 .. Merging, i.e. combining at least two sets of record carriers each arranged in the same ordered sequence to produce a single set having the same ordered sequence
- G06F 7/16 ... Combined merging and sorting
- G06F 7/20 .. Comparing separate sets of record carriers arranged in the same sequence to determine whether at least some of the data in one set is identical with that in the other set or sets

- G06F 7/22 . Arrangements for sorting or merging computer data on continuous record carriers, e.g. tape, drum, disc
- G06F 7/24 .. Sorting, i.e. extracting data from one or more carriers, rearranging the data in numerical or other ordered sequence, and rerecording the sorted data on the original carrier or on a different carrier or set of carriers {[sorting methods in general](#)}(G06F 7/36 takes precedence)
- G06F 7/26 ... the sorted data being recorded on the original record carrier within the same space in which the data had been recorded prior to their sorting, without using intermediate storage {contains no documents, see [G06F 7/24](#)}
- G06F 7/32 .. Merging, i.e. combining data contained in ordered sequence on at least two record carriers to produce a single carrier or set of carriers having all the original data in the ordered sequence {[merging methods in general](#)}(G06F 7/36 takes precedence)
- G06F 7/36 .. Combined merging and sorting
- G06F 7/38 . Methods or arrangements for performing computations using exclusively denominational number representation, e.g. using binary, ternary, decimal representation
- G06F 7/381 .. { using cryogenic components, e.g. Josephson gates}
- G06F 7/383 .. {using magnetic or similar elements (parametric and other resonant circuits [G06F 7/388](#))}
- G06F 7/385 ... {magnetic bubbles}
- G06F 7/386 ... {decimal, radix 20 or 12 ([G06F 7/385](#) takes precedence)}
- G06F 7/388 .. { using other various devices such as electro-chemical, microwave, surface acoustic wave, neuristor, electron beam switching, resonant, e.g. parametric, ferro-resonant}
- G06F 7/40 .. using contact- making devices, e.g. electro- magnetic relay ([G06F 7/46](#) takes precedence)
- G06F 7/405 ... {binary}
- G06F 7/42 ... Adding; Subtracting ([G06F 7/405](#) takes precedence)
- G06F 7/44 ... Multiplying; Dividing ([G06F 7/405](#) takes precedence)
- G06F 7/443 .... {by successive additions or subtractions}
- G06F 7/446 .... {by partial product forming (with electric multiplication table)}
- G06F 7/46 .. using electromechanical counter-type accumulators
- G06F 7/461 ... {Adding; subtracting}
- G06F 7/462 ... {Multiplying; dividing}
- G06F 7/463 .... {by successive additions or subtractions}
- G06F 7/465 .... {by partial product forming (with electric multiplication table)}
- G06F 7/466 .... {by successive multiplication or division by 2}
- G06F 7/467 .... {by using preset multiples of the multiplicand or the divisor}
- G06F 7/468 ... {for evaluating functions by calculation}
- G06F 7/48 .. using non-contact-making devices, e.g. tube, solid state device; using unspecified devices
- G06F 7/4806 ... {Computations with complex numbers}
- G06F 7/4812 .... {Complex multiplication}
- G06F 7/4818 .... {using coordinate rotation digital computer (CORDIC)}
- G06F 7/4824 ... {using signed-digit representation}

|             |       |  |
|-------------|-------|--|
| G06F 7/483  | ...   | Computations with numbers represented by a non-linear combination of denominational numbers, e.g. rational numbers, logarithmic number system, floating-point numbers ( <a href="#">conversion to or from floating-point codes H03M 7/24</a> ){( <a href="#">G06F 7/4806</a> , <a href="#">G06F 7/4824</a> , <a href="#">G06F 7/49</a> , <a href="#">G06F 7/491</a> , <a href="#">G06F 7/544</a> take precedence)} |
| G06F 7/4833 | ....  | { <a href="#">Logarithmic number system</a> }  |
| G06F 7/4836 | ....  | { <a href="#">Computations with rational numbers</a> }   |
| G06F 7/485  | ....  | Adding; Subtracting {( <a href="#">G06F 7/4833</a> , <a href="#">G06F 7/4836</a> take precedence)}   |
| G06F 7/487  | ....  | Multiplying; Dividing {( <a href="#">G06F 7/4833</a> , <a href="#">G06F 7/4836</a> take precedence)}   |
| G06F 7/4873 | ..... | { <a href="#">Dividing</a> }   |
| G06F 7/4876 | ..... | { <a href="#">Multiplying</a> }  |
| G06F 7/49   | ...   | Computations with a radix, other than binary, 8, 16 or decimal, e.g. ternary, negative or imaginary radices, mixed radix { <a href="#">non-linear PCM (G06F 7/4824</a> takes precedence)}  |

**WARNING**

Not complete. For radix 12 or 20 see provisionally also [G06F 7/491](#) and subgroups

|             |       |  |
|-------------|-------|--|
| G06F 7/491  | ...   | Computations with decimal numbers { radix 12 or 20. ( <a href="#">G06F 7/4824</a> takes precedence)}           |
| G06F 7/4912 | ....  | { <a href="#">Adding; Subtracting (G06F 7/492, G06F 7/498</a> take precedence)}                                |
| G06F 7/4915 | ....  | { <a href="#">Multiplying; Dividing (G06F 7/492, G06F 7/498</a> take precedence)}                              |
| G06F 7/4917 | ..... | { <a href="#">Dividing</a> }   |
| G06F 7/492  | ....  | using a binary weighted representation within each denomination { <a href="#">G06F 7/498</a> takes precedence} |
| G06F 7/4925 | ..... | { <a href="#">Adding; Subtracting (G06F 7/493</a> takes precedence)}   |
| G06F 7/493  | ..... | the representation being the natural binary coded representation, i.e. 8421-code                               |

**WARNING**

[G06F 7/491](#)

|            |       |                     |
|------------|-------|---------------------|
| G06F 7/494 | ..... | Adding; Subtracting |
|------------|-------|---------------------|

**WARNING**

[G06F 7/4912](#)

|            |       |  |
|------------|-------|--|
| G06F 7/495 | ..... | in digit-serial fashion, i.e. having a single digit-handling circuit treating all denominations after each other |
| G06F 7/496 | ..... | Multiplying; Dividing  |

**WARNING**

[G06F 7/491B](#), [G06F 7/4917](#)

|            |      |                                 |
|------------|------|---------------------------------|
| G06F 7/498 | .... | using counter-type accumulators |
|------------|------|---------------------------------|

|              |       |  |
|--------------|-------|--|
| G06F 7/4981  | ..... | { Adding; Subtracting}   |
| G06F 7/4983  | ..... | { Multiplying; Dividing}   |
| G06F 7/4985  | ..... | { by successive additions or subtractions}   |
| G06F 7/4986  | ..... | { by successive multiplication or division by 2}   |
| G06F 7/4988  | ..... | { by table look-up}  |
| G06F 7/499   | ...   | Denomination or exception handling, e.g. rounding, overflow { Note: documents published before 12-2005 are not systematically classified in the subgroups of <a href="#">G06F 7/499</a> : See the relevant subgroup of <a href="#">G06F 7/48</a> and the ICOs <b>S06F 7:499+</b> } |
| G06F 7/49905 | ....  | { Exception handling}  |
| G06F 7/4991  | ..... | { Overflow or underflow}   |
| G06F 7/49915 | ..... | { Mantissa overflow or underflow in handling floating-point numbers}   |
| G06F 7/49921 | ..... | { Saturation, i.e. clipping the result to a minimum or maximum value}  |
| G06F 7/49926 | ..... | { Division by zero}  |
| G06F 7/49931 | ....  | { Modulo N reduction of final result}  |
| G06F 7/49936 | ....  | { Normalisation mentioned as feature only}   |
| G06F 7/49942 | ....  | { Significance control}  |
| G06F 7/49947 | ..... | { Rounding}  |
| G06F 7/49952 | ..... | { Sticky bit}  |
| G06F 7/49957 | ..... | { Implementation of IEEE-754 Standard}   |
| G06F 7/49963 | ..... | { Rounding to nearest ( <a href="#">G06F 7/49957</a> takes precedence)}  |
| G06F 7/49968 | ..... | { Rounding towards positive infinity ( <a href="#">G06F 7/49957</a> takes precedence)}   |
| G06F 7/49973 | ..... | { Rounding towards negative infinity, e.g. truncation of two's complement numbers ( <a href="#">G06F 7/49957</a> takes precedence)}  |
| G06F 7/49978 | ..... | { Rounding towards zero ( <a href="#">G06F 7/49957</a> takes precedence)}  |
| G06F 7/49984 | ..... | { Rounding away from zero}   |
| G06F 7/49989 | ..... | { Interval arithmetic}   |
| G06F 7/49994 | ....  | { Sign extension}  |
| G06F 7/50    | ...   | Adding; Subtracting ( <a href="#">G06F 7/483</a> to <a href="#">G06F 7/491</a> , <a href="#">G06F 7/544</a> take precedence)   |
| G06F 7/501   | ....  | Half or full adders, i.e. basic adder cells for one denomination (EXCLUSIVE-OR circuits <a href="#">H03K 19/21</a> )   |
| G06F 7/5013  | ..... | { using algebraic addition of the input signals, e.g. Kirchhoff adders}  |
| G06F 7/5016  | ..... | { forming at least one of the output signals directly from the minterms of the input signals, i.e. with a minimum number of gate levels}   |
| G06F 7/502   | ..... | Half adders; Full adders consisting of two cascaded half adders ( <a href="#">G06F 7/5013</a> takes precedence)}   |
| G06F 7/503   | ..... | using carry switching, i.e. the incoming carry being connected directly, or only via an inverter, to the carry output under control of a carry propagate signal  |
| G06F 7/504   | ....  | in bit-serial fashion, i.e. having a single digit-handling circuit treating all denominations after each other   |
| G06F 7/5045  | ..... | { for multiple operands}   |
| G06F 7/505   | ....  | { in bit-parallel fashion, i.e. having a different digit-handling circuit for each denomination (half or full adders <a href="#">G06F 7/501</a> )}   |

|             |       |  |
|-------------|-------|--|
| G06F 7/5052 | ..... | { using carry completion detection, either over all stages or at sample stages only}   |
| G06F 7/5055 | ..... | { in which one operand is a constant, i.e. incrementers or decrementers}   |
| G06F 7/5057 | ..... | [N: using table look-up; using programmable logic arrays ( <a href="#">G06F 7/509</a> takes precedence)  |
| G06F 7/506  | ..... | with simultaneous carry generation for, or propagation over, two or more stages  |
| G06F 7/507  | ..... | using selection between two conditionally calculated carry or sum values   |
| G06F 7/508  | ..... | using carry look-ahead circuits  |
| G06F 7/509  | ..... | for multiple operands, e.g. digital integrators  |
| G06F 7/5095 | ..... | { word-serial, i.e. with an accumulator-register}  |
| G06F 7/52   | ...   | Multiplying; Dividing ( <a href="#">G06F 7/483</a> to <a href="#">G06F 7/491</a> , <a href="#">G06F 7/544</a> take precedence)   |
| G06F 7/523  | ....  | Multiplying only   |
| G06F 7/5235 | ..... | { using indirect methods, e.g. quarter square method, via logarithmic domain}  |
| G06F 7/525  | ..... | in serial-serial fashion, i.e. both operands being entered serially ( <a href="#">G06F 7/533</a> takes precedence)   |
| G06F 7/527  | ..... | in serial-parallel fashion, i.e. one operand being entered serially and the other in parallel ( <a href="#">G06F 7/533</a> takes precedence)   |
| G06F 7/5272 | ..... | { with row wise addition of partial products}  |
| G06F 7/5275 | ..... | { using carry save adders}   |
| G06F 7/5277 | ..... | { with column wise addition of partial products}   |
| G06F 7/53   | ..... | in parallel-parallel fashion, i.e. both operands being entered in parallel ( <a href="#">G06F 7/533</a> takes precedence)  |
| G06F 7/5306 | ..... | { with row wise addition of partial products ( <a href="#">G06F 7/5324</a> takes precedence)}  |
| G06F 7/5312 | ..... | { using carry save adders}   |
| G06F 7/5318 | ..... | { with column wise addition of partial products, e.g. using Wallace tree, Dadda counters ( <a href="#">G06F 7/5324</a> takes precedence)}  |
| G06F 7/5324 | ..... | { partitioned, i.e. using repetitively a smaller parallel parallel multiplier or using an array of such smaller multipliers}   |
| G06F 7/533  | ..... | Reduction of the number of iteration steps or stages, e.g. using the Booth algorithm, log-sum, odd-even  |
| G06F 7/5332 | ..... | { by skipping over strings of zeroes or ones, e.g. using the Booth Algorithm}  |
| G06F 7/5334 | ..... | { by using multiple bit scanning, i.e. by decoding groups of successive multiplier bits in order to select an appropriate precalculated multiple of the multiplicand as a partial product} |
| G06F 7/5336 | ..... | { overlapped, i.e. with successive bitgroups sharing one or more bits being recoded into signed digit representation, e.g. using the Modified Booth Algorithm}                             |
| G06F 7/5338 | ..... | { each bitgroup having two new bits, e.g. 2nd order MBA}   |
| G06F 7/535  | ....  | Dividing only  |
| G06F 7/537  | ..... | Reduction of the number of iteration steps or stages, e.g. using the Sweeny-Robertson-Tocher (SRT) algorithm { not used, see <a href="#">G06F 7/535</a> or <a href="#">G06F 7/5375</a> }   |
| G06F 7/5375 | ..... | { Non restoring calculation, where each digit is either negative, zero or  |

- positive, e.g. SRT; WARNING: Not complete. Provisionally see  
[G06F 7/535](#) + **S06F 7:537S** }
- G06F 7/544 . . . for evaluating functions by calculation ([G06F 7/4824](#) take precedence); with a look-up table [G06F 1/02](#); [N: complex mathematical operations [G06F 17/10](#)]
- G06F 7/5443 . . . . {Sum of products (for applications thereof, see the relevant places, e.g. [G06F 17/10](#), [H03H 17/00](#))}
- G06F 7/5446 . . . . {using crossaddition algorithms, e.g. CORDIC}
- G06F 7/548 . . . . Trigonometric functions; Co-ordinate transformations
- G06F 7/552 . . . . Powers or roots, {e.g. Pythagorean sums}
- G06F 7/5525 . . . . . {Roots or inverse roots of single operands}
- G06F 7/556 . . . . Logarithmic or exponential functions
- G06F 7/57 . . . Arithmetic logic units (ALU), i.e. arrangements or devices for performing two or more of the operations covered by groups [G06F 7/483-G06F 7/556](#) or for performing logical operations (instruction execution [G06F 9/30](#)){[G06F 7/49](#), [G06F 7/491](#) take precedence (logic gate circuits [H03K 19/00](#))}
- G06F 7/575 . . . . Basic arithmetic logic units, i.e. devices selectable to perform either addition, subtraction or one of several logical operations, using, at least partially, the same circuitry
- G06F 7/58 . . . Random or pseudo-random number generators {(random pulse generators [H03K 3/84](#); secret telegraphic communication [H04L 9/00](#); lottery apparatus [G07C 15/00](#))}
- G06F 7/582 . . . {Pseudo-random number generators}
- G06F 7/584 . . . {using finite field arithmetic, e.g. using a linear feedback shift register}
- G06F 7/586 . . . {using an integer algorithm, e.g. using linear congruential method}
- G06F 7/588 . . . {Random number generators, i.e. based on natural stochastic processes}
- G06F 7/60 . . . Methods or arrangements for performing computations using a digital non-denominational number representation, i.e. number representation without radix; Computing devices using combinations of denominational and non-denominational quantity representations, { e.g. using difunction pulse trains, STEELE computers, phase computers (conversion of digital data to or from non-denominational form [H03M 5/00](#), [H03M 7/00](#))}
- WARNING**
- Not complete: for computing devices using combinations of denominational and non-denominational quantity representations see also [G06F 7/62](#)
- G06F 7/602 . . . { using delta-sigma sequences}
- G06F 7/605 . . . {Additive or subtractive mixing of two pulse rates into one (beat-frequency oscillators [H03B 21/00](#); input circuits of electric counters, e.g. up-down counters [H03K 21/00](#))}
- G06F 7/607 . . . {number-of-ones counters, i.e. devices for counting the number of input lines set to ONE among a plurality of input lines, also called bit counters or parallel counters(for applications thereof, see the relevant places, e.g. [G06F 7/49](#), [G06F 7/5013](#), [G06F 7/509](#), [H03M 1/00](#), [H03M 7/20](#))}
- G06F 7/62 . . . Performing operations exclusively by counting total number of pulses; {Multiplication, division or derived operations using combined denominational and incremental processing by counters, i.e. without column shift ([G06F 7/68](#) takes precedence)}

- G06F 7/64 .. Digital differential analysers, i.e. computing devices for differentiation, integration or solving differential or integral equations, using pulses representing increments; Other incremental computing devices for solving difference equations ([G06F 7/70](#) takes precedence; differential analysers using hybrid computing techniques [G06J 1/02](#)){DDA application in numerical control [G05B 19/18](#)}
- G06F 7/66 ... wherein pulses represent unitary increments only
- G06F 7/68 .. using pulse rate multipliers or dividers {pulse rate multipliers or dividers per se}{([G06F 7/70](#) takes precedence)}{(frequency division in electronic watches [G04G 3/02](#); frequency multiplication or division in oscillators [H03B 19/00](#); frequency dividing counters per se [H03K 23/00](#) to [H03K 29/00](#))}
- G06F 7/70 .. using stochastic pulse trains, i.e. randomly occurring pulses the average pulse rates of which represent numbers {(conversion of analogue signals into stochastic pulse trains and vice-versa [H03M 1/04](#))}
- G06F 7/72 .. using residue arithmetic
- G06F 7/721 ... {Modular inversion, reciprocal or quotient calculation ([G06F 7/724](#), [G06F 7/727](#), [G06F 7/728](#) take precedence)}
- G06F 7/722 ... {Modular multiplication ([G06F 7/724](#), [G06F 7/727](#), [G06F 7/728](#) take precedence)}
- G06F 7/723 ... {Modular exponentiation ([G06F 7/724](#)), ([G06F 7/727](#)), ([G06F 7/728](#) take precedence)}
- G06F 7/724 ... {Finite field arithmetic (for error detection or correction in general [H03M 13/00](#), in computers [G06F 11/10](#))}
- G06F 7/725 .... {over elliptic curves}
- G06F 7/726 .... {Inversion; Reciprocal calculation; Division of elements of a finite field}
- G06F 7/727 ... {Modulo N arithmetic, with N being either  $(2^{**}n)-1$ ,  $2^{**}n$  or  $(2^{**}n)+1$ , e.g. mod 3, mod 4 or mod 5 ([G06F 7/728](#) takes precedence)}
- G06F 7/728 ... {using Montgomery reduction}
- G06F 7/729 ... {using representation by a residue number system}
- G06F 7/74 . Selecting or encoding within a word the position of one or more bits having a specified value, e.g. most or least significant one or zero detection, priority encoders{(with shifting [G06F 5/01](#))}
- G06F 7/76 . Arrangements for rearranging, permuting or selecting data according to predetermined rules, independently of the content of the data (according to the content of the data [G06F 7/06](#), [G06F 7/22](#); parallel / series conversion or vice versa [H03M 9/00](#))
- G06F 7/762 .. { having at least two separately controlled rearrangement levels, e.g. multistage interconnection networks ([G06F 7/764](#) to [G06F 7/768](#) take precedence)}
- G06F 7/764 .. { Masking}
- G06F 7/766 .. { Generation of all possible permutations}
- G06F 7/768 .. { Data position reversal, e.g. bit reversal, byte swapping}
- G06F 7/78 .. for changing the order of data flow, e.g. matrix transposition, LIFO buffers; Overflow or underflow handling therefor
- G06F 7/785 ... { having a sequence of storage locations each being individually accessible for both enqueue and dequeue operations, e.g. using a RAM}
- G06F 8/00** { Arrangements for software engineering (execution of stored program [G06F 9/06](#); testing or debugging [G06F 11/36](#); hardware/software co-design [G06F 17/50](#); software project management [G06Q 10/00C](#))}

- G06F 8/10 . { Requirements analysis; Specification techniques}
- G06F 8/20 . { Software design}
- G06F 8/22 .. { Procedural}
- G06F 8/24 .. { Object oriented}
- G06F 8/30 . { Creation or generation of source code}
- G06F 8/31 .. { Programming languages or programming paradigms}
- G06F 8/311 ... { Functional or applicative languages; Rewrite languages}
- G06F 8/312 ... { List processing, e.g. LISP programming language}
- G06F 8/313 ... { Logic programming, e.g. PROLOG programming language}
- G06F 8/3135 ..... { Unification or backtracking}
- G06F 8/314 ... { Parallel programming languages ([G06F 8/313](#) takes precedence)}
- G06F 8/315 ... { Object-oriented languages}
- G06F 8/316 ... { Aspect-oriented programming techniques}
- G06F 8/33 .. { Intelligent editors ([text processing G06F 17/21](#))}
- G06F 8/34 .. { Graphical or visual programming ([use of icons for interaction with graphical user interfaces G06F 3/048](#))}
- G06F 8/35 .. { Model driven}
- G06F 8/355 ... { Round-trip engineering}
- G06F 8/36 .. { Software reuse}
- G06F 8/37 .. { Compiler construction; Parser generation}
- G06F 8/38 .. { to implement user interfaces ([interaction techniques for graphical user interfaces G06F 3/048](#))}
- G06F 8/40 . { Transformations of program code}
- G06F 8/41 .. { Compilation}
- G06F 8/42 ... { Syntactic analysis}
- G06F 8/423 ..... { Preprocessors}
- G06F 8/425 ..... { Lexical analysis}
- G06F 8/427 ..... { Parsing}
- G06F 8/43 ... { Checking; Contextual analysis}
- G06F 8/433 ..... { Dependency analysis; Data or control flow analysis}
- G06F 8/434 ..... { Pointers; Aliasing}
- G06F 8/436 ..... { Semantic checking}
- G06F 8/437 ..... { Type checking}
- G06F 8/44 ... { Encoding}
- G06F 8/441 ..... { Register allocation; Assignment of physical memory space to logical memory space}
- G06F 8/443 ..... { Optimisation}
- G06F 8/4432 ..... { Reducing the energy consumption}
- G06F 8/4434 ..... { Reducing the memory space required by the program code ([digital compression H03M 7/30](#))}

|             |       |  |
|-------------|-------|--|
| G06F 8/4435 | ..... | { Detection or removal of dead or redundant code}  |
| G06F 8/4436 | ..... | { Exlining; Procedural abstraction}  |
| G06F 8/4441 | ..... | { Reducing the execution time required by the program code}  |
| G06F 8/4442 | ..... | { Reducing the number of cache misses; Data prefetching (cache prefetching <a href="#">G06F 12/0862</a> )}                                 |
| G06F 8/4443 | ..... | { Inlining}  |
| G06F 8/445  | ....  | { Exploiting fine grain parallelism, i.e. parallelism at instruction level (run-time instruction scheduling <a href="#">G06F 9/3836</a> )} |
| G06F 8/4451 | ..... | { Avoiding pipeline stalls}  |
| G06F 8/4452 | ..... | { Software pipelining}   |
| G06F 8/447  | ....  | { Target code generation}  |
| G06F 8/45   | ...   | { Exploiting coarse grain parallelism in compilation, i.e. parallelism between groups of instructions}                                     |
| G06F 8/451  | ....  | { Code distribution (considering CPU load at run-time <a href="#">G06F 9/505</a> ; load rebalancing <a href="#">G06F 9/5083</a> )}         |
| G06F 8/452  | ..... | { Loops}   |
| G06F 8/453  | ....  | { Data distribution}   |
| G06F 8/454  | ..... | { Consistency (cache consistency protocols in hierarchically structured memory systems <a href="#">G06F 12/0815</a> )}                     |
| G06F 8/456  | ....  | { Parallelism detection}   |
| G06F 8/457  | ....  | { Communication (intertask communication <b>G06F 9/46R6</b> )}   |
| G06F 8/458  | ....  | { Synchronisation, e.g. post-wait, barriers, locks (synchronisation among tasks <b>G06F 9/46R2</b> )}                                      |
| G06F 8/47   | ...   | { Retargetable compilers}  |
| G06F 8/48   | ...   | { Incremental compilation (software reuse <a href="#">G06F 8/36</a> )}   |
| G06F 8/49   | ...   | { Partial evaluation}  |
| G06F 8/51   | ..    | { Source to source}  |
| G06F 8/52   | ..    | { Binary to binary}  |
| G06F 8/53   | ..    | { Decompilation; Disassembly}  |
| G06F 8/54   | ..    | { Link editing before load time (link editing at or after load time <a href="#">G06F 9/44521</a> )}  |
| G06F 8/60   | .     | { Software deployment}   |
| G06F 8/61   | ..    | { Installation}  |
| G06F 8/62   | ...   | { Uninstallation}  |
| G06F 8/63   | ...   | { Image based installation; Cloning; Build to order}   |
| G06F 8/64   | ...   | { Retargetable}  |
| G06F 8/65   | ..    | { Update}  |
| G06F 8/66   | ...   | { of program stored in read-only memory [ROM]}   |
| G06F 8/665  | ...   | { of program code stored in alterable solid state memory, e.g. EEPROM, flash}  |
| G06F 8/67   | ...   | { while running}   |
| G06F 8/68   | ...   | { Incremental; Differential}   |
| G06F 8/70   | .     | { Software maintenance or management}  |
| G06F 8/71   | ..    | { Version control; Configuration management}   |

- G06F 8/72 .. { Code refactoring}
- G06F 8/73 .. { Program documentation}
- G06F 8/74 .. { Reverse engineering; Extracting design information from source code}
- G06F 8/75 .. { Structural analysis for program understanding}
- G06F 8/751 ... { Code clone detection}
- G06F 8/76 .. { Adapting program code to run in a different environment; Porting}
- G06F 8/77 .. { Software metrics}
- G06F 8/78 .. { Methods to solve the "Year 2000" [Y2K] problem}
  
- G06F 9/00** **Arrangements for programme control, e.g. control unit** (programme control for peripheral devices [G06F 13/10](#); in regulating or control systems G05B)
  
- G06F 9/02 . using wired connections, e.g. plugboard
- G06F 9/04 . using record carriers containing only programme instructions ([G06F 9/06](#) takes precedence)
- G06F 9/06 . using stored programme, i.e. using internal store of processing equipment to receive and retain programme
- G06F 9/22 .. Micro-control or micro-programme arrangements
- G06F 9/223 ... {Execution means for micro-instructions irrespective of the micro-instruction function, e.g. decoding of micro-instructions and nano-instructions; timing of micro instructions; programmable logic arrays; delays and fan-out problems}
- G06F 9/226 ... {Micro instruction function e.g. input/output micro-instruction; diagnostic micro-instruction; micro-instruction format}
- G06F 9/24 ... Loading of the micro-programme
- G06F 9/26 ... Address formation of the next micro-instruction ([G06F 9/28](#) takes precedence){Microprogram storage or retrieval arrangements}
- G06F 9/261 .... {Micro-instruction address formation}
- G06F 9/262 .... {Arrangements for next micro-instruction selection}
- G06F 9/264 ..... {Micro-instruction selection based on results of processing}
- G06F 9/265 ..... {by address selection on input of storage}
- G06F 9/267 ..... {by instruction selection on output of storage}
- G06F 9/268 ..... {Micro-instruction selection not based on processing results, e.g. interrupt, patch, first cycle store, diagnostic programs}
- G06F 9/28 ... Enhancement of operational speed, e.g. by using several micro-control devices operating in parallel
- G06F 9/30 .. Arrangements for executing machine-instructions, e.g. instruction decode (for executing micro-instructions [G06F 9/22](#); for executing subprogrammes [G06F 9/40](#))
- G06F 9/30003 ... { Arrangements for executing specific machine instructions }
- G06F 9/30007 .... { to perform operations on data operands}
- G06F 9/3001 ..... { Arithmetic instructions}
- G06F 9/30014 ..... { with variable precision}
- G06F 9/30018 ..... { Bit or string instructions; instructions using a mask}
- G06F 9/30021 ..... { Compare instructions, e.g. Greater-Than, Equal-To, MINMAX}
- G06F 9/30025 ..... { Format conversion instructions, e.g. Floating-Point to Integer, decimal

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|              |       | conversion}   |
| G06F 9/30029 | ..... | { Logical and Boolean instructions, e.g. XOR, NOT}                                  |
| G06F 9/30032 | ..... | { Movement instructions, e.g. MOVE, SHIFT, ROTATE, SHUFFLE}                         |
| G06F 9/30036 | ..... | { Instructions to perform operations on packed data, e.g. vector operations}        |
| G06F 9/3004  | ..... | { to perform operations on memory}  |
| G06F 9/30043 | ..... | { LOAD or STORE instructions; Clear instruction}                                    |
| G06F 9/30047 | ..... | { Prefetch instructions; cache control instructions}                                |
| G06F 9/3005  | ..... | { to perform operations for flow control}   |
| G06F 9/30054 | ..... | { Unconditional branch instructions}  |
| G06F 9/30058 | ..... | { Conditional branch instructions}  |
| G06F 9/30061 | ..... | { Multi-way branch instructions, e.g. CASE}   |
| G06F 9/30065 | ..... | { Loop control instructions; iterative instructions, e.g. LOOP, REPEAT}             |
| G06F 9/30069 | ..... | { Instruction skipping instructions, e.g. SKIP}                                     |
| G06F 9/30072 | ..... | { to perform conditional operations, e.g. using guard}                              |
| G06F 9/30076 | ..... | { to perform miscellaneous control operations, e.g. NOP}                            |
| G06F 9/30079 | ..... | { Pipeline control instructions}  |
| G06F 9/30083 | ..... | { Power or thermal control instructions}  |
| G06F 9/30087 | ..... | { Synchronisation or serialisation instructions}                                    |
| G06F 9/3009  | ..... | { Thread control instructions}  |
| G06F 9/30094 | ..... | { Condition code generation, e.g. Carry, Zero flag}                                 |
| G06F 9/30098 | ..... | { Register arrangements}  |
| G06F 9/30101 | ..... | { Special purpose registers}  |
| G06F 9/30105 | ..... | { Register structure}   |
| G06F 9/30109 | ..... | { having multiple operands in a single register}                                    |
| G06F 9/30112 | ..... | { for variable length data, e.g. single or double registers}                        |
| G06F 9/30116 | ..... | { Shadow registers, e.g. coupled registers, not forming part of the register space} |
| G06F 9/3012  | ..... | { Organisation of register space, e.g. banked or distributed register file}         |
| G06F 9/30123 | ..... | { according to context, e.g. thread buffers}  |
| G06F 9/30127 | ..... | { Register windows}   |
| G06F 9/3013  | ..... | { according to data content, e.g. floating-point registers, address registers}      |
| G06F 9/30134 | ..... | { Register stacks; shift registers}   |
| G06F 9/30138 | ..... | { Extension of register space, e.g. register cache}                                 |
| G06F 9/30141 | ..... | { Implementation provisions of register files, e.g. ports}                          |
| G06F 9/30145 | ..... | {Instruction analysis, e.g. decoding, instruction word fields}                      |
| G06F 9/30149 | ..... | { of variable length instructions}  |
| G06F 9/30152 | ..... | { Determining start or end of instruction; determining instruction length}          |
| G06F 9/30156 | ..... | { Special purpose encoding of instructions, e.g. Gray coding}                       |
| G06F 9/3016  | ..... | {Decoding the operand specifier, e.g. specifier format}                             |
| G06F 9/30163 | ..... | {with implied specifier, e.g. top of stack}   |
| G06F 9/30167 | ..... | { of immediate specifier, e.g. constants}   |

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| G06F 9/3017  | ...   | { Runtime instruction translation, e.g. macros}   |
| G06F 9/30174 | ..... | { for non-native instruction set, e.g. Javabyte, legacy code}   |
| G06F 9/30178 | ..... | { of compressed or encrypted instructions}  |
| G06F 9/30181 | ...   | { Instruction operation extension or modification}  |
| G06F 9/30185 | ..... | { according to one or more bits in the instruction, e.g. prefix, sub-opcode}  |
| G06F 9/30189 | ..... | { according to execution mode, e.g. mode flag}  |
| G06F 9/30192 | ..... | { according to data descriptor, e.g. dynamic data typing}   |
| G06F 9/30196 | ..... | { using decoder, e.g. decoder per instruction set, adaptable or programmable decoders}  |
| G06F 9/32    | ...   | Address formation of the next instruction, e.g. incrementing the instruction counter, jump ( <a href="#">G06F 9/38</a> takes precedence; sub-programme jump <a href="#">G06F 9/42</a> ) |
| G06F 9/321   | ..... | { Programme or instruction counter, e.g. incrementing}  |
| G06F 9/322   | ..... | { for non-sequential address}   |
| G06F 9/324   | ..... | { using program counter relative addressing}  |
| G06F 9/325   | ..... | { for loops, e.g. loop detection, loop counter}   |
| G06F 9/327   | ..... | { for interrupts}   |
| G06F 9/328   | ..... | { for runtime instruction patching}   |
| G06F 9/34    | ...   | Addressing or accessing the instruction operand or the result; {Formation of operand address; Addressing modes ( <a href="#">address translation G06F 12/00</a> )}                      |
| G06F 9/342   | ..... | { Extension of operand address space}   |
| G06F 9/345   | ..... | of multiple operands or results ({ <a href="#">addressing multiple banks G06F 12/06</a> })  |
| G06F 9/3455  | ..... | { using stride}   |
| G06F 9/35    | ..... | Indirect addressing, {i.e. using single address operand, e.g. address register}   |
| G06F 9/355   | ..... | Indexed addressing { i.e. using more than one address operand }   |
| G06F 9/3552  | ..... | { using wraparound, e.g. modulo or circular addressing}   |
| G06F 9/3555  | ..... | { using scaling, e.g. multiplication of index}  |
| G06F 9/3557  | ..... | { using program counter as base address}  |
| G06F 9/38    | ...   | Concurrent instruction execution, e.g. pipeline, look ahead   |
| G06F 9/3802  | ..... | { Instruction prefetching}  |
| G06F 9/3804  | ..... | { for branches, e.g. hedging, branch folding}   |
| G06F 9/3806  | ..... | { using address prediction, e.g. return stack, branch history buffer}   |
| G06F 9/3808  | ..... | { for instruction reuse, e.g. trace cache, branch target cache}   |
| G06F 9/381   | ..... | { Loop buffering}   |
| G06F 9/3812  | ..... | { with instruction modification, e.g. store into instruction stream}  |
| G06F 9/3814  | ..... | { Implementation provisions of instruction buffers, e.g. prefetch buffer; banks}  |
| G06F 9/3816  | ..... | { Instruction alignment, e.g. cache line crossing}  |
| G06F 9/3818  | ..... | { Decoding for concurrent execution}  |
| G06F 9/382   | ..... | { Pipelined decoding, e.g. using predecoding}   |
| G06F 9/3822  | ..... | { Parallel decoding, e.g. parallel decode units}  |
| G06F 9/3824  | ..... | { Operand accessing}  |
| G06F 9/3826  | ..... | { Data result bypassing, e.g. locally between pipeline stages, within a pipeline stage}   |

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| G06F 9/3828 | ..... | { with global bypass, e.g. between pipelines, between clusters}   |
| G06F 9/383  | ..... | { Operand prefetching ( <a href="#">cache prefetching G06F 12/0862</a> )}   |
| G06F 9/3832 | ..... | { Value prediction for operands; operand history buffers}   |
| G06F 9/3834 | ..... | {Maintaining memory consistency ( <a href="#">cache consistency protocols G06F 12/0815</a> )}   |
| G06F 9/3836 | ....  | {Instruction issuing, e.g. dynamic instruction scheduling, out of order instruction execution}  |
| G06F 9/3838 | ..... | { Dependency mechanisms, e.g. register scoreboarding}   |
| G06F 9/384  | ..... | { Register renaming}  |
| G06F 9/3842 | ..... | { Speculative instruction execution }   |
| G06F 9/3844 | ..... | {using dynamic prediction, e.g. branch history table}   |
| G06F 9/3846 | ..... | {using static prediction, e.g. branch taken strategy}   |
| G06F 9/3848 | ..... | { using hybrid branch prediction, e.g. selection between prediction techniques}   |
| G06F 9/3851 | ..... | {from multiple instruction streams, e.g. multistreaming ( <a href="#">initiation or dispatching of multiple tasks or threads G06F 9/46C4</a> )} |
| G06F 9/3853 | ..... | {of compound instructions}  |
| G06F 9/3855 | ..... | { Reordering, e.g. using a queue, age tags}   |
| G06F 9/3857 | ..... | { Result writeback, i.e. updating the architectural state}  |
| G06F 9/3859 | ..... | { with result invalidation, e.g. nullification}   |
| G06F 9/3861 | ....  | {Recovery, e.g. branch miss-prediction, exception handling ( <a href="#">error detection or correction G06F 11/00</a> )}                        |
| G06F 9/3863 | ..... | {using multiple copies of the architectural state, e.g. shadow registers}   |
| G06F 9/3865 | ..... | { using deferred exception handling, e.g. exception flags}  |
| G06F 9/3867 | ....  | {using instruction pipelines}   |
| G06F 9/3869 | ..... | { Implementation aspects, e.g. pipeline latches; pipeline synchronisation and clocking}   |
| G06F 9/3871 | ..... | { Asynchronous instruction pipeline, e.g. using handshake signals between stages}   |
| G06F 9/3873 | ..... | { Variable length pipelines, e.g. elastic pipeline}   |
| G06F 9/3875 | ..... | {Pipelining a single stage, e.g. superpipelining}   |
| G06F 9/3877 | ....  | {using a slave processor, e.g. coprocessor ( <a href="#">peripheral processor G06F 13/12</a> ; <a href="#">vector processor G06F 15/78V</a> )}  |
| G06F 9/3879 | ..... | { for non-native instruction execution, e.g. executing a command; for Java instruction set}   |
| G06F 9/3881 | ..... | { Arrangements for communication of instructions and data}  |
| G06F 9/3885 | ....  | {using a plurality of independent parallel functional units}  |
| G06F 9/3887 | ..... | { controlled by a single instruction, e.g. SIMD}  |
| G06F 9/3889 | ..... | { controlled by multiple instructions, e.g. MIMD, decoupled access or execute}  |
| G06F 9/3891 | ..... | { organised in groups of units sharing resources, e.g. clusters}  |
| G06F 9/3893 | ..... | { controlled in tandem, e.g. multiplier-accumulator}  |
| G06F 9/3895 | ..... | { for complex operations, e.g. multidimensional or interleaved address generators, macros}  |
| G06F 9/3897 | ..... | { with adaptable data path}   |

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| G06F 9/44    | ..    | Arrangements for executing specific programmes   |
| G06F 9/4401  | ...   | { Bootstrapping (secure booting <a href="#">G06F 21/575</a> ; fault tolerant booting <a href="#">G06F 11/1417</a> ; resetting means <a href="#">G06F 1/24</a> ; power-on self test <a href="#">G06F 11/2284</a> )} |
| G06F 9/4403  | ....  | { Processor initialisation}  |
| G06F 9/4405  | ....  | { of multiprocessor systems}   |
| G06F 9/4406  | ....  | { Loading of operating system}   |
| G06F 9/4408  | ..... | { Boot device selection}   |
| G06F 9/441   | ..... | { Multiboot arrangements, i.e. selecting an operating system to be loaded}   |
| G06F 9/4411  | ....  | { Configuring for operating with peripheral devices; Loading of device drivers}  |
| G06F 9/4413  | ..... | { Plug-and-play (PnP)}   |
| G06F 9/4415  | ..... | { Self describing peripheral devices}  |
| G06F 9/4416  | ....  | { Network booting; Remote initial programme loading (RIPL)}  |
| G06F 9/4418  | ....  | { Suspend and resume; Hibernate and awake}   |
| G06F 9/442   | ....  | { Shutdown}  |
| G06F 9/4421  | ...   | { Execution paradigms}   |
| G06F 9/4423  | ....  | { Procedural}  |
| G06F 9/4425  | ..... | { Executing sub-programmes}  |
| G06F 9/4426  | ..... | { Formation of sub-programme jump address}   |
| G06F 9/4428  | ....  | { Object-oriented}   |
| G06F 9/443   | ..... | { Object-oriented method invocation or resolution}   |
| G06F 9/4431  | ..... | { Optimising based on receiver type}   |
| G06F 9/4433  | ..... | { Inheritance}   |
| G06F 9/4435  | ..... | { Object persistence}  |
| G06F 9/4436  | ....  | { Data-driven}   |
| G06F 9/4438  | ....  | { Unification in logic programming }   |
| G06F 9/444   | ....  | { Finite state machines}   |
| G06F 9/4443  | ...   | { Execution mechanisms for user interfaces}  |
| G06F 9/4445  | ....  | { Remote windowing , e.g. X-Window System, desktop virtualisation (protocols for telewriting <a href="#">H04L 67/38</a> )}   |
| G06F 9/4446  | ....  | {Help systems}   |
| G06F 9/4448  | ....  | { Multi-language systems; Localisation; Internationalisation}  |
| G06F 9/445   | ...   | Programme loading or initiating {(bootstrapping <a href="#">G06F 9/4401</a> ; movement of software or configuration parameters for network-specific applications <a href="#">H04L 67/34</a> )}                     |
| G06F 9/44505 | ....  | { Configuring for programme initiating, e.g. using registry, configuration files}  |
| G06F 9/4451  | ..... | { User profiles, roaming (user profiles for network-specific applications <a href="#">H04L 67/306</a> )}   |
| G06F 9/44521 | ....  | { Dynamic linking or loading; Link editing at or after load time; e.g. Java class loading}   |
| G06F 9/44526 | ..... | { Plug-ins; Add-ons}   |
| G06F 9/44536 | ....  | { Selecting among different versions}  |
| G06F 9/44542 | ..... | { Retargetable}  |

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| G06F 9/44547 | ..... | { Fat binaries}  |
| G06F 9/44552 | ....  | { Conflict resolution, i.e. enabling coexistence of conflicting executables}   |
| G06F 9/44557 | ....  | { Code layout in executable memory}  |
| G06F 9/44563 | ..... | { Sharing}   |
| G06F 9/44568 | ....  | { Immediately runnable code}   |
| G06F 9/44573 | ..... | { Execute-in-place (XIP)}  |
| G06F 9/44578 | ..... | { Preparing or optimising for loading}   |
| G06F 9/44584 | ..... | { Portable applications, i.e. making applications self-contained, e.g. U3 standard}  |
| G06F 9/44589 | ....  | { Programme code verification, e.g. Java bytecode verification, proof-carrying code (high-level semantic checks <a href="#">G06F 8/43</a> ; testing and debugging software <a href="#">G06F 11/36</a> )}   |
| G06F 9/44594 | ....  | { Unloading}   |
| G06F 9/455   | ...   | Emulation; Software simulation { , i.e. virtualisation or emulation of application or operating system execution engines (instruction translation at instruction execution time <a href="#">G06F 9/3017</a> ; multiprogramming in general <a href="#">G06F 9/46</a> ; logical partitioning of resources or management or configuration of virtualized resources <a href="#">G06F 9/5077</a> ; in-circuit emulation <a href="#">G06F 11/3652</a> ; environments for testing or debugging software <a href="#">G06F 11/3664</a> )} |
| G06F 9/45504 | ....  | { Abstract machines for programme code execution, e.g. Java virtual machine (JVM), interpreters, emulators}  |
| G06F 9/45508 | ..... | { Runtime interpretation or emulation, e.g. emulator loops, bytecode interpretation}   |
| G06F 9/45512 | ..... | { Command shells}  |
| G06F 9/45516 | ..... | { Runtime code conversion or optimisation}   |
| G06F 9/4552  | ..... | { Involving translation to a different instruction set architecture, e.g. just-in-time translation in a JVM}   |
| G06F 9/45525 | ..... | { Optimisation or modification within the same instruction set architecture, e.g. HP Dynamo}   |
| G06F 9/45529 | ..... | { Embedded in an application, e.g. JavaScript in a Web browser}  |
| G06F 9/45533 | ....  | { Hypervisors; Virtual machine monitors}   |
| G06F 9/45537 | ..... | { Provision of facilities of other operating environments, e.g. WINE (I/O emulation <a href="#">G06F 13/105</a> )}   |
| G06F 9/45541 | ..... | { Bare-metal, i.e. hypervisor runs directly on hardware}   |
| G06F 9/45545 | ..... | { Guest-host, i.e. hypervisor is an application program itself, e.g. VirtualBox}   |
| G06F 9/4555  | ..... | { Para-virtualisation, i.e. guest operating system has to be modified}   |
| G06F 9/45554 | ..... | { Instruction set architectures of guest OS and hypervisor or native processor differ, e.g. Bochs or VirtualPC on PowerPC MacOS}   |
| G06F 9/45558 | ..... | { Hypervisor-specific management and integration aspects}  |
| G06F 9/46    | ..    | Multiprogramming arrangements  |
| G06F 9/461   | ...   | {Saving or restoring of program or task context}   |
| G06F 9/462   | ..... | {with multiple register sets}  |
| G06F 9/463   | ..... | {Program control block organisation}   |
| G06F 9/465   | ...   | { Distributed object oriented systems (remote method invocation (RMI) <a href="#">G06F 9/548</a> )}  |
| G06F 9/466   | ...   | {Transaction processing}   |

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| G06F 9/467  | ....  | { Transactional memory ( <a href="#">G06F 9/528</a> takes precedence)}   |
| G06F 9/468  | ...   | { Specific access rights for resources, e.g. using capability register}  |
| G06F 9/48   | ...   | Programme initiating; Programme switching, e.g. by interrupt   |
| G06F 9/4806 | ....  | { Task transfer initiation or dispatching}   |
| G06F 9/4812 | ..... | { by interrupt, e.g. masked}   |
| G06F 9/4818 | ..... | { Priority circuits therefor}  |
| G06F 9/4825 | ..... | { Interrupt from clock, e.g. time of day}  |
| G06F 9/4831 | ..... | { with variable priority}  |
| G06F 9/4837 | ..... | { time dependent}  |
| G06F 9/4843 | ....  | { by program, e.g. task dispatcher, supervisor, operating system}  |
| G06F 9/485  | ..... | {Task life-cycle, e.g. stopping, restarting, resuming execution ( <a href="#">G06F 9/4881</a> takes precedence)}   |
| G06F 9/4856 | ..... | { resumption being on a different machine, e.g. task migration , virtual machine migration ( <a href="#">G06F 9/5088</a> takes precedence)}  |
| G06F 9/4862 | ..... | { the task being a mobile agent, i.e. specifically designed to migrate}  |
| G06F 9/4868 | ..... | { with creation or replication}  |
| G06F 9/4875 | ..... | { with migration policy, e.g. auction, contract negotiation}   |
| G06F 9/4881 | ..... | { Scheduling strategies for dispatcher, e.g. round robin, multi-level priority queues}   |
| G06F 9/4887 | ..... | { involving deadlines, e.g. rate based, periodic}  |
| G06F 9/4893 | ..... | { taking into account power or heat criteria ( <a href="#">power management in computers in general G06F 1/3203</a> ; <a href="#">thermal management in computers in general G06F 1/206</a> )}         |
| G06F 9/50   | ...   | Allocation of resources, e.g. of the central processing unit (CPU)   |
| G06F 9/5005 | ....  | { to service a request}  |
| G06F 9/5011 | ....  | { the resources being hardware resources other than CPUs, Servers and Terminals}   |
| G06F 9/5016 | ..... | { the resource being the memory}   |
| G06F 9/5022 | ..... | { Mechanisms to release resources}   |
| G06F 9/5027 | ....  | { the resource being a machine, e.g. CPUs, Servers, Terminals}   |
| G06F 9/5033 | ..... | { considering data affinity}   |
| G06F 9/5038 | ..... | { considering the execution order of a plurality of tasks, e.g. taking priority or time dependency constraints into consideration ( <a href="#">scheduling strategies G06F 9/4881 and subgroups</a> )} |
| G06F 9/5044 | ..... | { considering hardware capabilities}   |
| G06F 9/505  | ..... | { considering the load}  |
| G06F 9/5055 | ..... | { considering software capabilities, i.e. software resources associated or available to the machine}   |
| G06F 9/5061 | ....  | { Partitioning or combining of resources}  |
| G06F 9/5066 | ..... | { Algorithms for mapping a plurality of inter-dependent sub-tasks onto a plurality of physical CPUs ( <a href="#">mapping at compile time, see G06F 9/45M1</a> )}                                      |
| G06F 9/5072 | ..... | { Grid computing}  |
| G06F 9/5077 | ..... | { Logical partitioning of resources; Management or configuration of virtualized resources ( <a href="#">specific details on emulation or internal functioning of virtual machines G06F 9/455</a> )}    |

- G06F 9/5083 . . . . { Techniques for rebalancing the load in a distributed system}
- G06F 9/5088 . . . . . { involving task migration}
- G06F 9/5094 . . . . { where the allocation takes into account power or heat criteria (power management in computers in general [G06F 1/3203](#); thermal management in computers in general [G06F 1/206](#))}
- G06F 9/52 . . . Programme synchronisation; Mutual exclusion, e.g. by means of semaphores; { Contention for resources among tasks}
- G06F 9/522 . . . . { Barrier synchronisation}
- G06F 9/524 . . . . { Deadlock detection or avoidance}
- G06F 9/526 . . . . { Mutual exclusion algorithms}
- G06F 9/528 . . . . . { by using speculative mechanisms}
- G06F 9/54 . . . Interprogramme communication; { Intertask communication}
- G06F 9/541 . . . . { via adapters, e.g. between incompatible applications}
- G06F 9/542 . . . . { Event management; Broadcasting; Multicasting; Notifications}
- G06F 9/543 . . . . { User-generated data transfer, e.g. clipboards, dynamic data exchange [DDE], object linking and embedding [OLE] }
- G06F 9/544 . . . . { Buffers; Shared memory; Pipes}
- G06F 9/545 . . . . { where tasks reside in different layers, e.g. user- and kernel-space}
- G06F 9/546 . . . . { Message passing systems or structures, e.g. queues}
- G06F 9/547 . . . . { Remote procedure calls [RPC]; Web services}
- G06F 9/548 . . . . . { Object oriented; Remote method invocation [RMI](non-remote method invocation [G06F 9/42M](#))}

**G06F 11/00** **Error detection; Error correction; Monitoring** (methods or arrangements for verifying the correctness of marking on a record carrier [G06K 5/00](#); in information storage based on relative movement between record carrier and transducer [G11B](#), e.g. [G11B 20/18](#); in static stores [G11C](#); coding, decoding or code conversion, for error detection or error correction, in general [H03M 13/00](#))

#### **NOTE**

In this group the indexing codes of [G06F 1/00](#) to [G06F 15/00](#) are added

- G06F 11/002 . { protecting against parasitic influences, e.g. noise, temperatures}

#### **WARNING**

This group is no longer used for the classification of new documents as from January 1, 2011. The documents are classified in [G06F 11/07](#) and subgroups according to the features used for protecting

- G06F 11/004 . { Error avoidance ([G06F 11/07](#) and subgroups take precedence)}
- G06F 11/006 . { Identification ([G06F 11/22M1C](#) takes precedence)}
- G06F 11/008 . {Reliability or availability analysis}

- G06F 11/07 . . . responding to the occurrence of a fault, e.g. fault tolerance
- G06F 11/0703 . . . { Error or fault processing not based on redundancy, i.e. by taking additional measures to deal with the error or fault not making use of redundancy in operation, in hardware, or in data representation}
- G06F 11/0706 . . . { the processing taking place on a specific hardware platform or in a specific software environment}
- G06F 11/0709 . . . . { in a distributed system consisting of a plurality of standalone computer nodes, e.g. clusters, client-server systems}
- G06F 11/0712 . . . . { in a virtual computing platform, e.g. logically partitioned systems}
- G06F 11/0715 . . . . { in a system implementing multitasking (multitasking per se [G06F 9/46](#))}
- G06F 11/0718 . . . . { in an object-oriented system}
- G06F 11/0721 . . . . { within a central processing unit [CPU]}
- G06F 11/0724 . . . . . { in a multiprocessor or a multi-core unit (multiprocessors per se [G06F 15/80](#))}
- G06F 11/0727 . . . . { in a storage system, e.g. in a DASD or network based storage system (circuits for error detection or correction within digital recording or reproducing units [G11B 20/18](#); drivers for digital recording or reproducing units [G06F 3/06](#); storage area networks [H04L 29/08549](#))}
- G06F 11/073 . . . . { in a memory management context, e.g. virtual memory or cache management (memory management [G06F 12/00](#); testing of static memory units [G11C 29/00](#))}
- G06F 11/0733 . . . . { in a data processing system embedded in an image processing device, e.g. printer, facsimile, scanner}
- G06F 11/0736 . . . . { in functional embedded systems, i.e. in a data processing system designed as a combination of hardware and software dedicated to performing a certain function (testing or monitoring of automated control systems [G05B 23/02](#))}
- G06F 11/0739 . . . . . { in a data processing system embedded in automotive or aircraft systems}
- G06F 11/0742 . . . . . { in a data processing system embedded in a mobile device, e.g. mobile phones, handheld devices}
- G06F 11/0745 . . . . { in an input/output transactions management context (input/output processing in general [G06F 13/00](#))}
- G06F 11/0748 . . . . { in a remote unit communicating with a single-box computer node experiencing an error/fault (remote testing [G06F 11/273R](#))}
- G06F 11/0751 . . . { Error or fault detection not based on redundancy (power supply failures [G06F 1/30](#); network fault management [H04L 12/2419](#))}
- G06F 11/0754 . . . . { by exceeding limits}
- G06F 11/0757 . . . . . { by exceeding a time limit, i.e. time-out, e.g. watchdogs}
- G06F 11/076 . . . . . { by exceeding a count or rate limit, e.g. word- or bit count limit}
- G06F 11/0763 . . . . { by bit configuration check, e.g. of formats or tags}
- G06F 11/0766 . . . { Error or fault reporting or storing (reporting or storing of non-error data [G06F 11/30](#), [G06F 11/34](#))}
- G06F 11/0769 . . . . { Readable error formats, e.g. cross-platform generic formats, human understandable formats}
- G06F 11/0772 . . . . { Means for error signaling, e.g. using interrupts, exception flags, dedicated error registers}
- G06F 11/0775 . . . . { Content or structure details of the error report, e.g. specific table structure,

|              |       |  |
|--------------|-------|--|
|              |       | specific error fields}   |
| G06F 11/0778 | ....  | { Dumping, i.e. gathering error/state information after a fault for later diagnosis}   |
| G06F 11/0781 | ....  | { Error filtering or prioritizing based on a policy defined by the user or on a policy defined by a hardware/software module, e.g. according to a severity level}  |
| G06F 11/0784 | ....  | { Routing of error reports, e.g. with a specific transmission path or data flow}   |
| G06F 11/0787 | ....  | { Storage of error reports, e.g. persistent data storage, storage using memory protection}   |
| G06F 11/079  | ...   | { Root cause analysis, i.e. error or fault diagnosis (in a hardware test environment <a href="#">G06F 11/22</a> ; in a software test environment <a href="#">G06F 11/36</a> )}   |
| G06F 11/0793 | ...   | { Remedial or corrective actions (by retry <a href="#">G06F 11/1402</a> ; recovery from an exception in an instruction pipeline <a href="#">G06F 9/3861</a> ; in a network context <a href="#">H04L 29/14</a> )}                         |
| G06F 11/0796 | ..    | { Safety measures, i.e. ensuring safe condition in the event of error, e.g. for controlling element}   |
| G06F 11/08   | ..    | Error detection or correction by redundancy in data representation, e.g. by using checking codes   |
| G06F 11/085  | ...   | {using codes with inherent redundancy, e.g. n-out-of-m codes}  |
| G06F 11/10   | ...   | Adding special bits or symbols to the coded information, e.g. parity check, casting out 9's or 11's  |
| G06F 11/1004 | ....  | { to protect a block of data words, e.g. CRC or checksum ( <a href="#">G06F 11/1076</a> takes precedence; security arrangements for protecting computers or computer systems against unauthorized activity <a href="#">G06F 21/00</a> )} |
| G06F 11/1008 | ....  | { in individual solid state devices ( <a href="#">G06F 11/1004</a> takes precedence)}  |
| G06F 11/1012 | ..... | { using codes or arrangements adapted for a specific type of error ( <a href="#">G06F 11/1048</a> takes precedence)}   |
| G06F 11/1016 | ..... | { Error in accessing a memory location, i.e. addressing error}   |
| G06F 11/102  | ..... | { Error in check bits}   |
| G06F 11/1024 | ..... | { Identification of the type of error}   |
| G06F 11/1028 | ..... | { Adjacent errors, e.g. error in n-bit (n>1) wide storage units, i.e. package error}   |
| G06F 11/1032 | ..... | { Simple parity}   |
| G06F 11/1036 | ..... | { Unidirectional errors}   |
| G06F 11/104  | ..... | { using arithmetic codes i.e. codes which are preserved during operation, e.g. modulo 9 or 11 check}   |
| G06F 11/1044 | ..... | { with specific ECC/EDC distribution}  |
| G06F 11/1048 | ..... | { using arrangements adapted for a specific error detection or correction feature}   |
| G06F 11/1052 | ..... | { Bypassing or disabling error detection or correction}  |
| G06F 11/1056 | ..... | { Updating check bits on partial write, i.e. read/modify/write}  |
| G06F 11/106  | ..... | { Correcting systematically all correctable errors, i.e. scrubbing}  |
| G06F 11/1064 | ..... | { in cache or content addressable memories}  |
| G06F 11/1068 | ..... | { in sector programmable memories, e.g. flash disk ( <a href="#">G06F 11/1072</a> takes precedence)}   |
| G06F 11/1072 | ..... | { in multilevel memories}  |
| G06F 11/1076 | ....  | { Parity data used in redundant arrays of independent storages, e.g. in RAID   |

|              |       |   |
|--------------|-------|---|
|              |       | systems}  |
| G06F 11/108  | ..... | { Parity data distribution in semiconductor storages, e.g. in SSD}  |
| G06F 11/1084 | ..... | { Degraded mode, e.g. caused by single or multiple storage removals or disk failures}   |
| G06F 11/1088 | ..... | { Reconstruction on already foreseen single or plurality of spare disks}  |
| G06F 11/1092 | ..... | { Rebuilding, e.g. when physically replacing a failing disk}  |
| G06F 11/1096 | ..... | { Parity calculation or recalculation after configuration or reconfiguration of the system}   |
| G06F 11/14   | ..    | Error detection or correction of the data by redundancy in operation ( <a href="#">G06F 11/16</a> takes precedence)                   |
| G06F 11/1402 | ...   | {Saving, restoring, recovering or retrying}   |
| G06F 11/1405 | ..... | {at machine instruction level}  |
| G06F 11/1407 | ..... | {Checkpointing the instruction stream}  |
| G06F 11/141  | ..... | {for bus or memory accesses}  |
| G06F 11/1412 | ..... | { of data}  |
| G06F 11/1415 | ..... | { at system level}  |
| G06F 11/1417 | ..... | {Boot up procedures}  |
| G06F 11/142  | ..... | { Reconfiguring to eliminate the error ( <b>group management mechanisms in a peer-to-peer network <a href="#">H04L 67/1044</a></b> )} |
| G06F 11/1423 | ..... | { by reconfiguration of paths}  |
| G06F 11/1425 | ..... | { by reconfiguration of node membership}  |
| G06F 11/1428 | ..... | { with loss of hardware functionality}  |
| G06F 11/143  | ..... | { with loss of software functionality}  |
| G06F 11/1433 | ..... | {during software upgrading}   |
| G06F 11/1435 | ..... | { using file system or storage system metadata}   |
| G06F 11/1438 | ..... | {Restarting or rejuvenating}  |
| G06F 11/1441 | ..... | {Resetting or repowering}   |
| G06F 11/1443 | ..... | {Transmit or communication errors}  |
| G06F 11/1446 | ..... | { Point-in-time backing up or restoration of persistent data}   |
| G06F 11/1448 | ..... | { Management of the data involved in backup or backup restore}  |
| G06F 11/1451 | ..... | { by selection of backup contents}  |
| G06F 11/1453 | ..... | { using de-duplication of the data}   |
| G06F 11/1456 | ..... | { Hardware arrangements for backup}   |
| G06F 11/1458 | ..... | { Management of the backup or restore process}  |
| G06F 11/1461 | ..... | { Backup scheduling policy}   |
| G06F 11/1464 | ..... | { for networked environments}   |
| G06F 11/1466 | ..... | { to make the backup process non-disruptive}  |
| G06F 11/1469 | ..... | { Backup restoration techniques}  |
| G06F 11/1471 | ..... | { involving logging of persistent data for recovery}  |
| G06F 11/1474 | ..... | { in transactions ( <a href="#">G06F 17/30286</a> takes precedence)}  |
| G06F 11/1476 | ..... | { in neural networks}   |
| G06F 11/1479 | ..... | { Generic software techniques for error detection or fault masking}   |
| G06F 11/1482 | ..... | { by means of middleware or OS functionality}   |

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| G06F 11/1484 | ..... | { involving virtual machines}   |
| G06F 11/1487 | ....  | { using N-version programming}  |
| G06F 11/1489 | ....  | { through recovery blocks}  |
| G06F 11/1492 | ....  | { by run-time replication performed by the application software}  |
| G06F 11/1494 | ..... | { N-modular type}   |
| G06F 11/1497 | ...   | { Details of time redundant execution on a single processing unit}  |
| G06F 11/16   | ..    | Error detection or correction of the data by redundancy in hardware   |
| G06F 11/1604 | ...   | { where the fault affects the clock signals of a processing unit and the redundancy is at or within the level of clock signal generation hardware}  |
| G06F 11/1608 | ...   | { Error detection by comparing the output signals of redundant hardware ( <a href="#">G06F 11/1629</a> , <a href="#">G06F 11/1666</a> take precedence; error detection or correction in information storage based on relative movement between record carrier and transducer <a href="#">G11B 20/18</a> ; checking static stores for correct operation <a href="#">G11C 29/00</a> ; for logic circuits <a href="#">H03K 19/003</a> , <a href="#">H03K 19/007</a> ; for pulse counters or frequency dividers <a href="#">H03K 21/40</a> )} |
| G06F 11/1612 | ....  | { where the redundant component is persistent storage}  |
| G06F 11/1616 | ....  | { where the redundant component is an I/O device or an adapter therefor}  |
| G06F 11/162  | ..... | {Displays}  |
| G06F 11/1625 | ....  | {in communications, e.g. transmission, interfaces}  |
| G06F 11/1629 | ...   | { Error detection by comparing the output of redundant processing systems}  |
| G06F 11/1633 | ....  | { using mutual exchange of the output between the redundant processing components}  |
| G06F 11/1637 | ....  | { using additional compare functionality in one or some but not all of the redundant processing components}   |
| G06F 11/1641 | ....  | { where the comparison is not performed by the redundant processing components}   |
| G06F 11/1645 | ..... | { and the comparison itself uses redundant hardware}  |
| G06F 11/165  | ....  | { with continued operation after detection of the error}  |
| G06F 11/1654 | ....  | { where the output of only one of the redundant processing components can drive the attached hardware, e.g. memory or I/O}  |
| G06F 11/1658 | ...   | { Data re-synchronization of a redundant component, or initial sync of replacement, additional or spare unit}   |
| G06F 11/1662 | ..... | { the resynchronized component or unit being a persistent storage device (re-synchronization of failed mirror storage <a href="#">G06F 11/2082</a> ; rebuild or reconstruction of parity RAID storage <a href="#">G06F 11/1008</a> )}   |

**WARNING**

Not complete pending a reclassification. See also [G06F 11/16D](#)

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| G06F 11/1666 | ... | { where the redundant component is memory or memory area} |
|--------------|-----|---|

**WARNING**

Not complete. See also **G06F 11/00C** and **G06F 11/20L** and respective subgroups

|             |      |   |
|-------------|------|---|
| G06F 11/167 | .... | { Error detection by comparing the memory output} |
|-------------|------|---|

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| G06F 11/1675 | ...   | { Temporal synchronisation or re-synchronisation of redundant processing components}  |
| G06F 11/1679 | ....  | { at clock signal level}  |
| G06F 11/1683 | ....  | { at instruction level}   |
| G06F 11/1687 | ....  | { at event level, e.g. by interrupt or result of polling}   |
| G06F 11/1691 | ....  | { using a quantum}  |
| G06F 11/1695 | ...   | { which are operating with time diversity}  |
| G06F 11/18   | ...   | { using passive fault-masking of the redundant circuits (error detection by comparing the output of redundant processing systems with continued operation after detection of the error <a href="#">G06F 11/165</a> )}                 |
| G06F 11/181  | ....  | { Eliminating the failing redundant component}  |
| G06F 11/182  | ....  | { based on mutual exchange of the output between redundant processing components}   |
| G06F 11/183  | ....  | { by voting, the voting not being performed by the redundant components}  |
| G06F 11/184  | ..... | { where the redundant components implement processing functionality}  |
| G06F 11/185  | ..... | { and the voting is itself performed redundantly}   |
| G06F 11/186  | ....  | { Passive fault masking when reading multiple copies of the same data}  |
| G06F 11/187  | ....  | { Details of voting}  |
| G06F 11/188  | ..... | { where exact match is not required}  |
| G06F 11/20   | ...   | using active fault-masking, e.g. by switching out faulty elements or by switching in spare elements   |
| G06F 11/2002 | ....  | { where interconnections or communication control functionality are redundant (flexible arrangements for bus networks involving redundancy <a href="#">H04L 12/40176</a> )}   |
| G06F 11/2005 | ..... | { using redundant communication controllers}  |
| G06F 11/2007 | ..... | { using redundant communication media}  |
| G06F 11/201  | ..... | { between storage system components}  |
| G06F 11/2012 | ..... | { and using different communication protocols}  |
| G06F 11/2015 | ....  | {Redundant power supplies (power supply failure <a href="#">G06F 1/30</a> )}  |
| G06F 11/2017 | ....  | { where memory access, memory control or I/O control functionality is redundant (redundant communication control functionality <a href="#">G06F 11/2005</a> ; redundant storage control functionality <a href="#">G06F 11/2089</a> )} |

**WARNING**

Not complete pending a reclassification. See also [G06F 11/20L](#)

|              |       |   |
|--------------|-------|---|
| G06F 11/202  | ....  | { where processing functionality is redundant (redundant communication control functionality <a href="#">G06F 11/2005</a> , redundant storage control functionality <a href="#">G06F 11/2089</a> )} |
| G06F 11/2023 | ..... | { details of failing over}  |
| G06F 11/2025 | ..... | { using centralised failover control functionality}   |
| G06F 11/2028 | ..... | { eliminating a faulty processor or activating a spare}   |
| G06F 11/203  | ..... | { using migration}  |
| G06F 11/2033 | ..... | { switching over of hardware resources}   |
| G06F 11/2035 | ..... | { without idle spare hardware}  |
| G06F 11/2038 | ..... | { with a single idle spare processing component}  |

|              |       |  |
|--------------|-------|--|
| G06F 11/2041 | ..... | { with more than one spare processing components}  |
| G06F 11/2043 | ..... | { where the redundant components share a common memory address space}  |
| G06F 11/2046 | ..... | { where the redundant components share persistent storage<br>( <a href="#">G06F 11/2043</a> takes precedence)}   |
| G06F 11/2048 | ..... | { where the redundant components share neither address space nor persistent storage}   |
| G06F 11/2051 | ..... | { in regular structures}   |
| G06F 11/2053 | ....  | { where persistent mass storage functionality or persistent mass storage control functionality is redundant (error detection or correction in information storage based on relative movement between record carrier and transducer <a href="#">G11B 20/18</a> )} |
| G06F 11/2056 | ..... | { by mirroring}  |
| G06F 11/2058 | ..... | { using more than 2 mirrored copies}   |
| G06F 11/2061 | ..... | { combined with de-clustering of data}   |
| G06F 11/2064 | ..... | { while ensuring consistency}  |
| G06F 11/2066 | ..... | { Optimisation of the communication load}  |
| G06F 11/2069 | ..... | { Management of state, configuration or failover}  |
| G06F 11/2071 | ..... | { using a plurality of controllers}  |
| G06F 11/2074 | ..... | { Details of asynchronous techniques}  |
| G06F 11/2076 | ..... | { Details of synchronous techniques}   |
| G06F 11/2079 | ..... | { Bidirectional techniques}  |
| G06F 11/2082 | ..... | { Data synchronisation}  |
| G06F 11/2084 | ..... | { on the same storage unit}  |
| G06F 11/2087 | ..... | { with a common controller}  |
| G06F 11/2089 | ..... | { Redundant storage control functionality}   |
| G06F 11/2092 | ..... | { Details of failing over between control units}   |
| G06F 11/2094 | ..... | { Redundant storage or storage space ( <a href="#">G06F 11/2056</a> takes precedence)}   |
| G06F 11/2097 | ....  | { maintaining the standby controller/processing unit updated (initialisation or re-synchronisation thereof <a href="#">G06F 11/1658</a> and subgroups)}  |
| G06F 11/22   | .     | Detection or location of defective computer hardware by testing during standby operation or during idle time, e.g. start-up testing (testing of digital circuits, e.g. of separate computer components <a href="#">G01R 31/317</a> )                             |
| G06F 11/2205 | ..    | { using arrangements specific to the hardware being tested}  |
| G06F 11/221  | ...   | { to test buses, lines or interfaces, e.g. stuck-at or open line faults}   |
| G06F 11/2215 | ...   | { to test error correction or detection circuits}  |
| G06F 11/2221 | ...   | { to test input/output devices or peripheral units}  |
| G06F 11/2226 | ...   | { to test ALU}   |
| G06F 11/2231 | ...   | { to test interrupt circuits}  |
| G06F 11/2236 | ...   | { to test CPU or processors}   |
| G06F 11/2242 | ....  | { in multi-processor systems, e.g. one processor becoming the test master ( <a href="#">G06F 11/2736</a> takes precedence)}  |
| G06F 11/2247 | ..    | {Verification or detection of system hardware configuration}   |

- G06F 11/2252 .. { using fault dictionaries}
- G06F 11/2257 .. { using expert systems}
- G06F 11/2263 .. { using neural networks}
- G06F 11/2268 .. {Logging of test results}
- G06F 11/2273 .. {Test methods}
- G06F 11/2284 .. { by power-on test, e.g. power-on self test (POST)}
- G06F 11/2289 .. { by configuration test}
- G06F 11/2294 .. { by remote test}
- G06F 11/24 .. Marginal checking {or other specified testing methods not covered by [G06F 11/26](#), e.g. race tests}
- G06F 11/25 .. Testing of logic operation, e.g. by logic analysers
- G06F 11/26 .. Functional testing
  - G06F 11/261 ... {by simulating additional hardware, e.g. fault simulation}
  - G06F 11/263 ... Generation of test inputs, e.g. test vectors, patterns or sequences; { with adaptation of the tested hardware for testability with external testers}
    - G06F 11/2635 .... { using a storage for the test inputs, e.g. test ROM, script files}
  - G06F 11/267 ... Reconfiguring circuits for testing, e.g. LSSD, partitioning
  - G06F 11/27 ... Built-in tests
  - G06F 11/273 ... Tester hardware, i.e. output processing circuits {([G06F 11/263](#) takes precedence)}
  - G06F 11/2733 .... {Test interface between tester and unit under test}
  - G06F 11/2736 .... {using a dedicated service processor for test}
  - G06F 11/277 .... with comparison between actual response and known fault-free response
- G06F 11/28 . by checking the correct order of processing ([G06F 11/08](#) to [G06F 11/26](#) take precedence; monitoring patterns of pulse trains [H03K 5/19](#))
- G06F 11/30 . Monitoring
  - G06F 11/3003 .. { Monitoring arrangements specially adapted to the computing system or computing system component being monitored}
  - G06F 11/3006 ... { where the computing system is distributed, e.g. networked systems, clusters, multiprocessor systems (multiprogramming arrangements [G06F 9/46](#); allocation of resources [G06F 9/50](#))}
  - G06F 11/301 ... { where the computing system is a virtual computing platform, e.g. logically partitioned systems (virtual machines [G06F 9/45533](#); logical partitioning of resources [G06F 9/5077](#))}
  - G06F 11/3013 ... { where the computing system is an embedded system, i.e. a combination of hardware and software dedicated to perform a certain function in mobile devices, printers, automotive or aircraft systems (testing or monitoring of control systems or parts thereof [G05B 23/02](#))}
  - G06F 11/3017 ... { where the computing system is implementing multitasking (multiprogramming arrangements [G06F 9/46](#); allocation of resources [G06F 9/50](#))}
  - G06F 11/302 ... { where the computing system component is a software system}
  - G06F 11/3024 ... { where the computing system component is a central processing unit (CPU)}
  - G06F 11/3027 ... { where the computing system component is a bus}
  - G06F 11/3031 ... { where the computing system component is a motherboard or an expansion card}

- G06F 11/3034 ... { where the computing system component is a storage system, e.g. DASD based or network based (digital recording or reproducing [G11B 20/18](#); digital input from or digital output to record carriers [G06F 3/06](#); arrangements and networking functions for distributed storage of data in a network [H04L 29/08549](#))}
- G06F 11/3037 ... { where the computing system component is a memory, e.g. virtual memory, cache (accessing, addressing or allocating within memory systems or architectures [G06F 12/00](#); checking stores for correct operation [G11C 29/00](#))}
- G06F 11/3041 ... { where the computing system component is an input/output interface (interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units [G06F 13/00](#))}
- G06F 11/3044 ... { where the computing system component is the mechanical casing of the computing system}
- G06F 11/3048 ... { where the topology of the computing system or computing system component explicitly influences the monitoring activity, e.g. serial, hierarchical systems}
- G06F 11/3051 .. { Monitoring arrangements for monitoring the configuration of the computing system or of the computing system component, e.g. monitoring the presence of processing resources, peripherals, I/O links, software programs (verification or detection of system hardware configuration [G06F 11/2247](#))}
- G06F 11/3055 .. { Monitoring arrangements for monitoring the status of the computing system or of the computing system component, e.g. monitoring if the computing system is on, off, available, not available (error or fault processing without redundancy [G06F 11/0703](#); error detection or correction by redundancy in data representation [G06F 11/08](#); error detection or correction by redundancy in operation [G06F 11/14](#); error detection or correction by redundancy in hardware [G06F 11/16](#))}
- G06F 11/3058 .. { Monitoring arrangements for monitoring environmental properties or parameters of the computing system or of the computing system component, e.g. monitoring of power, currents, temperature, humidity, position, vibrations (thermal management in cooling arrangements of a computing system [G06F 1/206](#))}
- G06F 11/3062 ... { where the monitored property is the power consumption (power management in a computing system [G06F 1/3203](#))}
- G06F 11/3065 .. { Monitoring arrangements determined by the means or processing involved in reporting the monitored data (error or fault reporting or logging [G06F 11/0766](#))}
- G06F 11/3068 ... { where the reporting involves data format conversion}
- G06F 11/3072 ... { where the reporting involves data filtering, e.g. pattern matching, time or event triggered, adaptive or policy-based reporting }
- G06F 11/3075 .... { the data filtering being achieved in order to maintain consistency among the monitored data, e.g. ensuring that the monitored data belong to the same timeframe, to the same system or component}
- G06F 11/3079 .... { the data filtering being achieved by reporting only the changes of the monitored data}
- G06F 11/3082 .... { the data filtering being achieved by aggregating or compressing the monitored data}
- G06F 11/3086 ... { where the reporting involves the use of self describing data formats, e.g. metadata, markup languages, human readable formats}
- G06F 11/3089 .. { Monitoring arrangements determined by the means or processing involved in sensing the monitored data, e.g. interfaces, connectors, sensors, probes, agents (software debugging using additional hardware using a specific debug interface [G06F 11/3656](#); performance evaluation by tracing or monitoring [G06F 11/3466](#))}
- G06F 11/3093 ... { Configuration details thereof, e.g. installation, enabling, spatial arrangement of the probes}
- G06F 11/3096 ... { wherein the means or processing minimize the use of computing system or of

- computing system component resources, e.g. non-intrusive monitoring which minimizes the probe effect: sniffing, intercepting, indirectly deriving the monitored data from other directly available data}
- G06F 11/32 .. with visual {or acoustical} indication of the functioning of the machine
  - G06F 11/321 ... {Display for diagnostics, e.g. diagnostic result display, self-test user interface}
  - G06F 11/322 .... {Display of waveforms, e.g. of logic analysers ([G06F 11/323](#) takes precedence)}
  - G06F 11/323 ... {Visualisation of programs or trace data}
  - G06F 11/324 ... {Display of status information}
  - G06F 11/325 .... {by lamps or LED`s}
  - G06F 11/326 ..... {for error or online/offline status}
  - G06F 11/327 .... {Alarm or error message display}
  - G06F 11/328 .... {Computer systems status display ([G06F 11/327](#) takes precedence)}
  - G06F 11/34 .. Recording or statistical evaluation of computer activity, e.g. of down time, of input/output operation; { Recording or statistical evaluation of user activity, e.g. usability assessment}
  - G06F 11/3404 ... { for parallel or distributed programming}
  - G06F 11/3409 ... { for performance assessment}
  - G06F 11/3414 .... {Workload generation, e.g. scripts, playback}
  - G06F 11/3419 .... { by assessing time}
  - G06F 11/3423 ..... { where the assessed time is active or idle time}
  - G06F 11/3428 .... { Benchmarking}
  - G06F 11/3433 .... {N: for load management (allocation of a server based on load conditions [G06F 9/505](#); load rebalancing [G06F 9/5083](#); redistributing the load in a network by a load balancer [H04L 67/1029](#))}
  - G06F 11/3438 ... { monitoring of user actions (checking the network activity of the user for network-specific applications [H04L 67/22](#))}
  - G06F 11/3442 ... { for planning or managing the needed capacity}
  - G06F 11/3447 ... { Performance evaluation by modeling}
  - G06F 11/3452 ... { Performance evaluation by statistical analysis}
  - G06F 11/3457 ... {Performance evaluation by simulation}
  - G06F 11/3461 ..... {Trace driven simulation}
  - G06F 11/3466 ... {Performance evaluation by tracing or monitoring}
  - G06F 11/3471 .... {Address tracing}
  - G06F 11/3476 .... {Data logging ([G06F 11/14](#), [G06F 11/2205](#) take precedence)}
  - G06F 11/348 ... {Circuit details, i.e. tracer hardware}
  - G06F 11/3485 .... {for I/O devices}
  - G06F 11/349 .... {for interfaces, buses}
  - G06F 11/3495 .... {for systems}
  - G06F 11/36 .. Preventing errors by testing or debugging software
  - G06F 11/3604 .. { Software analysis for verifying properties of programs (structural analysis for program understanding [G06F 9/44G4M6](#); byte-code verification [G06F 9/44589](#))}
  - G06F 11/3608 ... { using formal methods, e.g. model checking, abstract interpretation (fault-tolerant software [G06F 11/16S](#); theorem proving [G06N 5/006](#))}

- G06F 11/3612 ... { by runtime analysis (performance monitoring [G06F 11/3466](#))}
- G06F 11/3616 ... { using software metrics}
- G06F 11/362 .. { Software debugging }
- G06F 11/3624 ... { by performing operations on the source code, e.g. via a compiler}
- G06F 11/3628 ... { of optimised code (optimisation **G06F 9/45E3**)}
- G06F 11/3632 ... { of specific synchronisation aspects}
- G06F 11/3636 ... { by tracing the execution of the program}
- G06F 11/364 ..... { tracing values on a bus}
- G06F 11/3644 ... { by instrumenting at runtime (for security **G06F 21/00N3E2**)}
- G06F 11/3648 ... { using additional hardware}
- G06F 11/3652 ..... { in-circuit-emulation [ICE] arrangements (emulators **G06F 11/26S2**)}
- G06F 11/3656 ..... { using a specific debug interface}
- G06F 11/366 ... { using diagnostics ([G06F 11/0703](#) takes precedence)}
- G06F 11/3664 .. { Environments for testing or debugging software}
- G06F 11/3668 .. { Software testing (software testing in telephone exchanges [H04M 3/242](#), testing of hardware [G06F 11/22](#))}
- G06F 11/3672 ... { Test management}
- G06F 11/3676 ..... { for coverage analysis}
- G06F 11/368 ..... { for test version control, e.g. updating test cases to a new software version}
- G06F 11/3684 ..... { for test design, e.g. generating new test cases}
- G06F 11/3688 ..... { for test execution, e.g. scheduling of test suites}
- G06F 11/3692 ..... { for test results analysis}
- G06F 11/3696 ... { Methods or tools to render software testable}

**G06F 12/00**

**Accessing, addressing or allocating within memory systems or architectures** ({ digital input or output to record carriers, e.g. to disc storage units [G06F 3/06](#); information storage in general [G11](#))

- G06F 12/02 . Addressing or allocation; Relocation (programme address sequencing [G06F 9/00](#); arrangements for selecting an address in a digital store [G11C 8/00](#))
- G06F 12/0207 .. {with multidimensional access, e.g. row/column, matrix}
- G06F 12/0215 .. {with look ahead addressing means}
- G06F 12/0223 .. {User address space allocation, e.g. contiguous or non contiguous base addressing}
- G06F 12/023 ... {Free address space management}
- G06F 12/0238 ..... { in non-volatile memory}
- G06F 12/0246 ..... {in block erasable memory, e.g. flash memory}
- G06F 12/0253 ..... {Garbage collection, i.e. reclamation of unreferenced memory}
- G06F 12/0261 ..... {using reference counting}
- G06F 12/0269 ..... {Incremental or concurrent garbage collection, e.g. in real-time systems ([G06F 12/0261](#) takes precedence)}
- G06F 12/0276 ..... {Generational garbage collection}
- G06F 12/0284 ... { Multiple user address space allocation, e.g. using different base addresses (interprocessor communication [G06F 15/163](#))}

- G06F 12/0292 ... { using tables or multilevel address translation means ([G06F 12/023](#) takes precedence; address translation in virtual memory systems [G06F 12/10](#))}
- G06F 12/04 .. Addressing variable-length words or parts of words
- G06F 12/06 .. Addressing a physical block of locations, e.g. base addressing, module addressing, memory dedication ([G06F 12/08](#) takes precedence)

**NOTE**

This group is limited to Module addressing or allocation; base addressing is classified in [G06F 12/0223](#).

- G06F 12/0607 ... {Interleaved addressing}
- G06F 12/0615 ... {Address space extension}
- G06F 12/0623 ..... {for memory modules}
- G06F 12/063 ..... {for I/O modules, e.g. memory mapped I/O (I/O protocol [G06F 13/42](#))}
- G06F 12/0638 ... { Combination of memories, e.g. ROM and RAM such as to permit replacement or supplementing of words in one module by words in another module (address formation of the next micro-instruction [G06F 9/26](#); masking faults in memories by using spares or by reconfiguring [G11C 29/70](#))}
- G06F 12/0646 ... {Configuration or reconfiguration}
- G06F 12/0653 ..... {with centralised address assignment}
- G06F 12/0661 ..... {and decentralised selection}
- G06F 12/0669 ..... {with decentralised address assignment}
- G06F 12/0676 ..... {the address being position dependent}
- G06F 12/0684 ..... {with feedback, e.g. presence or absence of unit detected by addressing, overflow detection}
- G06F 12/0692 ..... {Multiconfiguration, e.g. local and global addressing}
- G06F 12/08 .. in hierarchically structured memory systems, e.g. virtual memory systems
- G06F 12/0802 ... {Addressing of a memory level in which the access to the desired data or data block requires associative addressing means, e.g. cache}
- G06F 12/0804 ..... {with main memory updating ([G06F 12/0806](#) takes precedence; see provisionally also [G06F 12/12](#))}
- G06F 12/0806 ..... {Multiuser, multiprocessor, multiprocessing cache systems}
- G06F 12/0808 ..... {with cache invalidating means ([G06F 12/0815](#) and subgroups take precedence)}
- G06F 12/0811 ..... {with multilevel cache hierarchies}
- G06F 12/0813 ..... {with a network or matrix configuration}
- G06F 12/0815 ..... {Cache consistency protocols}
- G06F 12/0817 ..... {using directory methods}
- G06F 12/082 ..... {Associative directories ([G06F 12/0822](#) takes precedence)}
- G06F 12/0822 ..... {Copy directories (local copy tags for implementing a bus snooping protocol [G06F 12/0831](#))}
- G06F 12/0824 ..... {Distributed directories, e.g. linked lists of caches}
- G06F 12/0826 ..... {Limited pointers directories; State-only directories without pointers}
- G06F 12/0828 ..... {with concurrent directory accessing, i.e. handling multiple concurrent coherency transactions}

|              |       |  |
|--------------|-------|--|
| G06F 12/0831 | ..... | {using a bus scheme (e.g. with bus monitoring or watching means)}  |
| G06F 12/0833 | ..... | {in combination with broadcast means (e.g. for invalidation or updating)}                                      |
| G06F 12/0835 | ..... | {for main memory peripheral accesses (e.g. I/O or DMA)}  |
| G06F 12/0837 | ..... | {with software control (e.g. non-cacheable data)}  |
| G06F 12/084  | ..... | {with a shared cache}  |
| G06F 12/0842 | ..... | {for multiprocessing or multitasking}  |
| G06F 12/0844 | ....  | {Multiple simultaneous or quasi-simultaneous cache accessing}  |
| G06F 12/0846 | ..... | {Cache with multiple tag or data arrays being simultaneously accessible}                                       |
| G06F 12/0848 | ..... | {Partitioned cache, e.g. separate instruction and operand caches}  |
| G06F 12/0851 | ..... | {Cache with interleaved addressing}  |
| G06F 12/0853 | ..... | {Cache with multiport tag or data arrays}  |
| G06F 12/0855 | ..... | {Overlapped cache accessing, e.g. pipeline (G06F 12/0846 takes precedence)}                                    |
| G06F 12/0857 | ..... | {by multiple requestors}   |
| G06F 12/0859 | ..... | {with reload from main memory}   |
| G06F 12/0862 | ....  | {with prefetch}  |
| G06F 12/0864 | ....  | {using pseudo-associative means, e.g. set-associative, hashing}  |
| G06F 12/0866 | ....  | { for peripheral storage systems, e.g. disk cache}   |
| G06F 12/0868 | ..... | { Data transfer between cache memory and other subsystems, e.g. storage devices or host systems}               |
| G06F 12/0871 | ..... | { Allocation and management of cache space}  |
| G06F 12/0873 | ..... | { Mapping of cache memory to specific storage devices or parts of a storage device}                            |
| G06F 12/0875 | ....  | {with dedicated cache, e.g. instruction or stack}  |
| G06F 12/0877 | ....  | {Cache access modes}   |
| G06F 12/0879 | ..... | {Burst mode}   |
| G06F 12/0882 | ..... | {Page mode}  |
| G06F 12/0884 | ..... | {Parallel mode, e.g. in parallel with main memory or CPU}  |
| G06F 12/0886 | ..... | {Variable-length word access (G06F 12/0851 takes precedence)}  |
| G06F 12/0888 | ....  | { using selective caching, e.g bypass}   |
| G06F 12/0891 | ....  | {using clearing, invalidating or resetting means}  |
| G06F 12/0893 | ....  | {Organization and technology of caches}  |
| G06F 12/0895 | ..... | {of parts of caches, e.g. directory or tag array}  |
| G06F 12/0897 | ..... | {with a plurality of cache hierarchy levels (G06F 12/0811 takes precedence)}                                   |
| G06F 12/10   | ...   | Address translation  |
| G06F 12/1009 | ....  | {using page tables, e.g. page table structures}  |
| G06F 12/1018 | ..... | {involving hashing techniques, e.g. inverted page tables}  |
| G06F 12/1027 | ....  | { using associative or pseudo-associative address translation means, e.g. translation look-aside buffer (TLB)} |
| G06F 12/1036 | ..... | {for multiple virtual address spaces, e.g. segmentation (G06F 12/1045 takes precedence)}                       |
| G06F 12/1045 | ..... | {associated with a data cache}   |

- G06F 12/1054 ..... {the data cache being concurrently physically addressed}
- G06F 12/1063 ..... {the data cache being concurrently virtually addressed}
- G06F 12/1072 .... {Decentralised address translation, e.g. in distributed shared memory systems}
- G06F 12/1081 .... { for peripheral access to main memory, e.g. DMA}
- G06F 12/109 .... {for multiple virtual address spaces, e.g. segmentation}
- G06F 12/12 ... Replacement control
- G06F 12/121 ..... {using a replacement algorithm}
- G06F 12/122 ..... {of the least frequently used type, e.g. with individual count value}
- G06F 12/123 ..... {with an age list, e.g. queue, MRU-LRU list}
- G06F 12/124 ..... {being minimized, e.g. non MRU}
- G06F 12/125 ..... {being generated by decoding an array or storage}
- G06F 12/126 ..... {with special data handling, e.g. priority of data or instructions, pinning, errors}
- G06F 12/127 ..... {using an additional replacement algorithm}
- G06F 12/128 ..... {adapted to multidimensional cache systems, e.g. set-associative, multicache, multiset or multilevel}
  
- G06F 12/14 . Protection against unauthorised use of memory { or access to memory (security arrangements for protecting computers or computer systems against unauthorised activity [G06F 21/00](#); multiprogramming arrangements [G06F 9/46](#))}
- G06F 12/1408 .. {by using cryptography (for digital transmission [H04L 9/00](#))}
- G06F 12/1416 .. {by checking the object accessibility, e.g. type of access defined by the memory independently of subject rights ([G06F 12/1458](#) takes precedence)}
- G06F 12/1425 ... {the protection being physical, e.g. cell, word, block}
- G06F 12/1433 .... {for a module or a part of a module}
- G06F 12/1441 .... {for a range}
- G06F 12/145 ... {the protection being virtual, e.g. for virtual blocks or segments before a translation mechanism}
- G06F 12/1458 .. {by checking the subject access rights}
- G06F 12/1466 ... {Key-lock mechanism}
- G06F 12/1475 ..... {in a virtual system, e.g. with translation means}
- G06F 12/1483 ... {using an access-table, e.g. matrix or list}
- G06F 12/1491 ... {in a hierarchical protection system, e.g. privilege levels, memory rings}
  
- G06F 12/16 . Protection against loss of memory contents {contains no material, see [G06F 11/00](#)}
  
- G06F 13/00** **Interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units** (interface circuits for specific input/output devices [G06F 3/00](#); multiprocessor systems [G06F 15/16](#); transmission of digital information in general [H04L](#); selecting [H04Q](#); { multiprogramme control therefor [G06F 9/46](#)})
  
- G06F 13/10 . Programme control for peripheral devices ([G06F 13/14](#) to [G06F 13/42](#) take precedence)
- G06F 13/102 .. {where the programme performs an interfacing function, e.g. device driver ([G06F 13/105](#) takes precedence; scheduling within device drivers **G06F 9/46C4S**;

- contention policies within device drivers [G06F 9/46R2](#))}**
- G06F 13/105 .. [N: where the programme performs an input/output emulation function
  - G06F 13/107 ... {Terminal emulation}
  - G06F 13/12 .. using hardware independent of the central processor, e.g. channel or peripheral processor
  - G06F 13/122 ... {where hardware performs an I/O function other than control of data transfer}
  - G06F 13/124 ... {where hardware is a sequential transfer control unit, e.g. microprocessor, peripheral processor or state-machine}
  - G06F 13/126 ..... {and has means for transferring I/O instructions and statuses between control unit and main processor}
  - G06F 13/128 ..... {for dedicated transfers to a network (for protocol converters [G06F 13/387](#))}
  
  - G06F 13/14 . Handling requests for interconnection or transfer
  - G06F 13/16 .. for access to memory bus ([G06F 13/28](#) takes precedence)
  - G06F 13/1605 ... {based on arbitration (arbitration in handling access to a common bus or bus system [G06F 13/36](#))}
  - G06F 13/161 ..... {with latency improvement}
  - G06F 13/1615 ..... {using a concurrent pipeline structure}
  - G06F 13/1621 ..... {by maintaining request order}
  - G06F 13/1626 ..... {by reordering requests}
  - G06F 13/1631 ..... {through address comparison}
  - G06F 13/1636 ..... {using refresh}
  - G06F 13/1642 .... {with request queuing}
  - G06F 13/1647 .... {with interleaved bank access}
  - G06F 13/1652 .... {in a multiprocessor architecture (interprocessor communication using common memory [G06F 15/167](#))}
  - G06F 13/1657 ..... {Access to multiple memories}
  - G06F 13/1663 ..... {Access to shared memory}
  - G06F 13/1668 ... {Details of memory controller}
  - G06F 13/1673 .... {using buffers}
  - G06F 13/1678 .... {using bus width}
  - G06F 13/1684 .... {using multiple buses}
  - G06F 13/1689 .... {Synchronisation and timing concerns (synchronisation on a memory bus [G06F 13/4234](#))}
  - G06F 13/1694 ..... {Configuration of memory controller to different memory types}
  - G06F 13/18 ... based on priority control ([G06F 13/1605](#) takes precedence)
  - G06F 13/20 .. for access to input/output bus
  - G06F 13/22 ... using successive scanning, e.g. polling ([G06F 13/24](#) takes precedence)
  - G06F 13/225 ..... {with priority control}
  - G06F 13/24 ... using interrupt ([G06F 13/32](#) takes precedence)
  - G06F 13/26 ..... with priority control
  - G06F 13/28 ... using burst mode transfer, e.g. direct memory access {DMA}, cycle steal ([G06F 13/32](#) takes precedence)
  - G06F 13/282 ..... {Cycle stealing DMA ([G06F 13/30](#) takes precedence)}

|              |       |   |
|--------------|-------|---|
| G06F 13/285  | ....  | {Halt processor DMA ( <a href="#">G06F 13/30</a> takes precedence)}   |
| G06F 13/287  | ....  | {Multiplexed DMA ( <a href="#">G06F 13/30</a> takes precedence)}  |
| G06F 13/30   | ....  | with priority control   |
| G06F 13/32   | ...   | using combination of interrupt and burst mode transfer  |
| G06F 13/34   | ....  | with priority control   |
| G06F 13/36   | ..    | for access to common bus or bus system  |
| G06F 13/362  | ...   | with centralised access control   |
| G06F 13/3625 | ....  | {using a time dependent access}   |
| G06F 13/364  | ....  | using independent requests or grants, e.g. using separated request and grant lines  |
| G06F 13/366  | ....  | using a centralised polling arbiter   |
| G06F 13/368  | ...   | with decentralised access control   |
| G06F 13/37   | ....  | using a physical-position-dependent priority, e.g. daisy chain, round robin or token passing  |
| G06F 13/372  | ....  | using a time-dependent priority, e.g. individually loaded time counters or time slot  |
| G06F 13/374  | ....  | using a self-select method with individual priority code comparator   |
| G06F 13/376  | ....  | using a contention resolving method, e.g. collision detection, collision avoidance  |
| G06F 13/378  | ....  | using a parallel poll method  |
| G06F 13/38   | .     | Information transfer, e.g. on bus ( <a href="#">G06F 13/14</a> takes precedence)  |
| G06F 13/382  | ..    | {using universal interface adapter}   |
| G06F 13/385  | ...   | {for adaptation of a particular data processing system to different peripheral devices}   |
| G06F 13/387  | ...   | {for adaptation of different data processing systems to different peripheral devices, e.g. protocol converters for incompatible systems, open system} |
| G06F 13/40   | ..    | Bus structure {(for computer networks <a href="#">G06F 15/16B4</a> ; for optical bus networks <a href="#">H04B 10/20</a> )}                           |
| G06F 13/4004 | ...   | {Coupling between buses}  |
| G06F 13/4009 | ....  | {with data restructuring}   |
| G06F 13/4013 | ..... | {with data re-ordering, e.g. Endian conversion}   |
| G06F 13/4018 | ..... | {with data-width conversion}  |
| G06F 13/4022 | ....  | {using switching circuits, e.g. switching matrix, connection or expansion network ( <a href="#">G06F 13/4009</a> takes precedence)}                   |
| G06F 13/4027 | ....  | {using bus bridges ( <a href="#">G06F 13/4022</a> takes precedence)}  |
| G06F 13/4031 | ..... | {with arbitration}  |
| G06F 13/4036 | ..... | {and deadlock prevention}   |
| G06F 13/404  | ..... | {with address mapping}  |
| G06F 13/4045 | ..... | {where the bus bridge performs an extender function}  |
| G06F 13/405  | ..... | {where the bridge performs a synchronising function}  |
| G06F 13/4054 | ..... | {where the function is bus cycle extension, e.g. to meet the timing requirements of the target bus}   |
| G06F 13/4059 | ..... | {where the synchronisation uses buffers, e.g. for speed matching between buses}   |

|              |       |   |
|--------------|-------|---|
| G06F 13/4063 | ...   | {Device-to-bus coupling}  |
| G06F 13/4068 | ....  | {Electrical coupling}   |
| G06F 13/4072 | ..... | {Drivers or receivers ( <a href="#">G06F 13/4086</a> takes precedence; for multistate logic circuits <a href="#">H03K 19/0002</a> )}                  |
| G06F 13/4077 | ..... | {Precharging or discharging}  |
| G06F 13/4081 | ..... | {Live connection to bus, e.g. hot-plugging (current or voltage limitation during live insertion <a href="#">H02H 9/004</a> )}                         |
| G06F 13/4086 | ..... | {Bus impedance matching, e.g. termination}  |
| G06F 13/409  | ....  | {Mechanical coupling ( <a href="#">Back panels H05K 7/1438</a> )}   |
| G06F 13/4095 | ..... | {in incremental bus architectures, e.g. bus stacks}   |
| G06F 13/42   | ..    | Bus transfer protocol, e.g. handshake; Synchronisation (synchronisation in transmission of digital information in general <a href="#">H04L 7/00</a> ) |
| G06F 13/4204 | ...   | {on a parallel bus}   |
| G06F 13/4208 | ....  | {being a system bus, e.g. VME bus, Futurebus, Multibus}   |
| G06F 13/4213 | ..... | {with asynchronous protocol}  |
| G06F 13/4217 | ..... | {with synchronous protocol}   |
| G06F 13/4221 | ....  | {being an input/output bus, e.g. ISA bus, EISA bus, PCI bus, SCSI bus}  |
| G06F 13/4226 | ..... | {with asynchronous protocol}  |
| G06F 13/423  | ..... | {with synchronous protocol}   |
| G06F 13/4234 | ....  | {being a memory bus}  |
| G06F 13/4239 | ..... | {with asynchronous protocol}  |
| G06F 13/4243 | ..... | {with synchronous protocol}   |
| G06F 13/4247 | ...   | {on a daisy chain bus}  |
| G06F 13/4252 | ....  | {using a handshaking protocol}  |
| G06F 13/4256 | ....  | {using a clocked protocol}  |
| G06F 13/426  | ....  | {using an embedded synchronisation, e.g. Firewire bus, Fibre Channel bus, SSA bus}  |
| G06F 13/4265 | ...   | {on a point to point bus ( <a href="#">G06F 13/4247</a> , <a href="#">G06F 13/4282</a> take precedence)}  |
| G06F 13/4269 | ....  | {using a handshaking protocol, e.g. Centronics connection}  |
| G06F 13/4273 | ....  | {using a clocked protocol}  |
| G06F 13/4278 | ....  | {using an embedded synchronisation}   |
| G06F 13/4282 | ...   | {on a serial bus, e.g. I2C bus, SPI bus (on daisy chain buses <a href="#">G06F 13/4247</a> )}   |
| G06F 13/4286 | ....  | {using a handshaking protocol, e.g. RS232C link}  |
| G06F 13/4291 | ....  | {using a clocked protocol}  |
| G06F 13/4295 | ....  | {using an embedded synchronisation}   |

**G06F 15/00**      **Digital computers in general** (details [G06F 1/00](#) to [G06F 13/00](#)); **Data processing equipment in general** (neural networks for image data processing [G06T](#))

|              |    |   |
|--------------|----|---|
| G06F 15/02   | .  | manually operated with input through keyboard and computation using a built-in programme, e.g. pocket calculators |
| G06F 15/0208 | .. | {for combination with other devices having a different main function, e.g. watches, pens}                         |
| G06F 15/0216 | .. | {Constructional details or arrangements}  |

- G06F 15/0225 .. {User interface arrangements, e.g. keyboard, display; Interfaces to other computer systems}
- G06F 15/0233 ... {with printing provisions}
- G06F 15/0241 .. {of the IC-card-like type}
- G06F 15/025 .. {adapted to a specific application}
- G06F 15/0258 ... {for unit conversion}
- G06F 15/0266 ... {for time management, e.g. calendars, diaries}
- G06F 15/0275 ... {for measuring}
- G06F 15/0283 ... {for data storage and retrieval}
- G06F 15/0291 ... { for reading, e.g. e-books (constructional details of portable computers [G06F 1/1613](#))}
  
- G06F 15/04 . programmed simultaneously with the introduction of data to be processed, e.g. on the same record carrier
  
- G06F 15/08 . using a plugboard for programming
- G06F 15/10 .. Tabulators
- G06F 15/12 ... having provision for both printed and punched output
- G06F 15/14 .. Calculating-punches
  
- G06F 15/16 . Combinations of two or more digital computers each having at least an arithmetic unit, a programme unit and a register, e.g. for a simultaneous processing of several programmes {(coordinating programme control therefor [G06F 9/44P](#); in regulating and control system [G05B](#))}
- G06F 15/161 .. { Computing infrastructure, e.g. computer clusters, blade chassis or hardware partitioning (casings, cabinets, racks or drawers for data centers [H05K 5/14S](#))}
- G06F 15/163 .. Interprocessor communication
- G06F 15/167 ... using a common memory, e.g. mailbox ([memory protection G06F 12/14](#); [memory access priority G06F 13/18](#))
- G06F 15/17 ... using an input/output type connection, e.g. channel, I/O port
- G06F 15/173 ... using an interconnection network, e.g. matrix, shuffle, pyramid, star, snowflake ([interface switching circuits G06F 13/40](#))
- G06F 15/17306 ..... { Intercommunication techniques}
- G06F 15/17312 ..... { Routing techniques specific to parallel machines, e.g. wormhole, store and forward, shortest path problem congestion ([routing on a LAN H04L 12/5689](#))}
- G06F 15/17318 ..... { Parallel communications techniques, e.g. gather, scatter, reduce, roadcast, multicast, all to all}
- G06F 15/17325 ..... { Synchronisation; Hardware support therefor ([intertask synchronisation G06F 9/52](#))}
- G06F 15/17331 ..... { Distributed shared memory [DSM], e.g. remote direct memory access [RDMA] }
- G06F 15/17337 ..... { Direct connection machines, e.g. completely connected computers, point to point communication networks ([coupling between buses G06F 13/4004](#))}
- G06F 15/17343 ..... { wherein the interconnection is dynamically configurable, e.g. having loosely coupled nearest neighbor architecture ([reconfigurable processors arrays G06F 15/7867](#))}
- G06F 15/1735 ..... { Network adapters, e.g. SCI, Myrinet ([protocol engines H04L 29/06081](#))}

|               |       |   |
|---------------|-------|---|
| G06F 15/17356 | ....  | {Indirect interconnection networks}   |
| G06F 15/17362 | ..... | { hierarchical topologies}  |
| G06F 15/17368 | ..... | { non hierarchical topologies}  |
| G06F 15/17375 | ..... | { One dimensional, e.g. linear array, ring}   |
| G06F 15/17381 | ..... | { Two dimensional, e.g. mesh, torus}  |
| G06F 15/17387 | ..... | { Three dimensional, e.g. hypercubes}   |
| G06F 15/17393 | ..... | {having multistage networks, e.g. broadcasting scattering, gathering, hot spot contention, combining/decombining}   |
| G06F 15/177   | ..    | { Initialisation or configuration control ( <b>processor initialisation G06F 9/445B2</b> )}   |
| G06F 15/18    | .     | in which a programme is changed according to experience gained by the computer itself during a complete run; Learning machines ( <a href="#">adaptive control systems G05B 13/00</a> ){ not used, see <b>G06N 1/00L</b> }         |
| G06F 15/76    | .     | Architectures of general purpose stored programme computers ( <a href="#">with programme plugboard G06F 15/08</a> ; <a href="#">multicomputers G06F 15/16</a> , <a href="#">general purpose image data processing G06T 1/00</a> ) |
| G06F 15/78    | ..    | comprising a single central processing unit   |
| G06F 15/7803  | ...   | { System on board, i.e. computer system on one or more PCB, e.g. motherboards, daughterboards or blades}  |
| G06F 15/7807  | ...   | { System on chip, i.e. computer system on a single chip; System in package, i.e. computer system on one or more chips in a single package}  |
| G06F 15/781   | ....  | { On-chip cache; Off-chip memory}   |
| G06F 15/7814  | ....  | { Specially adapted for real time processing, e.g. comprising hardware timers}  |
| G06F 15/7817  | ....  | { Specially adapted for signal processing, e.g. Harvard architectures}  |
| G06F 15/7821  | ....  | { Tightly coupled to memory, e.g. computational memory, smart memory, processor in memory}  |
| G06F 15/7825  | ....  | { Globally asynchronous, locally synchronous, e.g. network on chip}   |
| G06F 15/7828  | ...   | {without memory}  |
| G06F 15/7832  | ....  | {on one IC chip ( <b>single chip microprocessors</b> )}   |
| G06F 15/7835  | ....  | {on more than one IC chip}  |
| G06F 15/7839  | ...   | {with memory}   |
| G06F 15/7842  | ....  | {on one IC chip ( <b>single chip microcontrollers</b> )}  |
| G06F 15/7846  | ..... | [N: On-chip cache and off-chip main memory  |
| G06F 15/785   | ..... | {with decentralized control, e.g. smart memories}   |
| G06F 15/7853  | ..... | {including a ROM}   |
| G06F 15/7857  | ..... | {using interleaved memory ( <b>addressing G06F 12/0607</b> )}   |
| G06F 15/786   | ..... | {using a single memory module}  |
| G06F 15/7864  | ....  | {on more than one IC chip}  |
| G06F 15/7867  | ...   | {with reconfigurable architecture}  |
| G06F 15/7871  | ....  | { Reconfiguration support, e.g. configuration loading, configuration switching, or hardware OS}   |
| G06F 15/7875  | ..... | { for multiple contexts}  |
| G06F 15/7878  | ..... | { for pipeline reconfiguration}   |
| G06F 15/7882  | ..... | { for self reconfiguration}   |

|              |       |  |
|--------------|-------|--|
| G06F 15/7885 | ....  | { Runtime interface, e.g. data exchange, runtime control}  |
| G06F 15/7889 | ..... | { Reconfigurable logic implemented as a co-processor (instruction execution using a coprocessor <a href="#">G06F 9/3877</a> )}   |
| G06F 15/7892 | ..... | { Reconfigurable logic embedded in CPU, e.g. reconfigurable unit}  |
| G06F 15/7896 | ...   | { Modular architectures, e.g. assembled from a number of identical packages}   |
| G06F 15/80   | ..    | comprising an array of processing units with common control, e.g. single instruction multiple data processors ( <a href="#">G06F 15/82</a> takes precedence; {for correlation function computation <b>G06F 17/15C</b> }) |
| G06F 15/8007 | ...   | { single instruction multiple data [SIMD] multiprocessors}   |
| G06F 15/8015 | ....  | { One dimensional arrays, e.g. rings, linear arrays, buses}  |
| G06F 15/8023 | ....  | { Two dimensional arrays, e.g. mesh, torus}  |
| G06F 15/803  | ....  | {Three-dimensional arrays or hypercubes}   |
| G06F 15/8038 | ...   | {Associative processors}   |
| G06F 15/8046 | ...   | { Systolic arrays}   |
| G06F 15/8053 | ...   | { Vector processors}   |
| G06F 15/8061 | ....  | { Details on data memory access}   |
| G06F 15/8069 | ..... | { using a cache}   |
| G06F 15/8076 | ....  | { Details on data register access}   |
| G06F 15/8084 | ..... | { Special arrangements thereof, e.g. mask or switch}   |
| G06F 15/8092 | ....  | { Array of vector units}   |
| G06F 15/82   | ..    | data or demand driven  |
| G06F 15/825  | ...   | { Dataflow computers}  |

**G06F 17/00**      **Digital computing or data processing equipment or methods, specially adapted for specific functions**

|             |      |  |
|-------------|------|--|
| G06F 17/10  | .    | Complex mathematical operations {(function generation by table look-up <a href="#">G06F 1/03</a> ; evaluation of elementary functions by calculation <a href="#">G06F 7/544</a> )}   |
| G06F 17/11  | ..   | for solving equations { , e.g. nonlinear equations, general mathematical optimization problems (optimization specially adapted for a specific administrative, business or logistic context <a href="#">G06Q 10/04</a> )}   |
| G06F 17/12  | ...  | Simultaneous equations { , e.g. systems of linear equations}   |
| G06F 17/13  | ...  | Differential equations (using digital differential analysers <a href="#">G06F 7/64</a> )   |
| G06F 17/14  | ..   | Fourier, Walsh or analogous domain transformations, { e.g. Laplace, Hilbert, Karhunen-Loeve, transforms (for correlation function computation <a href="#">G06F 17/156</a> ; spectrum analysers <a href="#">G01R 23/16</a> )}   |
| G06F 17/141 | ...  | { Discrete Fourier transforms}   |
| G06F 17/142 | .... | {Fast Fourier transforms, e.g. using a Cooley-Tukey type algorithm}  |
| G06F 17/144 | .... | { Prime factor Fourier transforms, e.g. Winograd transforms, number theoretic transforms}  |
| G06F 17/145 | ...  | {Square transforms, e.g. Hadamard, Walsh, Haar, Hough, Slant transforms}   |
| G06F 17/147 | ...  | { Discrete orthonormal transforms, e.g. discrete cosine transform, discrete sine transform, and variations therefrom, e.g. modified discrete cosine transform, integer transforms approximating the discrete cosine transform ( <a href="#">G06F 17/145</a> takes precedence)} |
| G06F 17/148 | ...  | {Wavelet transforms}   |

- G06F 17/15 .. Correlation function computation { including computation of convolution operations (arithmetic circuits for sum of products per se, e.g. multiply-accumulators [G06F 7/5443](#); digital filters, e.g. FIR, IIR, adaptive filters [H03H 17/00](#))}
- G06F 17/153 ... { Multidimensional correlation or convolution}
- G06F 17/156 ... { using a domain transform, e.g. Fourier transform, polynomial transform, number theoretic transform}
- G06F 17/16 .. Matrix or vector computation, { e.g. matrix-matrix or matrix-vector multiplication, matrix factorization (matrix transposition [G06F 7/78](#))}
- G06F 17/17 .. Function evaluation by approximation methods, e.g. inter- or extrapolation, smoothing, least mean square method ({[G06F 17/18](#) takes precedence}; interpolation for numerical control [G05B 19/18](#))
- G06F 17/175 ... {of multidimensional data}
- G06F 17/18 .. for evaluating statistical data, { e.g. average values, frequency distributions, probability functions, regression analysis (forecasting specially adapted for a specific administrative, business or logistic context [G06Q 10/04](#))}
  
- G06F 17/20 . Handling natural language data (speech analysis or synthesis [G10L](#))
- G06F 17/21 .. Text processing ([G06F 17/27](#), [G06F 17/28](#) take precedence; systems for composing machines [B41B 27/00](#))
- G06F 17/211 ... {Formatting, i.e. changing of presentation of document ([G06F 17/25](#), [G06F 17/26](#) take precedence)}
- G06F 17/212 .... {Display of layout of document; Preview}
- G06F 17/214 .... { Font handling; Temporal and kinetic typography}
- G06F 17/215 .... {Mathematical or scientific, subscripts, superscripts}
- G06F 17/217 .... {Pagination}
- G06F 17/218 .... { Tagging; Marking up (details of markup languages [G06F 17/22](#)); Designating a block; Setting of attributes (style sheets, e.g. eXtensible Stylesheet Language Transformation (XSL-T) [G06F 17/227](#))}
- G06F 17/22 ... Manipulating or registering by use of codes, e.g. in sequence of text characters {(compression [H03M 7/30](#))}
- G06F 17/2205 .... {Storage facilities}
- G06F 17/2211 .... {Calculation of differences between files}
- G06F 17/2217 .... {Character encodings}
- G06F 17/2223 ..... {Handling non-latin characters, e.g. kana-to-kanji conversion}
- G06F 17/2229 .... { Fragmentation of text-files, e.g. reusable text-blocks, including linking to the fragments, XInclude, Namespaces}
- G06F 17/2235 .... { Hyperlinking (information retrieval based on hyperlinks [G06F 17/30G4](#))}
- G06F 17/2241 .... {Hierarchical processing, e.g. outlines}
- G06F 17/2247 .... { Tree structured documents; Markup, e.g. Standard Generalized Markup Language (SGML), Document Type Definition (DTD) (validation and parsing [G06F 17/2705](#); data retrieval [G06F 17/30](#); coding and compression [H03M 7/30](#))}
- G06F 17/2252 .... { Coding or compression of tree-structured data (coding and compression in general [H03M 7/30](#))}
- G06F 17/2258 .... {Adaptation of the text data for streaming purposes, e.g. XStream}
- G06F 17/2264 .... {Transformation}
- G06F 17/227 ..... {Tree transformation for tree-structured or markup documents, e.g. eXtensible Stylesheet Language Transformation (XSL-T) stylesheets,

|              |       |  |
|--------------|-------|--|
|              |       | Omnimark, Balise}  |
| G06F 17/2276 | ..... | {using dictionaries or tables}   |
| G06F 17/2282 | ..... | {Automatic learning of transformation rules, e.g. by example}                        |
| G06F 17/2288 | ....  | {Version control}  |
| G06F 17/2294 | ....  | {Handling of whitespace}   |
| G06F 17/24   | ...   | Editing, e.g. insert/delete {(G06F 17/22 takes precedence)}                          |
| G06F 17/241  | ....  | {Annotation, e.g. comment data, footnotes}   |
| G06F 17/242  | ....  | {by use of digital ink}  |
| G06F 17/243  | ....  | {Form filling; Merging, e.g. graphical processing of form or text}                   |
| G06F 17/245  | ....  | {Tables; Ruled lines}  |
| G06F 17/246  | ....  | {Spreadsheets (relational data bases G06F 17/30R; form-filling G06F 17/243)}         |
| G06F 17/247  | ....  | {Tabulation, e.g. one dimensional positioning}                                       |
| G06F 17/248  | ....  | {Templates}  |
| G06F 17/25   | ...   | Automatic justification  |
| G06F 17/26   | ...   | Automatic hyphenation  |
| G06F 17/27   | ..    | Automatic analysis, e.g. parsing {(speech recognition, analysis or synthesis G10L)}  |
| G06F 17/2705 | ...   | {Parsing}  |
| G06F 17/271  | ....  | { Syntactic parsing, e.g. based on context-free grammar (CFG), unification grammars} |
| G06F 17/2715 | ....  | {Statistical methods}  |
| G06F 17/272  | ....  | {Parsing markup language streams (streaming G06F 17/2258)}                           |
| G06F 17/2725 | ....  | {Validation}   |
| G06F 17/273  | ...   | {Orthographic correction, e.g. spelling checkers, vowelisation}                      |
| G06F 17/2735 | ...   | {Dictionaries}   |
| G06F 17/274  | ...   | {Grammatical analysis; Style critique}   |
| G06F 17/2745 | ...   | {Heading extraction; Automatic titling, numbering}                                   |
| G06F 17/275  | ...   | {Language Identification}  |
| G06F 17/2755 | ...   | {Morphological analysis}   |
| G06F 17/276  | ...   | {Stenotyping, code gives word, guess-ahead for partial word input}                   |
| G06F 17/2765 | ...   | {Recognition}  |
| G06F 17/277  | ....  | { Lexical analysis, e.g. tokenisation, collocates}                                   |
| G06F 17/2775 | ....  | { Phrasal analysis, e.g. finite state techniques, chunking}                          |
| G06F 17/278  | ..... | { Named entity recognition}  |
| G06F 17/2785 | ...   | { Semantic analysis}   |
| G06F 17/279  | ....  | { Discourse representation}  |
| G06F 17/2795 | ...   | {Thesaurus; Synonyms}  |
| G06F 17/28   | ..    | Processing or translating of natural language (G06F 17/27 takes precedence)          |
| G06F 17/2809 | ...   | { Data driven translation}   |
| G06F 17/2818 | ....  | {Statistical methods, e.g. probability models}                                       |
| G06F 17/2827 | ....  | {Example based machine translation; Alignment}                                       |
| G06F 17/2836 | ....  | { Machine assisted translation, e.g. translation memory}                             |

- G06F 17/2845 . . . . {Using very large corpora, e.g. the world wide web (WWW)}
- G06F 17/2854 . . . { Translation evaluation}
- G06F 17/2863 . . . {Processing of non-latin text (Kana-to-kanji conversion [G06F 17/2223](#), vowelisation [G06F 17/273](#))}
- G06F 17/2872 . . . { Rule based translation}
- G06F 17/2881 . . . . { Natural language generation}
- G06F 17/289 . . . {Use of machine translation, e.g. multi-lingual retrieval, server side translation for client devices, real-time translation (Data retrieval [G06F 17/30](#), administrative and business methods [G06Q 10/00](#), [G06Q 30/00](#))}
- G06F 17/30 . . . Information retrieval; Database structures therefor; { File system structures therefor (data processing systems or methods specially adapted for administrative, commercial, financial managerial, supervisory or forecasting purposes [G06Q](#))}
- G06F 17/30002 . . . { Interfaces; Database management systems; Updating}
- WARNING**
- G06F 17/30S4T and G06F 17/30S4F9M**  
This group is no longer used for the classification of new documents as from April 15, 2012. The backlog of this group is being continuously reclassified to subgroups of [G06F 17/30067](#) and [G06F 17/30286](#)
- G06F 17/30005 . . . { File format conversion (code conversion circuits or methods [H03M 5/00](#), [H03M 7/00](#))}
- WARNING**
- This group is no longer used for the classification of new documents as from April 15, 2012. The backlog of this group is being continuously reclassified to subgroups of [G06F 17/30179](#) and [G06F 17/30569](#)
- G06F 17/30008 . . . { Concurrency control and recovery ([G06F 11/1412](#) takes precedence; transaction processing [G06F 9/466](#))}
- WARNING**
- This group is no longer used for the classification of new documents as from April 15, 2012. The backlog of this group is being continuously reclassified to subgroups of [G06F 17/30067](#) and [G06F 17/30286](#)
- G06F 17/30011 . . . {Document retrieval systems }
- G06F 17/30014 . . . { Hypermedia (hyperlinking within text processing [G06F 17/2235](#))}
- G06F 17/30017 . . . { Multimedia data retrieval; Retrieval of more than one type of audiovisual media (retrieval of image data [G06F 17/30244](#); retrieval of video data [G06F 17/30781](#); retrieval of audio data [G06F 17/3074](#); editing or indexing of data stored based on relative movement between record carrier and transducer [G11B27](#))} [1207]
- WARNING**
- [G06F 17/3002](#) - [G06F 17/30064](#) are not complete pending reclassification.  
See also [G06F 17/30017](#)
- G06F 17/3002 . . . { Indexing (indexing by using information signals detectable on the record carrier and recorded by the same method as the main recording [G11B 27/28](#))}

- G06F 17/30023 ... { Querying (programmed access in sequence to addressed parts of tracks of operating discs [G11B 27/105](#))}
- G06F 17/30026 ..... { using audio data (details of audio retrieval [G06F 17/3074](#); general determination or detection of speech characteristics [G10L11](#); speech recognition [G10L15](#); speaker recognition [G10L17](#); electrophonic musical instruments [G10H](#))}
- G06F 17/30029 ..... { by filtering; by personalisation, e.g. querying making use of user profiles}
- G06F 17/30032 ..... { using biological or physiological data of a human being, e.g. blood pressure, facial expression, gestures}
- G06F 17/30035 ..... { Administration of user profiles, e.g. generation, initialisation, adaptation, distribution}
- G06F 17/30038 ..... { based on information manually generated or based on information not derived from the media content, e.g. tags, keywords, comments, usage information, user ratings}
- G06F 17/30041 ..... { using location information}
- G06F 17/30044 ..... { using time information}
- G06F 17/30047 ..... { using image data, e.g. images, photos, pictures taken by a user}
- G06F 17/3005 ... { Presentation of query results (menu, index or table of content presentation of record carriers [G11B 27/32](#), [G11B 27/34](#))}
- G06F 17/30053 ..... { by the use of playlists}
- G06F 17/30056 ..... { Multimedia presentations, e.g. slide shows, multimedia albums}
- G06F 17/30058 ... { Retrieval by browsing and visualisation of multimedia data (trick modes [G11B 27/005](#); browsing through video recorded on operating discs [G11B 27/105](#))}
- G06F 17/30061 ..... { Spatial browsing, e.g. 2D maps, 3D or virtual spaces (interaction with 3D GUI environments in general [G06F 3/048A1E](#))}
- G06F 17/30064 ..... { Temporal browsing, e.g. timeline}
- G06F 17/30067 .. { File systems; File servers ([G06F 17/3061](#), [G06F 17/30017](#), [G06F 17/30244](#), [G06F 17/3074](#), [G06F 17/30781](#) take precedence; dedicated interfaces to storage systems [G06F 3/0601](#); error detection, correction or monitoring [G06F 11/00](#))}

### WARNING

Groups [G06F 17/3007](#) to [G06F 17/30238](#) are not complete pending reclassification. See also this group

- G06F 17/3007 ... { File system administration (file or folder operations [G06F 17/30115](#))}
- G06F 17/30073 ..... { Details of archiving (details of hierarchical storage management (HSM) systems [G06F 17/30221](#); lifecycle management in storage systems [G06F 3/0649](#); backup systems [G06F 11/1446](#))}
- G06F 17/30076 ..... { Details of conversion of file system types or formats (management of the data involved in backup or backup restore [G06F 11/1448](#))}
- G06F 17/30079 ..... { Details of migration of file systems (migration mechanisms in storage systems [G06F 3/0647](#))}
- G06F 17/30082 ..... { Use of management policies (file migration policies for HSM systems [G06F 17/30221](#); backup systems [G06F 11/1446](#))}
- G06F 17/30085 ..... { characterised by the use of retention policies (retention policies for HSM systems [G06F 17/30221](#))}

|               |       |   |
|---------------|-------|---|
| G06F 17/30088 | ....  | { Details of file system snapshots on the file-level, e.g. snapshot creation, administration, deletion (use of snapshots for error detection or correction <a href="#">G06F 11/14</a> , <a href="#">G06F 11/16</a> )}   |
| G06F 17/30091 | ...   | { File storage and access structures (management of files in storage systems <a href="#">G06F 3/0643</a> )}   |
| G06F 17/30094 | ....  | { Distributed indices}  |
| G06F 17/30097 | ....  | { Hash-based (content-based indexing of textual data <a href="#">G06F 17/30613</a> )}   |
| G06F 17/301   | ...   | { Details of searching files based on file metadata}  |
| G06F 17/30103 | ....  | { Query formulation}  |
| G06F 17/30106 | ....  | { File search processing}   |
| G06F 17/30109 | ..... | { using file content signatures, e.g. hash values}  |
| G06F 17/30112 | ....  | { Query results presentation}   |
| G06F 17/30115 | ...   | { File and folder operations}   |
| G06F 17/30117 | ....  | { Delete operations (erasing in storage systems <a href="#">G06F 3/0652</a> )}  |
| G06F 17/3012  | ....  | { File meta data generation}  |
| G06F 17/30123 | ..... | { File name conversion (management of the data involved in backup or backup restore <a href="#">G06F 11/1448</a> )}   |
| G06F 17/30126 | ....  | { Details of user interfaces specifically adapted to file systems, e.g. browsing and visualisation, 2d or 3d GUIs (query results presentation <a href="#">G06F 17/30112</a> ; interaction techniques for graphical user interfaces <a href="#">G06F 3/048</a> )}  |
| G06F 17/30129 | ...   | { Details of further file system functionalities}   |
| G06F 17/30132 | ....  | { Caching or prefetching or hoarding of files (caching for data retrieval from the Internet <a href="#">G06F 17/30902</a> ; caching for peripheral storage systems, e.g. disk cache <a href="#">G06F 12/0866</a> ; network-specific arrangements or communication protocols for caching <a href="#">H04L 67/2842</a> )} |
| G06F 17/30135 | ....  | { Details of de-fragmentation performed by the file system (management of blocks in storage devices <a href="#">G06F 3/064</a> ; saving storage space on storage systems <a href="#">G06F 3/0608</a> )}   |
| G06F 17/30138 | ....  | { Details of free space management performed by the file system (management of blocks in storage devices <a href="#">G06F 3/064</a> ; saving storage space on storage systems <a href="#">G06F 3/0608</a> )}  |
| G06F 17/30141 | ....  | { Customisation support for file systems, e.g. localisation, multi-language support, personalisation}   |
| G06F 17/30144 | ....  | { Details of monitoring file system events, e.g. by the use of hooks, filter drivers, logs}   |
| G06F 17/30147 | ....  | { for reducing power consumption or coping with limited storage space, e.g. in mobile devices (saving storage space on storage devices <a href="#">G06F 3/0608</a> ; power saving in storage systems <a href="#">G06F 3/0625</a> )}   |
| G06F 17/3015  | ....  | { Redundancy elimination performed by the file system (management of the data involved in backup or backup restore using de-duplication of the data <a href="#">G06F 11/1453</a> )}   |
| G06F 17/30153 | ..... | { using compression, e.g. sparse files (details of compression <a href="#">H03M 7/30</a> ; protocols for data compression <a href="#">H04L 69/04</a> )}   |
| G06F 17/30156 | ..... | { De-duplication implemented within the file system, e.g. based on file segments (de-duplication techniques in storage systems for the management of data blocks <a href="#">G06F 3/0641</a> )}   |
| G06F 17/30159 | ..... | { based on file chunks}   |
| G06F 17/30162 | ..... | { based on delta files}   |

|               |       |  |
|---------------|-------|--|
| G06F 17/30165 | ....  | { Support for shared access to files, file-sharing support}  |
| G06F 17/30168 | ..... | { Concurrency control, e.g. optimistic or pessimistic approaches}  |
| G06F 17/30171 | ..... | { Locking methods, e.g. locking methods for file systems allowing shared and concurrent access to files}   |
| G06F 17/30174 | ....  | { Techniques for file synchronisation in file systems (change detection <a href="#">G06F 17/30144</a> ; file management policies in general <a href="#">G06F 17/30082</a> ; distributed file systems <a href="#">G06F 17/30194</a> ; synchronisation of structured data <a href="#">G06F 17/30575</a> ; protocols for data synchronisation between network nodes <a href="#">H04L 67/1095</a> )} |
| G06F 17/30176 | ..... | { Details of non-transparently synchronising file systems}   |
| G06F 17/30179 | ..... | { Details of file format conversion}   |
| G06F 17/30182 | ...   | { File system types}   |
| G06F 17/30185 | ....  | { Append-only file systems, e.g. using logs or journals to store data}   |
| G06F 17/30188 | ..... | { providing write once read many [WORM] semantics}   |
| G06F 17/30191 | ..... | { Journaling file systems}   |
| G06F 17/30194 | ....  | { Distributed file systems}  |
| G06F 17/30197 | ..... | { implemented using NAS architecture (distributed or networked storage systems <a href="#">G06F 3/067</a> ; protocols for distributed storage of data in a network <a href="#">H04L 67/1097</a> )}   |
| G06F 17/302   | ..... | { Details of management specifically adapted to network area storage (NAS) (management of NAS or SAN <a href="#">G06F 3/067</a> )}   |
| G06F 17/30203 | ..... | [N: Details of providing network file services by network file servers, e.g. by using NFS, CIFS (network file access protocols <a href="#">H04L 67/1097</a> )}   |
| G06F 17/30206 | ..... | { implemented based on peer-to-peer networks, e.g. gnutella (p2p communication protocols <a href="#">H04L 67/104</a> )}  |
| G06F 17/30209 | ..... | { Details of management specifically adapted to peer-to-peer storage networks (topology management mechanisms of peer-to-peer networks <a href="#">H04L 67/1042</a> )}   |
| G06F 17/30212 | ..... | { implemented as replicated file system}   |
| G06F 17/30215 | ..... | { Details of management specifically adapted to replicated file systems}   |
| G06F 17/30218 | ....  | { specifically adapted to static storage, e.g. adapted to flash memory, SSD (dedicated interfaces to non-volatile semiconductor memory device <a href="#">G06F 3/0679</a> ; dedicated interfaces to non-volatile semiconductor memory arrays <a href="#">G06F 3/0688</a> )}  |
| G06F 17/30221 | ....  | { Details of hierarchical storage management (HSM) systems, e.g. file migration and policies thereof (details of archiving <a href="#">G06F 17/30F6A</a> ; life cycle management <a href="#">G06F 3/0649</a> ; hybrid storage combining heterogeneous device types <a href="#">G06F 3/0685</a> )}  |
| G06F 17/30224 | ....  | { Parallel file systems, i.e. file systems supporting multiple processors}   |
| G06F 17/30227 | ....  | { Transactional file systems (commit processing in structured data stores <a href="#">G06F 17/30377</a> )}   |
| G06F 17/3023  | ....  | { Versioning file systems, temporal file systems, e.g. file system supporting different historic versions of e.g. files}   |
| G06F 17/30233 | ....  | { Virtual file systems}  |
| G06F 17/30235 | ..... | { Implementing virtual folder structures}  |
| G06F 17/30238 | ..... | { Specific adaptations of the file system to access devices and non-file objects via standard file system access operations, e.g. pseudo file systems (dedicated interfaces to storage systems <a href="#">G06F 3/0601</a> )}  |

- G06F 17/30241 .. {in geographical information databases (instruments for geographical navigation [G01C 21/00](#); combinations of GPS with other systems **G01S 5/14B3**; three dimensional geographic models **G06T 17/50**)}
- G06F 17/30244 .. {in image databases}
- G06F 17/30247 ... { based on features automatically derived from the image data (pattern recognition [G06K 9/00](#))}
- G06F 17/3025 ..... {using colour}
- G06F 17/30253 ..... {using extracted text}
- G06F 17/30256 ..... {using a combination of image content features}
- G06F 17/30259 ..... {using shape and object relationship}
- G06F 17/30262 ..... {using texture}
- G06F 17/30265 ... { based on information manually generated or based on information not derived from the image data}
- G06F 17/30268 ..... { using information manually generated, e.g. tags, keywords, comments, manually generated location and time information}
- G06F 17/30271 ... {the images having vectorial formats}
- G06F 17/30274 ... {by browsing}
- G06F 17/30277 ... {by graphical querying}
- G06F 17/3028 ... {data organisation and access thereof}
- G06F 17/30283 .. { using distributed data base systems, e.g. networks}

**WARNING****G06F 17/30S4P3D**

This group is no longer used for the classification of new documents as from April 15, 2012. The backlog of this group is being continuously reclassified to subgroups of [G06F 17/30067](#) and [G06F 17/30286](#)

- G06F 17/30286 .. { in structured data stores}

**WARNING**

Not complete pending the completion of a reclassification; see also [G06F 17/30B](#), [G06F 17/30008](#) and [G06F 17/30283](#)

- G06F 17/30289 ... { Database design, administration or maintenance}
- G06F 17/30292 ..... { Schema design and management}
- G06F 17/30294 ..... { with details for data modelling support}
- G06F 17/30297 ..... { with details for schema evolution support}
- G06F 17/303 ..... { Database migration support}
- G06F 17/30303 ..... { Improving data quality; Data cleansing}
- G06F 17/30306 ..... { Database tuning (**G06F 17/30S2D**, [G06F 17/30339](#) take precedence; database performance monitoring [G06F 11/3409](#))}
- G06F 17/30309 ..... { Managing data history or versioning (querying temporal data [G06F 17/30551](#); querying versioned data [G06F 17/30548](#))}
- G06F 17/30312 ... { Storage and indexing structures; Management thereof}
- G06F 17/30315 ..... { Column-oriented storage; Management thereof}
- G06F 17/30318 ..... { Details of Large Object storage; Management thereof}

|                       |       |  |
|-----------------------|-------|--|
| G06F 17/30321         | ..... | { Indexing structures ( <b>indexing structures for unstructured textual data</b> <a href="#">G06F 17/30619</a> )}  |
| G06F 17/30324         | ..... | { Vectors, bitmaps or matrices}  |
| G06F 17/30327         | ..... | { Trees, e.g. B+trees}   |
| <b><u>WARNING</u></b> |       |  |
| G06F 17/30333         | ..... | { Hash tables}   |
| G06F 17/30333         | ..... | { Multidimensional index structures}   |
| G06F 17/30336         | ..... | { indexing structure managing details}   |
| G06F 17/30339         | ..... | { Tablespace storage structures; Management thereof}   |
| G06F 17/30342         | ..... | { Details of User-Defined Types; Storage management thereof}   |
| G06F 17/30345         | ...   | { Update requests}   |
| G06F 17/30348         | ..... | { Concurrency control ( <b>transaction processing</b> <a href="#">G06F 9/466</a> )}  |
| G06F 17/30351         | ..... | { Optimistic concurrency control}  |
| G06F 17/30353         | ..... | { using timestamps}  |
| G06F 17/30356         | ..... | { using versioning}  |
| G06F 17/30359         | ..... | { Pessimistic concurrency control approaches, e.g. locking, multiple versions without time stamps}   |
| G06F 17/30362         | ..... | { Locking methods, e.g. distributed locking, locking implementation details}   |
| G06F 17/30365         | ..... | { Update request formulation}  |
| G06F 17/30368         | ..... | { Change logging, detection, and notification ( <b>replication</b> <a href="#">G06F 17/30575</a> )}  |
| G06F 17/30371         | ..... | { Ensuring data consistency and integrity}   |
| G06F 17/30374         | ..... | { Details of updates performed during offline database operations}   |
| G06F 17/30377         | ..... | { Details of updates performed during online database operations; commit processing}   |
| G06F 17/3038          | ..... | { Details of bulk updating operations ( <b>data conversion details</b> <a href="#">G06F 17/30569</a> )}  |
| G06F 17/30383         | ..... | { Updating materialised views}   |
| G06F 17/30386         | ...   | { Retrieval requests}  |
| G06F 17/30389         | ..... | { Query formulation ( <b>Interaction techniques for graphical user interfaces</b> <a href="#">G06F 3/048</a> )}  |
| G06F 17/30392         | ..... | { Interactive query statement specification based on a database schema}  |
| G06F 17/30395         | ..... | { Iterative querying; query formulation based on the results of a preceding query}   |
| G06F 17/30398         | ..... | { Query predicate definition using graphical user interfaces, including menus and forms ( <a href="#">G06F 17/30392</a> <b>takes precedence</b> )}         |
| G06F 17/30401         | ..... | { Natural language query formulation ( <b>natural language analysis, translation, semantics</b> <a href="#">G06F 17/27</a> , <a href="#">G06F 17/28</a> )} |
| G06F 17/30404         | ..... | { Query languages}   |
| G06F 17/30407         | ..... | { Active constructs}   |
| G06F 17/3041          | ..... | { Embedded query languages}  |
| G06F 17/30412         | ..... | { Grouping and aggregation}  |
| G06F 17/30415         | ..... | { Stored procedures}   |

|               |       |   |
|---------------|-------|---|
| G06F 17/30418 | ..... | { Data retrieval commands; view definitions}  |
| G06F 17/30421 | ..... | { for particular applications; for extensibility, e.g. user defined types}  |
| G06F 17/30424 | ....  | { Query processing}   |
| G06F 17/30427 | ..... | { Query translation}  |
| G06F 17/3043  | ..... | { Translation of natural language queries to structured queries (natural language analysis, translation, semantics <a href="#">G06F 17/27</a> , <a href="#">G06F 17/28</a> )} |
| G06F 17/30433 | ..... | { Access plan code generation and invalidation; reuse of access plans}  |
| G06F 17/30436 | ..... | { Internal representations for queries}   |
| G06F 17/30439 | ..... | { Standardisation and Simplification}   |
| G06F 17/30442 | ..... | { Query optimisation}   |
| G06F 17/30445 | ..... | { for parallel queries}   |
| G06F 17/30448 | ..... | { Query rewriting and transformation}   |
| G06F 17/30451 | ..... | { of sub-queries or views}  |
| G06F 17/30454 | ..... | { of operators}   |
| G06F 17/30457 | ..... | { to use cached/materialised query results}   |
| G06F 17/3046  | ..... | { Optimising common expressions}  |
| G06F 17/30463 | ..... | { Plan optimisation}  |
| G06F 17/30466 | ..... | { Join order optimisation}  |
| G06F 17/30469 | ..... | { Selectivity estimation or determination}  |
| G06F 17/30471 | ..... | { Optimisations to support specific applications; extensibility of optimisers}  |
| G06F 17/30474 | ..... | { Run-time optimisation}  |
| G06F 17/30477 | ..... | { Query execution}  |
| G06F 17/3048  | ..... | { Database cache management}  |
| G06F 17/30483 | ..... | { of query operations}  |
| G06F 17/30486 | ..... | { Unary operations; data partitioning operations}   |
| G06F 17/30489 | ..... | { Aggregation and duplicate elimination}  |
| G06F 17/30492 | ..... | { Efficient disk access during query execution}   |
| G06F 17/30495 | ..... | { Binary matching operations}   |
| G06F 17/30498 | ..... | { Join operations}  |
| G06F 17/30501 | ..... | { Intermediate data storage techniques for performance improvement}   |
| G06F 17/30504 | ..... | { Pointer and reference processing operations}  |
| G06F 17/30507 | ..... | { Applying rules; deductive queries}  |
| G06F 17/3051  | ..... | { Triggers and constraints}   |
| G06F 17/30513 | ..... | { Recursive queries}  |
| G06F 17/30516 | ..... | { Data stream processing; continuous queries}   |
| G06F 17/30519 | ..... | { Query processing with adaptation to specific hardware, e.g. adapted for using GPUs or SSDs}   |
| G06F 17/30522 | ..... | { Query processing with adaptation to user needs}   |
| G06F 17/30525 | ..... | { using data annotations (user-defined metadata)}   |
| G06F 17/30528 | ..... | { using context}  |

|               |       |  |
|---------------|-------|--|
| G06F 17/3053  | ..... | { using ranking}   |
| G06F 17/30533 | ..... | { Other types of queries}  |
| G06F 17/30536 | ..... | { Approximate and statistical query processing}  |
| G06F 17/30539 | ..... | { Query processing support for facilitating data mining operations in structured databases}  |
| G06F 17/30542 | ..... | { Fuzzy query processing}  |
| G06F 17/30545 | ..... | { Distributed queries}   |
| G06F 17/30548 | ..... | { Querying sequence data, e.g. querying versioned data }   |
| G06F 17/30551 | ..... | { Querying temporal data}  |
| G06F 17/30554 | ....  | { Query result display and visualisation}  |
| G06F 17/30557 | ...   | { Details of integrating or interfacing systems involving at least one database management system}   |
| G06F 17/3056  | ....  | { between a Database Management System and a front-end application}  |
| G06F 17/30563 | ....  | { Details for extract, transform and load [ETL] procedures, e.g. ETL data flows in data warehouses}  |
| G06F 17/30566 | ....  | { in federated and virtual databases ( <b>distributed queries</b> <a href="#">G06F 17/30545</a> )}   |
| G06F 17/30569 | ....  | { Details of data format conversion from or to a database}   |
| G06F 17/30572 | ...   | { Visual data mining and browsing structured data}   |
| G06F 17/30575 | ...   | { Replication, distribution or synchronisation of data between databases or within a distributed database; Distributed database system architectures therefor} |
| G06F 17/30578 | ....  | { Details of asynchronous replication and data reconciliation}   |
| G06F 17/30581 | ....  | { Details of synchronous replication}  |
| G06F 17/30584 | ....  | { Details of data partitioning, e.g. horizontal or vertical partitioning}  |
| G06F 17/30587 | ...   | { Details of specialised database models}  |
| G06F 17/30589 | ....  | { Hierarchical databases, e.g. IMS, LDAP data stores, Lotus Notes}   |
| G06F 17/30592 | ....  | { Multi-dimensional databases and data warehouses, e.g. MOLAP, ROLAP}  |
| G06F 17/30595 | ....  | { Relational databases}  |
| G06F 17/30598 | ..... | { Clustering or classification ( <b>for textual data</b> <a href="#">G06F 17/30705</a> )}  |
| G06F 17/30601 | ..... | { including cluster or class visualization or browsing ( <b>for textual data</b> <a href="#">G06F 17/30713</a> )}  |
| G06F 17/30604 | ..... | { Entity relationship models}  |
| G06F 17/30607 | ....  | { Object oriented databases}   |
| G06F 17/3061  | ..    | { of unstructured textual data ( <b>document management systems</b> <a href="#">G06F 17/30011</a> )}   |
| G06F 17/30613 | ...   | { Indexing}  |
| G06F 17/30616 | ....  | { Selection or weighting of terms for indexing ( <a href="#">G06F 17/30663</a> takes precedence; <b>for summarization</b> <a href="#">G06F 17/30719</a> )}     |
| G06F 17/30619 | ....  | { indexing structures ( <b>indexing structures for structured data stores</b> <a href="#">G06F 17/30321</a> )}   |
| G06F 17/30622 | ..... | { Inverted lists}  |
| G06F 17/30625 | ..... | { Trees}   |
| G06F 17/30628 | ..... | { Hash tables}   |
| G06F 17/30631 | ..... | { Index managing details}  |
| G06F 17/30634 | ...   | { Querying}  |

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|---------------|-------|--|
| G06F 17/30637 | ....  | { Query formulation}   |
| G06F 17/3064  | ..... | { using system suggestions ( <a href="#">G06F 17/30646</a> takes precedence)}  |
| G06F 17/30643 | ..... | { using document space presentation or visualization, e.g. category, hierarchy or range presentation and selection}  |
| G06F 17/30646 | ..... | { reformulation based on results of preceding query}   |
| G06F 17/30648 | ..... | { using relevance feedback from the user, e.g. relevance feedback on documents, documents sets, document terms or passages}  |
| G06F 17/30651 | ..... | { using graphical result space presentation or visualisation}  |
| G06F 17/30654 | ..... | { Natural language query formulation or dialogue systems}  |
| G06F 17/30657 | ....  | { Query processing}  |
| G06F 17/3066  | ..... | { Query translation}   |
| G06F 17/30663 | ..... | { Selection or weighting of terms from queries, including natural language queries}  |
| G06F 17/30666 | ..... | { Syntactic pre-processing steps, e.g. stopword elimination, stemming ( <b>lexical analysis G06F 9/45A</b> )}  |
| G06F 17/30669 | ..... | { Translation of the query language, e.g. Chinese to English ( <b>language translation <a href="#">G06F 17/28</a></b> )}   |
| G06F 17/30672 | ..... | { Query expansion}   |
| G06F 17/30675 | ..... | { Query execution ( <a href="#">G06F 17/30699</a> takes precedence)}   |
| G06F 17/30678 | ..... | { using boolean model}   |
| G06F 17/30681 | ..... | { using phonetics}   |
| G06F 17/30684 | ..... | { using natural language analysis}   |
| G06F 17/30687 | ..... | { using probabilistic model}   |
| G06F 17/3069  | ..... | { using vector based model}  |
| G06F 17/30693 | ..... | { Reuse of stored results of previous queries ( <b>for formulation of new queries <a href="#">G06F 17/30646</a></b> )}   |
| G06F 17/30696 | ....  | { Presentation or visualization of query results ( <a href="#">G06F 17/30651</a> takes precedence; <b>browsing or visualization of document space <a href="#">G06F 17/30716</a></b> )} |
| G06F 17/30699 | ...   | { Filtering based on additional data, e.g. user or group profiles ( <b>filtering in web context <a href="#">G06F 17/30867</a></b> )}   |
| G06F 17/30702 | ....  | { Profile generation, learning or modification}  |
| G06F 17/30705 | ...   | { Clustering or classification ( <b>manual classification <a href="#">G06F 17/30722</a></b> )}   |
| G06F 17/30707 | ....  | { into predefined classes}   |
| G06F 17/3071  | ....  | { including class or cluster creation or modification}   |
| G06F 17/30713 | ....  | { including cluster or class visualization or browsing}  |
| G06F 17/30716 | ...   | { Browsing or visualization}   |
| G06F 17/30719 | ....  | { Summarization for human users}   |
| G06F 17/30722 | ...   | { based on associated metadata or manual classification, e.g. bibliographic data}  |
| G06F 17/30725 | ....  | { using identifiers, e.g. barcodes, RFIDs ( <b>for URLs <a href="#">G06F 17/30879</a></b> )}   |
| G06F 17/30728 | ....  | { using citations ( <b>hypermedia G06F 17/30G4</b> )}  |
| G06F 17/30731 | ...   | { Creation of semantic tools}  |
| G06F 17/30734 | ....  | { Ontology}  |
| G06F 17/30737 | ....  | { Thesaurus}   |

G06F 17/3074 .. { Audio data retrieval (retrieval of video data [G06F 17/30781](#); retrieval of multimedia data [G06F 17/30017](#); general determination or detection of speech characteristics G10L11; speech recognition G10L15; speaker recognition G10L17; electrophonic musical instruments G10H; editing or indexing of data stored based on relative movement between record carrier and transducer G11B27)}

### **WARNING**

Groups [G06F 17/30743](#) - [G06F 17/30778](#) are not complete pending reclassification. See also [G06F 17/3074](#)

G06F 17/30743 ... { using features automatically derived from the audio content, e.g. descriptors, fingerprints, signatures, MEP-cepstral coefficients, musical score, tempo (content oriented musical parameter indexing, e.g. tempo G10H; determination or detection of speech characteristics G10L11; audio watermarking, e.g. by inserting fingerprints **G10L 19/00W**; indexing by using information signals detectable on the record carrier and recorded by the same method as the main recording [G11B 27/28](#))}

G06F 17/30746 .... { using automatically derived transcript of audio data, e.g. lyrics (speech recognition G10L15)}

G06F 17/30749 ... { using information manually generated or using information not derived from the audio data, e.g. title and artist information, time and location information, usage information, user ratings (programmed access in sequence to addressed parts of tracks of operating discs [G11B 27/105](#))}

G06F 17/30752 .... { using information manually generated, e.g. tags, keywords, comments, title or artist information, time, location or usage information, user ratings}

G06F 17/30755 ... { Query formulation specially adapted for audio data retrieval}

G06F 17/30758 .... { Query by example, e.g. query by humming}

G06F 17/30761 .... { Filtering; personalisation, e.g. querying making use of user profiles}

G06F 17/30764 ..... { by using biological or physiological data}

G06F 17/30766 ..... { Administration of user profiles, e.g. generation, initialization, adaptation, distribution}

G06F 17/30769 ... { Presentation of query results (menu, index or table of content presentation of record carriers [G11B 27/32](#), [G11B 27/34](#))}

G06F 17/30772 .... { making use of playlists}

G06F 17/30775 ... { Browsing (generation of a list or set of audio data **G06F 17/30U4R**; trick modes [G11B 27/005](#); browsing through audio recorded on operating discs [G11B 27/105](#))}

G06F 17/30778 ... { Audio database index structures and management thereof}

G06F 17/30781 .. { of video data (recognising patterns [G06K 9/00](#); image analysis [G06T 7/00](#); editing or indexing information signals on a record carrier in which information is recorded and accessed based on relative movement between record carrier and transducer [G11B 27/00](#); source coding or decoding of digital video signal [H04N 7/26](#); selective content distribution, e.g. interactive television, video on demand [H04N 21/00](#))}

G06F 17/30784 ... { using features automatically derived from the video content, e.g. descriptors, fingerprints, signatures, genre (recognising video content [G06K 9/00711](#); extraction of features or characteristics for pattern recognition of the image [G06K 9/46](#))}

G06F 17/30787 .... { using audio features (general determination or detection of speech characteristics [G10L 11/00](#); speech recognition [G10L 15/00](#); speaker recognition [G10L 17/00](#); contents oriented musical parameter indexing, e.g. tempo G10H)}

|               |       |   |
|---------------|-------|---|
| G06F 17/3079  | ....  | { using objects detected or recognised in the video content (methods for image acquisition of a pattern to be recognized involving target detection <a href="#">G06K 9/3241</a> )}  |
| G06F 17/30793 | ..... | { the detected or recognised objects being people (face recognition <a href="#">G06K 9/00221</a> ; human body recognition <a href="#">G06K 9/00369</a> ; speaker recognition <a href="#">G10L 17/00</a> )}  |
| G06F 17/30796 | ....  | { using original textual content or text extracted from visual content or transcript of audio data (extraction of overlay text <a href="#">G06K 9/32R1T2</a> )}   |
| G06F 17/30799 | ....  | { using low-level visual features of the video content (methods for preprocessing an image in order to extract features of a pattern to be recognized <a href="#">G06K 9/46</a> ; image processing involving image features extraction in general <a href="#">G06T</a> )}   |
| G06F 17/30802 | ..... | { using colour or luminescence (colour analysis on image data <a href="#">G06T 7/408</a> )}   |
| G06F 17/30805 | ..... | { using shape ( <a href="#">G06F 17/3079</a> takes precedence; segmentation or edge detection on image data <a href="#">G06T 7/0079</a> ; analysis of geometric attributes on image data <a href="#">G06T 7/60</a> )}   |
| G06F 17/30808 | ..... | { using texture ( <a href="#">G06F 17/3079</a> takes precedence; texture analysis on image data <a href="#">G06T 7/401</a> , <a href="#">G06T 7/407</a> )}  |
| G06F 17/30811 | ..... | { using motion, e.g. object motion, camera motion (motion analysis on image data <a href="#">G06T 7/20</a> )}   |
| G06F 17/30814 | ..... | { using domain-transform features, e.g. DCT, wavelet transform coefficients}  |
| G06F 17/30817 | ...   | { using information manually generated or using information not derived from the video content, e.g. time and location information, usage information, user ratings}  |
| G06F 17/3082  | ....  | { using information manually generated, e.g. tags, keywords, comments, title and artist information, manually generated time, location and usage information, user ratings}   |
| G06F 17/30823 | ...   | { Query formulation and processing specifically adapted for the retrieval of video data}  |
| G06F 17/30825 | ....  | { Query by example, e.g. a complete video frame or video sequence (graphical querying <a href="#">G06F 17/30831</a> )}  |
| G06F 17/30828 | ....  | { Filtering and personalisation; User profiles}   |
| G06F 17/30831 | ....  | { Graphical querying, e.g. query-by-region, query-by-sketch, query-by-trajectory, GUIs for designating a person/face/object as a query predicate (end-user interface involving hot spots associated with the video <a href="#">H04N 21/4725</a> ; end-user interface for selecting a Region of Interest <a href="#">H04N 21/4728</a> )} |
| G06F 17/30834 | ....  | { Query language or query format}   |
| G06F 17/30837 | ...   | { Query results presentation or summarisation specifically adapted for the retrieval of video data (end-user interface for requesting or interacting with video content, e.g. video on demand interface or electronic program guide <a href="#">H04N 21/472</a> )}  |
| G06F 17/3084  | ....  | { Presentation of query results ( <a href="#">G06F 17/30843</a> takes precedence; browsing a video collection <a href="#">G06F 17/30849</a> )}  |
| G06F 17/30843 | ....  | { Presentation in form of a video summary, e.g. the video summary being a video sequence, a composite still image or having synthesized frames}   |
| G06F 17/30846 | ...   | { Browsing of video data (end-user interface for requesting or interacting with video content, e.g. video on demand interface or electronic program guide <a href="#">H04N 21/472</a> ; indicating arrangements in the context of indexing and addressing recorded information <a href="#">G11B 27/34</a> )}                            |

|               |       |   |
|---------------|-------|---|
| G06F 17/30849 | ....  | { Browsing a collection of video files or sequences}  |
| G06F 17/30852 | ....  | { Browsing the internal structure of a single video sequence}   |
| G06F 17/30855 | ....  | { Hypervideo (linking data to content, e.g. by linking an URL to a video object in the context of video distribution systems <a href="#">H04N 21/858</a> )}               |
| G06F 17/30858 | ...   | { Video database index structures or management thereof (table of contents on a record carrier <a href="#">G11B 27/327</a> )}   |
| G06F 17/30861 | ..    | {Retrieval from the Internet, e.g. browsers (internet protocol <a href="#">H04L 29/06095</a> )}   |
| G06F 17/30864 | ...   | {by querying, e.g. search engines or meta-search engines, crawling techniques, push systems}  |
| G06F 17/30867 | ....  | {with filtering and personalisation}  |
| G06F 17/3087  | ....  | {Spatially dependent indexing and retrieval, e.g. location dependent results to queries}  |
| G06F 17/30873 | ...   | {by navigation, e.g. using categorized browsing, portals, synchronized browsing, visual networks of documents, virtual worlds or tours}                                   |
| G06F 17/30876 | ...   | {by using information identifiers, e.g. encoding URL in specific indicia, browsing history}   |
| G06F 17/30879 | ....  | {by using bar codes}  |
| G06F 17/30882 | ....  | { details of hyperlinks; management of linked annotations}  |
| G06F 17/30884 | ....  | {Bookmark management}   |
| G06F 17/30887 | ....  | {URL specific, e.g. using aliases, detecting broken or misspelled links (address allocation to terminals or nodes connected to a network <a href="#">H04L 29/12009</a> )} |
| G06F 17/3089  | ...   | {Web site content organization and management, e.g. publishing, automatic linking or maintaining pages}   |
| G06F 17/30893 | ....  | {Access to data in other repository systems, e.g. legacy data or dynamic Web page generation}   |
| G06F 17/30896 | ....  | {Document structures and storage, e.g. HTML extensions}   |
| G06F 17/30899 | ...   | {Browsing optimisation}   |
| G06F 17/30902 | ....  | { of access to content, e.g. by caching (accessing, addressing or allocating within memory systems and caches <a href="#">G06F 12/08</a> )}                               |
| G06F 17/30905 | ....  | {Optimising the visualization of content, e.g. distillation of HTML documents}  |
| G06F 17/30908 | ..    | {of semistructured data, the underlying structure being taken into account, e.g. mark-up language structure data}   |
| G06F 17/30911 | ...   | {Indexing, e.g. of XML tags}  |
| G06F 17/30914 | ...   | {Mapping or conversion}   |
| G06F 17/30917 | ....  | {Mapping to a database}   |
| G06F 17/3092  | ....  | {Mark-up to mark-up conversion (conversion for visualization in web browsing <a href="#">G06F 17/30905</a> )}   |
| G06F 17/30923 | ...   | {XML native databases, structures and querying}   |
| G06F 17/30926 | ....  | { Query formulation}  |
| G06F 17/30929 | ....  | { Query processing}   |
| G06F 17/30932 | ..... | { Query translation}  |
| G06F 17/30935 | ..... | { Query optimisation}   |
| G06F 17/30938 | ..... | { Query execution}  |
| G06F 17/30941 | ....  | { Results presentation}   |
| G06F 17/30943 | ..    | { details of database functions independent of the retrieved data type}   |

- G06F 17/30946 ... { indexing structures (indexing structures for specific data types [G06F 17/30067](#), [G06F 17/30619](#), [G06F 17/30321](#))}
- G06F 17/30949 .... { hash tables (hashing functions for network address lookup or routing in networks [H04L 12/5689](#))}
- G06F 17/30952 .... { using directory or table look-up (use of a directory or look-up table in file systems [G06F 17/30067](#))}
- G06F 17/30955 ..... { using more than one table in sequence, i.e. systems with three or more layers}
- G06F 17/30958 .... { Graphs; Linked lists ([G06F 17/30961](#) takes precedence)}
- G06F 17/30961 .... { Trees}
- G06F 17/30964 ... { Querying}
- G06F 17/30967 .... { Query formulation}
- G06F 17/3097 ..... { using system suggestions}
- G06F 17/30973 ..... { using search space presentation or visualization, e.g. category or range presentation and selection}
- G06F 17/30976 ..... { Natural language query formulation or dialogue systems}
- G06F 17/30979 .... { Query processing}
- G06F 17/30982 ..... { by using parallel associative memories or content-addressable memories}
- G06F 17/30985 ..... { by using string matching techniques (sequence comparison in bioinformatics [G06F 19/22](#); string matching used for packet routing in packet switching systems [H04L 12/5689](#))}
- G06F 17/30988 ..... { by searching ordered data, e.g. alpha-numerically ordered data (sequence comparison in bioinformatics [G06F 19/22](#))}
- G06F 17/30991 .... { Presentation or visualization of query results}
- G06F 17/30994 ... { Browsing or visualization}
- G06F 17/30997 ... { Retrieval based on associated metadata}
  
- G06F 17/40 . Data acquisition and logging (for input to computer [G06F 3/00](#); { displays as computer output [G06F 3/14](#); for image data processing [G06T 9/00](#); compression in general [H03M 7/30](#); for transmission [H04B 1/66](#); for pictorial communication [H04N](#); arrangements in telecontrol or telemetry systems for selectively calling a substation from a main station [H04Q 9/00](#)})

**WARNING**

This group is no longer used for the classification of new documents. The documents are classified in the application fields according to the references above

- G06F 17/50 . Computer-aided design
- G06F 17/5004 .. { Architectural design, e.g. building design}
- G06F 17/5009 .. {using simulation}
- G06F 17/5013 ... {using petri net models}
- G06F 17/5018 ... {using finite difference methods or finite element methods (picture mesh generation [G06T 17/20](#))}
- G06F 17/5022 ... {Logic simulation, e.g. for logic circuit operation (fault-simulation [G06F 11/261](#); test pattern synthesising [G06F 11/263](#))}

- G06F 17/5027 . . . . {Logic emulation using reprogrammable logic devices, e.g. field programmable gate arrays (FPGA)}
- G06F 17/5031 . . . . {Timing analysis}
- G06F 17/5036 . . . {for analog modelling, e.g. for circuits, spice programme, direct methods, relaxation methods}
- G06F 17/504 . . . {Formal methods}
- G06F 17/5045 . . {Circuit design ([G06F 17/5068](#) takes precedence; logic circuits [H03K 19/00](#))}
- G06F 17/505 . . . {Logic synthesis, e.g. technology mapping, optimisation}
- G06F 17/5054 . . . {for user-programmable logic devices, e.g. field programmable gate arrays (FPGA)}
- G06F 17/5059 . . . {Delay-insensitive circuit design, e.g. asynchronous, self-timed}
- G06F 17/5063 . . . {Analog circuit design, e.g. amplifiers}
- G06F 17/5068 . . {Physical circuit design, e.g. layout for integrated circuits or printed circuit boards}
- G06F 17/5072 . . . {Floorplanning, e.g. partitioning, placement}
- G06F 17/5077 . . . {Routing}
- G06F 17/5081 . . . {Layout analysis, e.g. layout verification, design rule check}
- G06F 17/5086 . . {Mechanical design, e.g. parametric or variational design}
- G06F 17/509 . . {Network design, e.g. positioning, routing, graphs ([circuit design G06F 17/5068](#))}
- G06F 17/5095 . . { Vehicle design, e.g. aircraft or automotive design}

- G06F 17/60 . . Administrative, commercial, managerial, supervisory or forecasting purposes ([electronic cash registers other than digital data processing aspects thereof G07G 1/12](#))

### **WARNING**

This group is no longer used for the classification of new documents as from January 1, 2006. The backlog of this group is being continuously reclassified to the relevant groups of G06Q

- G06F 17/602 . . {Data processing in buying-selling transactions ([for trading of electric energy H02J 3/008](#))(not used)}
- G06F 17/604 . . . {for exchange business, e.g. quotations or sales transactions of stock or other commodities ([stock quotation systems H04L 12/1804](#))}
- G06F 17/606 . . . {Centrally controlled vending systems ([mechanisms actuated by objects other than coins to free or to actuate vending, hiring or the like apparatus G07F 7/00](#))}
- G06F 17/608 . . {Betting on the outcome of an event, e.g. a race, an election; Totalisators}

- G06F 19/00** **Digital computing or data processing equipment or methods, specially adapted for specific applications ([G06F 17/00](#) takes precedence; data processing systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes G06Q)**

### **WARNING**

This group only covers specific applications related to the fields of healthcare or life sciences, e.g. bioinformatics ([G09F 19/10](#)), medical informatics ([G06F 19/30](#)), or chemoinformatics ([G06F 19/70](#)).

Groups [G06F 19/30-G06F 19/709](#) do not correspond to former or future IPC groups.

Concordance CPC : IPC for said groups is as follows: - [G06F 19/30](#) -

[G06F 19/366](#) : [G06F 19/00](#)

- [G06F 19/70](#) - [G06F 19/709](#) : [G06F 19/00](#)

- [G06F 19/10](#) . Bioinformatics, i.e. methods or systems for genetic or protein-related data processing in computational molecular biology (in silico methods of screening virtual chemical libraries [C40B 30/02](#); in silico or mathematical methods of creating virtual chemical libraries [C40B 50/02](#))
- [G06F 19/12](#) . . for modelling or simulation in systems biology, e.g. probabilistic or dynamic models, gene-regulatory networks, protein interaction networks or metabolic networks
- [G06F 19/14](#) . . for phylogeny or evolution, e.g. evolutionarily conserved regions determination or phylogenetic tree construction
- [G06F 19/16](#) . . for molecular structure, e.g. structure alignment, structural or functional relations, protein folding, domain topologies, drug targeting using structure data, involving two-dimensional or three-dimensional structures
- [G06F 19/18](#) . . for functional genomics or proteomics, e.g. genotype-phenotype associations, linkage disequilibrium, population genetics, binding site identification, mutagenesis, genotyping or genome annotation, protein-protein interactions or protein-nucleic acid interactions
- [G06F 19/20](#) . . for hybridisation or gene expression, e.g. microarrays, sequencing by hybridisation, normalisation, profiling, noise correction models, expression ratio estimation, probe design or probe optimisation
- [G06F 19/22](#) . . for sequence comparison involving nucleotides or amino acids, e.g. homology search, motif or SNP [Single-Nucleotide Polymorphism] discovery or sequence alignment
- [G06F 19/24](#) . . for machine learning, data mining or biostatistics, e.g. pattern finding, knowledge discovery, rule extraction, correlation, clustering or classification
- [G06F 19/26](#) . . for data visualisation, e.g. graphics generation, display of maps or networks or other visual representations
- [G06F 19/28](#) . . for programming tools or database systems, e.g. ontologies, heterogeneous data integration, data warehousing or computing architectures
- [G06F 19/30](#) . { Medical informatics, i.e. computer-based analysis or dissemination of patient or disease data (bioinformatics [G06F 19/10](#); measuring for diagnostic purposes [A61B 5/00](#); recognising patterns in biomedical signals [G06K 9/00496](#); data processing systems or methods specially adapted for administrative or managerial aspects of healthcare or welfare [G06Q 50/22](#))}
- [G06F 19/32](#) . . { Medical data management, e.g. systems or protocols for archival or communication of medical images, computerised patient records or computerised general medical references (information retrieval or databases per se [G06F 17/30](#); data security aspects [G06F 21/00](#))}
- [G06F 19/321](#) . . . { Management of medical image data, e.g. communication or archiving systems such as picture archiving and communication systems [PACS] or related medical protocols such as digital imaging and communications in medicine protocol [DICOM]; Editing of medical image data, e.g. adding diagnosis information (image data processing in general [G06T](#), image data processing related to 3D objects [G06F 17/00](#); biomedical image inspection [G06T 7/0012](#))}

- G06F 19/322 ... { Management of patient personal data, e.g. patient records, conversion of records or privacy aspects}
- G06F 19/323 .... { on a portable record carrier, e.g. CD, smartcard or RFID}
- G06F 19/324 ... { Management of patient independent data, e.g. medical references in digital format}
- G06F 19/325 .... { Medical practices, e.g. general treatment protocols}
- G06F 19/326 .... { Medication information, e.g. drug reference databases}
- G06F 19/327 ... { Management of hospital data, e.g. scheduling of medical staff or operation rooms, measuring the quality or efficiency of medical staff}
- G06F 19/328 ... { Health insurance management, e.g. payments or protection against fraud}
- G06F 19/34 .. { Computer-assisted medical diagnosis or treatment, e.g. computerised prescription or delivery of medication or diets, computerised local control of medical devices, medical expert systems or telemedicine}
- G06F 19/3406 ... { Local monitoring or local control of medical devices, e.g. configuration parameters, graphical user interfaces [GUI] or dedicated hardware interfaces}
- G06F 19/3412 .... { Medical equipment management, e.g. updates or maintenance}
- G06F 19/3418 ... { Telemedicine, e.g. remote diagnosis, remote control of instruments or remote monitoring of patient carried devices}
- G06F 19/3425 ... { Consulting other medical practitioners, e.g. cooperation, by teleconferencing}
- G06F 19/3431 ... { Calculating a health index for the patient, e.g. for risk assessment}
- G06F 19/3437 ... { Medical simulation or modelling, e.g. simulating the evolution of medical disorders (computer-aided design using simulation [G06F 17/5009](#); biomedical image modelling [G06T 17/00](#))}
- G06F 19/3443 ... { Medical data mining, e.g. in previous cases of different patients (pattern recognition in general [G06K 9/62](#))}
- G06F 19/345 ... { Medical expert systems, neural networks or other automated diagnosis (computer systems utilising knowledge based models [G06N 5/00](#); neural networks per se [G06N 3/02](#))}
- G06F 19/3456 ... { Computer-assisted prescription or delivery of medication, e.g. prescription filling or compliance checking}
- G06F 19/3462 .... { Computer-assisted distribution of medication from dispensers, i.e. making sure that medication is correctly delivered to patients (medication containers [A61J 1/00](#); dispensers activated by money or the like [G07F](#))}
- G06F 19/3468 .... { Computer-assisted delivery of medication via infusion or injection (infusion devices per se [A61M 5/14](#))}
- G06F 19/3475 ... { Computer-assisted prescription or delivery of diets, e.g. prescription filling or compliance checking}
- G06F 19/3481 ... { Computer-assisted prescription or delivery of treatment by physical action, e.g. surgery or physical exercise (surgical instruments, devices or methods [A61B 17/00](#); apparatuses for physical training [A63B](#))}
- G06F 19/3487 ... { Medical report generation}
- G06F 19/3493 ... { Computer-assisted epidemiological alert systems, e.g. bioterrorism or flu alerts}
- G06F 19/36 .. { Computer-assisted acquisition of medical data, e.g. computerised clinical trials or questionnaires (measuring analogue medical signals [A61B 5/00](#))}
- G06F 19/363 ... { Manual data input, e.g. electronic questionnaires or clinical trials}
- G06F 19/366 ... { Acquisition of data related to laboratory tests, e.g. special identifiers for examination containers (investigating biological material [G01N 33/48](#))}

- G06F 19/70 . { Chemoinformatics, i.e. data processing methods or systems for the retrieval, analysis, visualisation, or storage of physicochemical or structural data of chemical compounds (in silico methods of screening virtual chemical libraries [C40B 30/02](#); in silico or mathematical methods of creating virtual chemical libraries [C40B 50/02](#); computer-aided design per se [G06F 17/50](#); bioinformatics [G06F 19/10](#); processing of 2D or 3D images G06T)}
- WARNING**
- Subgroups [G06F 19/701-G06F 19/709](#) are not complete pending reclassification; see also group [G06F 19/70](#).
- G06F 19/701 .. { for molecular modelling, e.g. calculation and theoretical details of quantum mechanics, molecular mechanics, molecular dynamics, Monte Carlo methods, conformational analysis or the like (molecular modelling of nucleic acids or proteins [G06F 19/16](#))}
- G06F 19/702 .. { for analysis and planning of chemical reactions and syntheses, e.g. synthesis design, reaction prediction, mechanism elucidation}
- G06F 19/703 .. { for computer-assisted identification of chemical compounds or molecular structures, e.g. computer-assisted structure elucidation [CASE] systems}
- G06F 19/704 .. { for prediction of properties of compounds, e.g. calculating and selecting molecular descriptors, details related to the development of SAR/QSAR/QSPR models, ADME/Tox models or PK/PD models}
- G06F 19/705 .. { for database search of chemical structures, e.g. full structure search, substructure search, similarity search, pharmacophore search, 3D structure search (information retrieval in general [G06F 17/30](#))}
- G06F 19/706 .. { for drug design with the emphasis on a therapeutic agent, e.g. ligand-biological target interactions, pharmacophore generation (drug targeting using protein structure data [G06F 19/16](#); binding site identification [G06F 19/18](#))}
- G06F 19/707 .. { using machine learning, data mining or chemometrics, e.g. pattern recognition, knowledge discovery, rule extraction, correlation, clustering or classification, chemical name to structure conversion (use of machine learning, data mining or biostatistics for processing genetic or protein-related data [G06F 19/24](#))}
- G06F 19/708 .. { for data visualisation, e.g. molecular structure representations, graphics generation, display of maps or networks or other visual representations (data visualisation specially adapted for processing genetic or protein-related data [G06F 19/26](#))}
- G06F 19/709 .. { for programming tools or database systems, e.g. ontologies, heterogeneous data integration, data warehousing or computing architectures (programming tools or database systems specially adapted for processing genetic or protein-related data [G06F 19/28](#))}
- G06F 21/00** **Security arrangements for protecting computers, components thereof, programs or data against unauthorised activity** {(address-based protection against unauthorised use of memory [G06F 12/14](#); record carriers for use with machines and with at least a part designed to carry digital markings [G06K 19/00](#); preventing unauthorised reproduction or copying of disk-type recordable media [G11B 20/00](#); secret or secure communication [H04L 9/00](#); digital watermarking on images [H04N 1/32](#); protection in video systems or pay television [H04N 7/16](#))}
- G06F 21/10 . { Protecting distributed programs or content, e.g. vending or licensing of copyrighted material}
- G06F 21/105 .. { Tools for software license management or administration, e.g. managing licenses

- at corporate level}
- G06F 21/12 .. { Protecting executable software}
- G06F 21/121 ... { Restricting unauthorised execution of programs}
- G06F 21/123 .... { by using dedicated hardware, e.g. dongles, smart cards, cryptographic processors, global positioning systems (GPS) devices}
- G06F 21/125 .... { by manipulating the program code, e.g. source code, compiled code, interpreted code, machine code}
- G06F 21/126 ..... { Interacting with the operating system}
- G06F 21/128 .... { involving web programs, i.e. using technology especially used in internet, generally interacting with a web browser, e.g. hypertext markup language (HTML), applets, java}
- G06F 21/14 ... { against software analysis or reverse engineering, e.g. by obfuscation}
- G06F 21/16 .. { Program or content traceability, e.g. by watermarking (digital watermarking on images [H04N 1/32](#))}
- G06F 21/30 . { Authentication, i.e. establishing the identity or authorisation of security principals}
- G06F 21/305 .. { by remotely controlling device operation}
- G06F 21/31 .. { User authentication}
- G06F 21/313 ... { using a call-back technique via a telephone network}
- G06F 21/316 ... { by observing the pattern of computer usage, e.g. typical user behaviour}
- G06F 21/32 ... { using biometric data, e.g. fingerprints, iris scans or voiceprints}
- G06F 21/33 ... { using certificates}
- G06F 21/335 .... { for accessing specific resources, e.g. using Kerberos tickets}
- G06F 21/34 ... { involving the use of external additional devices, e.g. dongles or smart cards}
- G06F 21/35 .... { communicating wirelessly}
- G06F 21/36 ... { by graphic or iconic representation}
- G06F 21/40 ... { by quorum, i.e. whereby two or more security principals are required}
- G06F 21/41 ... { where a single sign-on provides access to a plurality of computers}
- G06F 21/42 ... { using separate channels for security data}
- G06F 21/43 .... { wireless channels}
- G06F 21/44 .. { Program or device authentication}
- G06F 21/445 ... { by mutual authentication, e.g. between devices or programs}
- G06F 21/45 .. { Structures or tools for the administration of authentication}
- G06F 21/46 ... { by designing passwords or checking the strength of passwords}
- G06F 21/50 . { Monitoring users, programs or devices to maintain the integrity of platforms, e.g. of processors, firmware or operating systems}
- G06F 21/51 .. { at application loading time, e.g. accepting, rejecting, starting or inhibiting executable software based on integrity or source reliability}
- G06F 21/52 .. { during program execution, e.g. stack integrity; Preventing unwanted data erasure; Buffer overflow}
- G06F 21/53 ... { by executing in a restricted environment, e.g. sandbox or secure virtual machine}
- G06F 21/54 ... { by adding security routines or objects to programs}
- G06F 21/55 .. { Detecting local intrusion or implementing counter-measures}

|              |       |  |
|--------------|-------|--|
| G06F 21/552  | ...   | { involving long-term monitoring or reporting}   |
| G06F 21/554  | ...   | { involving event detection and direct action}   |
| G06F 21/556  | ...   | { involving covert channels, i.e. data leakage between processes}  |
| G06F 21/558  | ..... | { with measures against differential power attack}   |
| G06F 21/56   | ...   | { Computer malware detection or handling, e.g. anti-virus arrangements}  |
| G06F 21/561  | ..... | { Virus type analysis}   |
| G06F 21/562  | ..... | { Static detection}  |
| G06F 21/563  | ..... | { by source code analysis}   |
| G06F 21/564  | ..... | { by virus signature recognition}  |
| G06F 21/565  | ..... | { by checking file integrity}  |
| G06F 21/566  | ..... | { Dynamic detection, i.e. detection performed at run-time, e.g. emulation, suspicious activities}  |
| G06F 21/567  | ..... | { using dedicated hardware}  |
| G06F 21/568  | ..... | { eliminating virus, restoring damaged files}  |
| G06F 21/57   | ..    | { Certifying or maintaining trusted computer platforms, e.g. secure boots or power-downs, version controls, system software checks, secure updates or assessing vulnerabilities} |
| G06F 21/572  | ...   | { Secure firmware programming, e.g. of basic input output system (BIOS)}   |
| G06F 21/575  | ...   | { Secure boot}   |
| G06F 21/577  | ...   | { Assessing vulnerabilities and evaluating computer system security}   |
| G06F 21/60   | .     | { Protecting data}   |
| G06F 21/602  | ..    | { Providing cryptographic facilities or services}  |
| G06F 21/604  | ..    | { Tools and structures for managing or administering access control systems}   |
| G06F 21/606  | ..    | { by securing the transmission between two devices or processes}   |
| G06F 21/608  | ...   | { Secure printing}   |
| G06F 21/62   | ..    | { Protecting access to data via a platform, e.g. using keys or access control rules}   |
| G06F 21/6209 | ...   | { to a single file or object, e.g. in a secure envelope, encrypted and accessed using a key, or with access control rules appended to the object itself}                         |
| G06F 21/6218 | ...   | { to a system of files or objects, e.g. local or distributed file system or database}  |
| G06F 21/6227 | ..... | { where protection concerns the structure of data, e.g. records, types, queries}   |
| G06F 21/6236 | ..... | { between heterogeneous systems}   |
| G06F 21/6245 | ..... | { Protecting personal data, e.g. for financial or medical purposes}  |
| G06F 21/6254 | ..... | { by anonymising data, e.g. decorrelating personal data from the owner's identification}   |
| G06F 21/6263 | ..... | { during internet communication, e.g. revealing personal data from cookies}  |
| G06F 21/6272 | ..... | { by registering files or documents with a third party}  |
| G06F 21/6281 | ..... | { at program execution time, where the protection is within the operating system}  |
| G06F 21/629  | ...   | { to features or functions of an application}  |
| G06F 21/64   | ..    | { Protecting data integrity, e.g. using checksums, certificates or signatures}   |
| G06F 21/645  | ...   | { using a third party}   |

- G06F 21/70 . { Protecting specific internal or peripheral components, in which the protection of a component leads to protection of the entire computer}
- G06F 21/71 .. { to assure secure computing or processing of information}
- G06F 21/72 ... { in cryptographic circuits}
- G06F 21/725 .... { operating on a secure reference time value}
- G06F 21/73 ... { by creating or determining hardware identification, e.g. serial numbers}
- G06F 21/74 ... { operating in dual or compartmented mode, i.e. at least one secure mode}
- G06F 21/75 ... { by inhibiting the analysis of circuitry or operation}
- G06F 21/76 ... { in application-specific integrated circuits [ASICs] or field-programmable devices, e.g. field-programmable gate arrays [FPGAs] or programmable logic devices [PLDs] }
- G06F 21/77 ... { in smart cards}
- G06F 21/78 .. { to assure secure storage of data (address-based protection against unauthorised use of memory [G06F 12/14](#); record carriers for use with machines and with at least a part designed to carry digital markings [G06K 19/00](#))}
- G06F 21/79 ... { in semiconductor storage media, e.g. directly-addressable memories}
- G06F 21/80 ... { in storage media based on magnetic or optical technology, e.g. disks with sectors (preventing unauthorised reproduction or copying of disk-type recordable media [G11B 20/00](#))}
- G06F 21/805 .... { using a security table for the storage sub-system}
- G06F 21/81 .. { by operating on the power supply, e.g. enabling or disabling power-on, sleep or resume operations}
- G06F 21/82 .. { Protecting input, output or interconnection devices}
- G06F 21/83 ... { input devices, e.g. keyboards, mice or controllers thereof}
- G06F 21/84 ... { output devices, e.g. displays or monitors}
- G06F 21/85 ... { interconnection devices, e.g. bus-connected or in-line devices}
- G06F 21/86 .. { Secure or tamper-resistant housings}
- G06F 21/87 ... { by means of encapsulation, e.g. for integrated circuits}
- G06F 21/88 .. { Detecting or preventing theft or loss}
  
- G06F 2003/00** **Input arrangements for transferring data to be processed into a form capable of being handled by the computer; Output arrangements for transferring data from processing unit to output unit, e.g. interface arrangements** ([typewriters B41J](#); [conversion of physical variables F15B 5/00](#), [G01](#); [image acquisition G06T 1/00](#), [G06F 9/00](#); [coding, decoding or code conversion in general H03M](#) ; [transmission of digital information H04L](#); { in regulating or control systems [G05B](#)})
  
- G06F 2003/06 . Digital input from or digital output to record carriers, { e.g. RAID, emulated record carriers, networked record carriers (recording or reproducing devices per se [G11B](#); error detection, error correction, monitoring per se regarding storage systems [G06F11](#); accessing or addressing within memory systems or architectures [G06F12](#); information retrieval [G06F 17/30](#))}
- G06F 2003/0691 .. buffering arrangements
- G06F 2003/0692 .. digital I/O from or to direct access storage devices, e.g. magnetic, optical, magneto-optical disc

- G06F 2003/0694 . . . emulating arrangements, e.g. RAM-disc
- G06F 2003/0695 . . . formatting arrangements
- G06F 2003/0697 . . . device management, e.g. handlers, drivers, I/O schedulers
- G06F 2003/0698 . . . digital I/O from or to serial access storage devices, e.g. magnetic tape
  
- G06F 2009/00**      **Arrangements for programme control, e.g. control unit** ([programme control for peripheral devices G06F 13/10](#); in regulating or control systems G05B)
  
- G06F 2009/06 . . . using stored programme, i.e. using internal store of processing equipment to receive and retain programme
- G06F 2009/30 . . . Arrangements for executing machine-instructions, e.g. instruction decode ([for executing micro-instructions G06F 9/22](#); [for executing subprogrammes G06F 9/40](#))
- G06F 2009/38 . . . Concurrent instruction execution, e.g. pipeline, look ahead
- G06F 2009/3877 . . . . {using a slave processor, e.g. coprocessor ([peripheral processor G06F 13/12](#); [vector processor G06F 15/78V](#))}
- G06F 2009/3883 . . . . . Two-engine architectures, i.e. stand-alone processor acting as a slave processor
- G06F 2009/44 . . . Arrangements for executing specific programmes
- G06F 2009/4441 . . . Programme partitioning, e.g. concurrency or parallelism detection, programming parallel machines in general
- G06F 2009/445 . . . Programme loading or initiating {(bootstrapping [G06F 9/4401](#); [movement of software or configuration parameters for network-specific applications H04L 67/34](#))}
- G06F 2009/44515 . . . . using non-volatile memory from which the program can be directly executed, e.g. EEPROM
- G06F 2009/44531 . . . . involving multiple processors
- G06F 2009/455 . . . Emulation; Software simulation { , i.e. [virtualisation or emulation of application or operating system execution engines \(instruction translation at instruction execution time G06F 9/3017](#); [multiprogramming in general G06F 9/46](#); [logical partitioning of resources or management or configuration of virtualized resources G06F 9/5077](#); [in-circuit emulation G06F 11/3652](#); [environments for testing or debugging software G06F 11/3664](#))}
- G06F 2009/45533 . . . . { Hypervisors; Virtual machine monitors}
- G06F 2009/45558 . . . . . { Hypervisor-specific management and integration aspects}
- G06F 2009/45562 . . . . . { Creating, deleting, cloning virtual machine instances}
- G06F 2009/45566 . . . . . { Nested virtual machines}
- G06F 2009/4557 . . . . . { Distribution of virtual machine instances; Migration and load balancing aspects ([load distribution or balancing G06F 9/505](#), [G06F 9/5083](#); [Task migration G06F 9/4856](#))}
- G06F 2009/45575 . . . . . { Starting, stopping, suspending, resuming virtual machine instances ([programme initiating G06F 9/445](#); [task life-cycle in general G06F 9/485](#))}
- G06F 2009/45579 . . . . . { I/O management ([device drivers, storage access](#))([internal functioning of device drivers G06F 13/102](#), [loading of device drivers G06F 9/4424](#))}
- G06F 2009/45583 . . . . . { Memory management, e.g. access, allocation ([memory management in general G06F12](#); [allocation of memory to service a request G06F 9/5016](#))}
- G06F 2009/45587 . . . . . { Isolation or security of virtual machine instances ([security](#)

- arrangements **G06F 21/00N**)}
- G06F 2009/45591 . . . . . { Monitoring or debugging support (monitoring and debugging in general in [G06F 11/30](#), [G06F 11/36](#))}
- G06F 2009/45595 . . . . . { Network integration; enabling network access in virtual machine instances (network-specific arrangements for supporting networked applications [H04L 67/00](#))}
- G06F 2011/00**      **Error detection; Error correction; Monitoring** (methods or arrangements for verifying the correctness of marking on a record carrier [G06K 5/00](#); in information storage based on relative movement between record carrier and transducer [G11B](#), e.g. [G11B 20/18](#); in static stores [G11C](#); coding, decoding or code conversion, for error detection or error correction, in general [H03M 13/00](#))
- NOTE**
- In this group the indexing codes of [G06F 1/00](#) to [G06F 15/00](#) are added
- G06F 2011/22      .    Detection or location of defective computer hardware by testing during standby operation or during idle time, e.g. start-up testing (testing of digital circuits, e.g. of separate computer components [G01R 31/317](#))
- G06F 2011/2273    ..    {Test methods}
- G06F 2011/2278    ...    Power-On Test, e.g. POST
- G06F 2015/00**      **Digital computers in general** (details [G06F 1/00](#) to [G06F 13/00](#)); **Data processing equipment in general** (neural networks for image data processing [G06T](#))
- G06F 2015/76      .    Architectures of general purpose stored programme computers (with programme plugboard [G06F 15/08](#); multicomputers [G06F 15/16](#), general purpose image data processing [G06T 1/00](#))
- G06F 2015/761    ..    Indexing scheme relating to architectures of general purpose stored programme computers
- G06F 2015/763    ...    ASIC
- G06F 2015/765    ...    Cache
- G06F 2015/766    ...    Flash EPROM
- G06F 2015/768    ...    Gate array
- G06F 2101/00**      **Indexing scheme relating to the type of digital function generated**
- G06F 2101/02      .    Linear multivariable functions, i.e. sum of products
- G06F 2101/04      .    Trigonometric functions
- G06F 2101/06      .    Co-ordinate transformations
- G06F 2101/08      .    Powers or roots
- G06F 2101/10      .    Logarithmic or exponential functions

- G06F 2101/12 . Reciprocal functions
- G06F 2101/14 . Probability distribution functions
- G06F 2101/16 . PCM companding functions

**G06F 2200/00**      **Indexing scheme relating to [G06F 1/04-G06F 1/32](#)**

- G06F 2200/16 . Indexing scheme relating to [G06F 1/16-G06F 1/18](#)
- G06F 2200/161 .. Indexing scheme relating to constructional details of the monitor
- G06F 2200/1611 ... CRT monitor
- G06F 2200/1612 ... Flat panel monitor
- G06F 2200/1613 ... Supporting arrangements e.g. for filters or documents associated to a laptop display
- G06F 2200/1614 ... Image rotation following screen orientation, e.g. switching from landscape to portrait mode
- G06F 2200/163 .. Indexing scheme relating to constructional details of the computer
- G06F 2200/1631 ... Panel PC, e.g. single housing hosting PC and display panel
- G06F 2200/1632 ... Pen holder integrated in the computer
- G06F 2200/1633 ... Protecting arrangement for the entire housing of the computer
- G06F 2200/1634 ... Integrated protective display lid, e.g. for touch-sensitive display in handheld computer
- G06F 2200/1635 ... Stackable modules
- G06F 2200/1636 ... Sensing arrangement for detection of a tap gesture on the housing
- G06F 2200/1637 ... Sensing arrangement for detection of housing movement or orientation, e.g. for controlling scrolling or cursor movement on the display of an handheld computer
- G06F 2200/1638 ... Computer housing designed to operate in both desktop and tower orientation
- G06F 2200/1639 ... Arrangements for locking plugged peripheral connectors
- G06F 2200/20 . Indexing scheme relating to [G06F 1/20](#)
- G06F 2200/201 .. Cooling arrangements using cooling fluid
- G06F 2200/202 .. Air convective hinge
- G06F 2200/203 .. Heat conductive hinge
- G06F 2200/26 . Indexing scheme relating to [G06F 1/26](#)
- G06F 2200/261 .. PC controlled powerstrip

**G06F 2201/00**      **Indexing scheme relating to error detection, to error correction, and to monitoring**

- G06F 2201/80 . Database-specific techniques

- G06F 2201/805 . Real-time
- G06F 2201/81 . Threshold
- G06F 2201/815 . Virtual (middleware or OS functionality using virtual machines to implement generic software techniques for error detection or fault masking [G06F 11/1484](#))
- G06F 2201/82 . Solving problems relating to consistency (ensuring consistency in mirrored systems [G06F 11/2064](#))
- G06F 2201/825 . the problem or solution involving locking
- G06F 2201/83 . the solution involving signatures
- G06F 2201/835 . Timestamp
- G06F 2201/84 . Using snapshots, i.e. a logical point-in-time copy of the data
- G06F 2201/845 . Systems in which the redundancy can be transformed in increased performance
- G06F 2201/85 . Active fault masking without idle spares (active fault masking without idle spare hardware where processing functionality is redundant [G06F 11/2035](#))
- G06F 2201/855 . Details of asynchronous mirroring using a journal to transfer not-yet-mirrored changes
- G06F 2201/86 . Event-based monitoring
- G06F 2201/865 . Monitoring of software
- G06F 2201/87 . Monitoring of transactions
- G06F 2201/875 . Monitoring of systems including the internet
- G06F 2201/88 . Monitoring involving counting
- G06F 2201/885 . Monitoring specific for caches

**G06F 2203/00**      **Indexing scheme relating to [G06F 3/00-3/048](#)**

- G06F 2203/01 . Indexing scheme relating to [G06F 3/01](#)
- G06F 2203/011 . . Emotion or mood input determined on the basis of sensed human body parameters such as pulse, heart rate or beat, temperature of skin, facial expressions, iris, voice pitch, brain activity patterns
- G06F 2203/012 . . Walk-in-place systems for allowing a user to walk in a virtual environment while constraining him to a given position in the physical environment
- G06F 2203/013 . . Force feedback applied to a game
- G06F 2203/014 . . Force feedback applied to GUI
- G06F 2203/015 . . Force feedback applied to a joystick
- G06F 2203/033 . Indexing scheme relating to [G06F 3/033](#)

- G06F 2203/0331 .. Finger worn pointing device
- G06F 2203/0332 .. Ergonomic shaped mouse adjustable to suit one of both hands
- G06F 2203/0333 .. Ergonomic shaped mouse for one hand
- G06F 2203/0334 .. Ergonomic shaped mouse for vertical grip, whereby the hand controlling the mouse is resting or gripping it with an attitude almost vertical with respect of the working surface
- G06F 2203/0335 .. Finger operated miniaturized mouse
- G06F 2203/0336 .. Mouse integrated fingerprint sensor
- G06F 2203/0337 .. Status LEDs integrated in the mouse to provide visual feedback to the user about the status of the input device, the PC, or the user
- G06F 2203/0338 .. Fingerprint track pad, i.e. fingerprint sensor used as pointing device tracking the fingertip image.
- G06F 2203/0339 .. Touch strips, e.g. orthogonal touch strips to control cursor movement or scrolling; single touch strip to adjust parameter or to implement a row of soft keys
  
- G06F 2203/038 . Indexing scheme relating to [G06F 3/038](#)
- G06F 2203/0381 .. Multimodal input, i.e. interface arrangements enabling the user to issue commands by simultaneous use of input devices of different nature, e.g. voice plus gesture on digitizer
- G06F 2203/0382 .. Plural input, i.e. interface arrangements in which a plurality of input device of the same type are in communication with a PC
- G06F 2203/0383 .. Remote input, i.e. interface arrangements in which the signals generated by a pointing device are transmitted to a PC at a remote location, e.g. to a PC in a LAN
- G06F 2203/0384 .. Wireless input, i.e. hardware and software details of wireless interface arrangements for pointing devices
  
- G06F 2203/041 . Indexing scheme relating to [G06F 3/041](#)-G06F3-045
- G06F 2203/04101 .. 2.5D-digitiser, i.e. digitiser detecting the X/Y position of the input means, finger or stylus, also when it does not touch, but is proximate to the digitiser's interaction surface and also measures the distance of the input means within a short range in the Z direction, possibly with a separate measurement setup
- G06F 2203/04102 .. Flexible digitiser, i.e. constructional details for allowing the whole digitising part of a device to be flexed or rolled like a sheet of paper
- G06F 2203/04103 .. Manufacturing, i.e. details related to manufacturing processes specially suited for touch sensitive devices
- G06F 2203/04104 .. Multi-touch detection in digitiser, i.e. details about the simultaneous detection of a plurality of touching locations, e.g. multiple fingers or pen and finger
- G06F 2203/04105 .. Separate pressure detection, i.e. detection of pressure applied on the touch surface using additional pressure sensors or switches not interfering with the position sensing process and generally disposed outside of the active touch sensing part
- G06F 2203/04106 .. Multi-sensing digitiser, i.e. digitiser using at least two different sensing technologies simultaneously or alternatively, e.g. for detecting pen and finger, for saving power or for improving position detection
- G06F 2203/04107 .. Shielding in digitiser, i.e. guard or shielding arrangements, mostly for capacitive touchscreens, e.g. driven shields, driven grounds
- G06F 2203/04108 .. Touchless 2D- digitiser, i.e. digitiser detecting the X/Y position of the input means, finger or stylus, also when it does not touch, but is proximate to the digitiser's interaction surface without distance measurement in the Z direction
- G06F 2203/04109 .. FTIR in optical digitiser, i.e. touch detection by frustrating the total internal

- reflection within an optical waveguide due to changes of optical properties or deformation at the touch location.
- G06F 2203/04111 . . Cross over in capacitive digitiser, i.e. details of structures for connecting electrodes of the sensing pattern where the connections cross each other, e.g. bridge structures comprising an insulating layer, or vias through substrate
  - G06F 2203/04112 . . Electrode mesh in capacitive digitiser: electrode for touch sensing is formed of a mesh of very fine, normally metallic, interconnected lines that are almost invisible to see. This provides a quite large but transparent electrode surface, without need for ITO or similar transparent conductive material
  - G06F 2203/04113 . . Peripheral electrode pattern in resistive digitiser, i.e. electrodes at the periphery of the resistive sheet are shaped in patterns enhancing linearity of induced field
  - G06F 2203/048 . . Indexing scheme relating to [G06F 3/048](#)
  - G06F 2203/04801 . . Cursor retrieval aid, i.e. visual aspect modification, blinking, colour changes, enlargement or other visual cues, for helping user do find the cursor in graphical user interfaces
  - G06F 2203/04802 . . 3D-info-object: information is displayed on the internal or external surface of a three dimensional manipulable object, e.g. on the faces of a cube that can be rotated by the user
  - G06F 2203/04803 . . Split screen, i.e. subdividing the display area or the window area into separate subareas.
  - G06F 2203/04804 . . Transparency, e.g. transparent or translucent windows
  - G06F 2203/04805 . . Virtual magnifying lens, i.e. window or frame movable on top of displayed information to enlarge it for better reading or selection
  - G06F 2203/04806 . . Zoom, i.e. interaction techniques or interactors for controlling the zooming operation
  - G06F 2203/04807 . . Pen manipulated menu
  - G06F 2203/04808 . . Several contacts: gestures triggering a specific function, e.g. scrolling, zooming, right-click, when the user establishes several contacts with the surface simultaneously; e.g. using several fingers or a combination of fingers and pen.
  - G06F 2203/04809 . . Textured surface identifying touch areas, e.g. overlay structure for a virtual keyboard
- G06F 2205/00**      **Indexing scheme relating to group [G06F 5/00](#); Methods or arrangements for data conversion without changing the order or content of the data handled**
- G06F 2205/003 . . Reformatting, i.e. changing the format of data representation
  - G06F 2205/06 . . Indexing scheme relating to groups [G06F 5/06](#) - [G06F 5/16](#)
  - G06F 2205/061 . . Adapt frequency, i.e. clock frequency at one side is adapted to clock frequency, or average clock frequency, at the other side; Not pulse stuffing only
  - G06F 2205/062 . . Allowing rewriting or rereading data to or from the buffer
  - G06F 2205/063 . . Dynamically variable buffer size
  - G06F 2205/064 . . Linked list, i.e. structure using pointers, e.g. allowing non-contiguous address segments in one logical buffer or dynamic buffer space allocation
  - G06F 2205/065 . . With bypass possibility
  - G06F 2205/066 . . User-programmable number or size of buffers, i.e. number of separate buffers or their size can be allocated freely
  - G06F 2205/067 . . Bidirectional FIFO, i.e. system allowing data transfer in two directions

- G06F 2205/10 . Indexing scheme relating to groups [G06F 5/10](#) - [G06F 5/14](#)
- G06F 2205/102 .. Avoiding metastability, i.e. preventing hazards, e.g. by using Gray code counters
- G06F 2205/104 .. Delay lines
- G06F 2205/106 .. Details of pointers, i.e. structure of the address generators
- G06F 2205/108 .. Reading or writing the data blockwise, e.g. using an extra end-of-block pointer
- G06F 2205/12 . Indexing scheme relating to groups [G06F 5/12](#) - [G06F 5/14](#)
- G06F 2205/123 .. Contention resolution, i.e. resolving conflicts between simultaneous read and write operations
- G06F 2205/126 .. Monitoring of intermediate fill level, i.e. with additional means for monitoring the fill level, e.g. half full flag, almost empty flag

### **G06F 2206/00 Indexing scheme related to dedicated interfaces for computers**

- G06F 2206/10 . Indexing scheme related to storage interfaces for computers, indexing schema related to group [G06F 3/06](#)
- G06F 2206/1004 .. Defragmentation
- G06F 2206/1008 .. Graphical user interface (GUI)
- G06F 2206/1012 .. Load balancing
- G06F 2206/1014 .. One time programmable (OTP) memory, e.g. PROM, WORM
- G06F 2206/15 . Indexing scheme related to printer interfaces for computers, indexing schema related to group [G06F 3/12](#)
- G06F 2206/1504 .. Cost estimation
- G06F 2206/1506 .. Degraded mode, e.g. in view of consumables depleted, thresholds reached
- G06F 2206/1508 .. Load balancing
- G06F 2206/151 .. Pre-printed media, e.g. media stock, forms, logos
- G06F 2206/1512 .. Print-to a presentation device other than a printer, e.g. e-reader, e-paper, tablet
- G06F 2206/1514 .. Sub-job
- G06F 2206/20 . Indexing scheme related to audio interfaces for computers, indexing schema related to group [G06F 3/16](#)

### **G06F 2207/00 Indexing scheme relating to methods or arrangements for processing data by operating upon the order or content of the data handled**

- G06F 2207/02 . Indexing scheme relating to groups [G06F 7/02](#) - [G06F 7/026](#)
- G06F 2207/025 .. String search, i.e. pattern matching, e.g. find identical word or best match in a string
- G06F 2207/22 . Indexing scheme relating to groups [G06F 7/22](#) - [G06F 7/36](#)
- G06F 2207/222 .. Binary data tree
- G06F 2207/224 .. External sorting
- G06F 2207/226 .. Priority queue, i.e. 1 word in, 1 word out sorter ; Output word, i.e. min or max of words in memory

- G06F 2207/228 ..     Sorting or merging network
- G06F 2207/38 .     Indexing scheme relating to groups [G06F 7/38-G06F 7/575](#)
- G06F 2207/3804 ..     Details (*not used*)
- G06F 2207/3808 ...     concerning the type of numbers or the way they are handled
- G06F 2207/3812 .....     Devices capable of handling different types of numbers
- G06F 2207/3816 .....     Accepting numbers of variable word length
- G06F 2207/382 .....     Reconfigurable for different fixed word lengths ([multigauge devices G06F 2207/3828](#))
- G06F 2207/3824 .....     Accepting both fixed-point and floating-point numbers
- G06F 2207/3828 ....     Multigauge devices, i.e. capable of handling packed numbers without unpacking them
- G06F 2207/3832 ....     Less usual number representations
- G06F 2207/3836 .....     One`s complement
- G06F 2207/384 .....     Octal
- G06F 2207/3844 .....     Hexadecimal
- G06F 2207/3848 .....     Unit distance code
- G06F 2207/3852 ....     Calculation with most significant digit first
- G06F 2207/3856 ....     Operand swapping
- G06F 2207/386 ...     Special constructional features
- G06F 2207/3864 ....     Clockless, i.e. asynchronous operation used as a design principle ([G06F 2207/3888 takes precedence](#))
- G06F 2207/3868 ....     Bypass control, i.e. possibility to transfer an operand unchanged to the output
- G06F 2207/3872 ....     Precharge of output to prevent leakage
- G06F 2207/3876 ....     Alternation of true and inverted stages
- G06F 2207/388 ....     Skewing
- G06F 2207/3884 ....     Pipelining
- G06F 2207/3888 .....     Wave pipelining, i.e. processing multiple subsequent operand sets asynchronously within each pipeline stage
- G06F 2207/3892 .....     Systolic array
- G06F 2207/3896 ....     Bit slicing
- G06F 2207/48 ..     Indexing scheme relating to groups [G06F 7/48-G06F 7/575](#)
- G06F 2207/4802 ...     Special implementations
- G06F 2207/4804 ....     Associative memory or processor
- G06F 2207/4806 ....     Cascode or current mode logic
- G06F 2207/4808 ....     Charge transfer devices
- G06F 2207/481 ....     Counters performing arithmetic operations
- G06F 2207/4812 ....     Multiplexers
- G06F 2207/4814 ....     Non-logic devices, e.g. operational amplifiers
- G06F 2207/4816 ....     Pass transistors
- G06F 2207/4818 ....     Threshold devices
- G06F 2207/482 .....     using capacitive adding networks
- G06F 2207/4822 .....     Majority gates

- G06F 2207/4824 . . . . . Neural networks
- G06F 2207/4826 . . . . . using transistors having multiple electrodes of the same type, e.g. multi-emitter devices, neuron-MOS devices
- G06F 2207/4828 . . . . . Negative resistance devices, e.g. tunnel diodes, gunn effect devices
  
- G06F 2207/483 . . Indexing scheme relating to group [G06F 7/483](#)
- G06F 2207/4835 . . Computations with rational numbers
  
- G06F 2207/491 . . Indexing scheme relating to groups [G06F 7/491-G06F 7/4917](#)
- G06F 2207/49105 . . Determining 9's or 10's complement
- G06F 2207/4911 . . Decimal floating-point representation
- G06F 2207/49115 . . Duodecimal numbers
- G06F 2207/4912 . . Non-specified BCD representation
- G06F 2207/49125 . . Non-specified decimal representation
- G06F 2207/4913 . . Sterling system, i.e. mixed radix with digit weights of 10-20-12
- G06F 2207/49135 . . Using 036012 or 3612 code, i.e. binary coded decimal representation with digit weight of (0,) 3, 6, (0,) 1 and 2 respectively
- G06F 2207/4914 . . Using 2-out-of-5 code, i.e. binary coded decimal representation with digit weight of 2, 4, 2 and 1 respectively
- G06F 2207/49145 . . Using 2421 code, i.e. non-weighted representation in which 2 out of 5 bits are "1" for each decimal digit
- G06F 2207/4915 . . Using 4221 code, i.e. binary coded decimal representation with digit weight of 4, 2, 2 and 1 respectively
- G06F 2207/49155 . . Using 51111 code, i.e. binary coded decimal representation with digit weight of 5, 1, 1, 1 and 1 respectively
- G06F 2207/4916 . . Using 5211 code, i.e. binary coded decimal representation with digit weight of 5, 2, 1 and 1 respectively
- G06F 2207/49165 . . Using 5311 code, i.e. binary coded decimal representation with digit weight of 5, 3, 1 and 1 respectively
- G06F 2207/4917 . . Using 5321 or 543210 code, i.e. binary coded decimal representation with digit weight of 5, (4, ) 3, 2, 1 (and 0) respectively
- G06F 2207/49175 . . Using 54321 code, i.e. binary coded decimal representation with digit weight of 5, 4, 3, 2 and 1 respectively
- G06F 2207/4918 . . Using Aiken code, i.e. using both first and last 5 of 16 possible 4-bit values, rendering the code symmetrical within the series of 16 values
- G06F 2207/49185 . . Using biquinary code, i.e. combination of 5-valued and 2-valued digits, having values 0, 1, 2, 3, 4 and 0, 5 or 0, 2, 4, 6, 8 and 0, 1 respectively
- G06F 2207/4919 . . Using excess-3 code, i.e. natural BCD + offset of 3, rendering the code symmetrical within the series of 16 possible 4 bit values
- G06F 2207/49195 . . Using pure decimal representation, e.g. 10-valued voltage signal, 1-out-of-10 code
  
- G06F 2207/492 . . Indexing scheme relating to groups [G06F 7/492-G06F 7/496](#)
- G06F 2207/4921 . . Single digit adding or subtracting
- G06F 2207/4922 . . Multi-operand adding or subtracting
- G06F 2207/4923 . . Incrementer or decrementer
- G06F 2207/4924 . . Digit-parallel adding or subtracting

- G06F 2207/506 . Indexing scheme relating to groups [G06F 7/506](#) - [G06F 7/508](#)
- G06F 2207/5063 .. 2-input gates, i.e. only using 2-input logical gates, e.g. binary carry look-ahead, e.g. Kogge-Stone or Ladner-Fischer adder
  
- G06F 2207/535 . Indexing scheme relating to groups [G06F 7/535](#)-[G06F 7/5375](#)
- G06F 2207/5351 .. Multiplicative non-restoring division, e.g. SRT, using multiplication in quotient selection
- G06F 2207/5352 .. Non-restoring division not covered by [G06F 7/5375](#)
- G06F 2207/5353 .. Restoring division
- G06F 2207/5354 .. Using table lookup, e.g. for digit selection in division by digit recurrence
- G06F 2207/5355 .. Using iterative approximation not using digit recurrence, e.g. Newton Raphson or Goldschmidt
- G06F 2207/5356 .. Via reciprocal, i.e. calculate reciprocal only, or calculate reciprocal first and then the quotient from the reciprocal and the numerator
  
- G06F 2207/544 . Indexing scheme relating to group [G06F 7/544](#)
- G06F 2207/5442 .. Absolute difference
  
- G06F 2207/552 . Indexing scheme relating to groups [G06F 7/552](#)-[G06F 7/5525](#)
- G06F 2207/5521 .. Inverse root of a number or a function, e.g. the reciprocal of a Pythagorean sum
- G06F 2207/5523 .. Calculates a power, e.g. the square, of a number or a function, e.g. polynomials
- G06F 2207/5525 .. Pythagorean sum, i.e. the square root of a sum of squares
- G06F 2207/5526 .. Roots or inverse roots of single operands ([not used](#))
- G06F 2207/5528 ... Non-restoring calculation, where each result digit is either negative, zero or positive, e.g. SRT
  
- G06F 2207/556 . Indexing scheme relating to group [G06F 7/556](#)
- G06F 2207/5561 .. Exponentiation by multiplication, i.e. calculating  $Y^{**INT(X)}$  by multiplying Y with itself or a power of itself, INT(X) being the integer part of X
  
- G06F 2207/58 . Indexing scheme relating to groups [G06F 7/58](#) - [G06F 7/588](#)
- G06F 2207/581 .. Generating an LFSR sequence, e.g. an m-sequence ; sequence may be generated without LFSR, e.g. using Galois Field arithmetic
- G06F 2207/582 .. Parallel finite field implementation, i.e. at least partially parallel implementation of finite field arithmetic, generating several new bits or trits per step e.g. using a GF multiplier
- G06F 2207/583 .. Serial finite field implementation, i.e. serial implementation of finite field arithmetic, generating one new bit or trit per step, e.g. using an LFSR or several independent LFSRs; also includes PRNGs with parallel operation between LFSR and outputs
  
- G06F 2207/72 . Indexing scheme relating to groups [G06F 7/72](#)-[G06F 7/729](#)
- G06F 2207/7204 .. Prime number generation or prime number testing
- G06F 2207/7209 .. Calculation via subfield, i.e. the subfield being GF(q) with q a prime power, e.g.  $GF((2^{**m})^{**n})$  via  $GF(2^{**m})$
- G06F 2207/7214 .. Calculation via prime subfield, i.e. the subfield being GF(p) with p an integer prime > 3 ; e.g.  $GF(p^{**k})$  via  $GF(p)$
- G06F 2207/7219 .. Countermeasures against side channel or fault attacks

- G06F 2207/7223 . . . Randomisation as countermeasure against side channel attacks
- G06F 2207/7228 . . . . Random curve mapping, e.g. mapping to an isomorphous or projective curve
- G06F 2207/7233 . . . . Masking, e.g.  $(A^{**}e)+r \bmod n$
- G06F 2207/7238 . . . . . Operand masking, i.e. message blinding, e.g.  $(A+r)^{**}e \bmod n$ ;  $k.(P+R)$
- G06F 2207/7242 . . . . . Exponent masking, i.e. key masking, e.g.  $A^{**}(e+r) \bmod n$ ;  $(k+r).P$
- G06F 2207/7247 . . . . . Modulo masking, e.g.  $A^{**}e \bmod (n*r)$
- G06F 2207/7252 . . . . of operation order, e.g. starting to treat the exponent at a random place, or in a randomly chosen direction
- G06F 2207/7257 . . . . Random modification not requiring correction
- G06F 2207/7261 . . . Uniform execution, e.g. avoiding jumps, or using formulae with the same power profile
- G06F 2207/7266 . . . Hardware adaptation, e.g. dual rail logic; calculate add and double simultaneously
- G06F 2207/7271 . . . Fault verification, e.g. comparing two values which should be the same, unless a computational fault occurred
- G06F 2207/7276 . . Additional details of aspects covered by group [G06F 7/723](#)
- G06F 2207/728 . . . using repeated square-and-multiply, i.e. right-to-left binary exponentiation
- G06F 2207/7285 . . . using the window method, i.e. left-to-right k-ary exponentiation
- G06F 2207/729 . . . . . Sliding-window exponentiation
- G06F 2207/7295 . . . using an addition chain, or an addition-subtraction chain

#### **G06F 2209/00**      **Indexing scheme relating to [G06F 9/00](#)**

- G06F 2209/46 . Indexing scheme relating to [G06F 9/46](#)
- G06F 2209/461 . . Bridge
- G06F 2209/462 . . Lookup
- G06F 2209/463 . . Naming
- G06F 2209/48 . Indexing scheme relating to [G06F 9/48](#)
- G06F 2209/481 . . Exception handling
- G06F 2209/482 . . Application
- G06F 2209/483 . . Multiproc
- G06F 2209/484 . . Precedence
- G06F 2209/485 . . Resource constraint
- G06F 2209/486 . . Scheduler internals
- G06F 2209/50 . Indexing scheme relating to [G06F 9/50](#)
- G06F 2209/501 . . Performance criteria
- G06F 2209/5011 . . Pool
- G06F 2209/5012 . . Processor sets
- G06F 2209/5013 . . Request control
- G06F 2209/5014 . . Reservation
- G06F 2209/5015 . . Service provider selection
- G06F 2209/5016 . . Session

- G06F 2209/5017 .. Task decomposition
- G06F 2209/5018 .. Thread allocation
- G06F 2209/5019 .. Workload prediction
- G06F 2209/502 .. Proximity
- G06F 2209/5021 .. Priority
- G06F 2209/5022 .. Workload threshold
- G06F 2209/503 .. Resource availability
- G06F 2209/504 .. Resource capping
- G06F 2209/505 .. Clust
- G06F 2209/506 .. Constraint
- G06F 2209/507 .. Low-level
- G06F 2209/508 .. Monitor
- G06F 2209/509 .. Offload
  
- G06F 2209/52 . Indexing scheme relating to [G06F 9/52](#)
- G06F 2209/521 .. Atomic
- G06F 2209/522 .. Manager
- G06F 2209/523 .. Mode
  
- G06F 2209/54 . Indexing scheme relating to [G06F 9/54](#)
- G06F 2209/541 .. Client-server
- G06F 2209/542 .. Intercept
- G06F 2209/543 .. Local
- G06F 2209/544 .. Remote
- G06F 2209/545 .. Gui
- G06F 2209/546 .. Xcast
- G06F 2209/547 .. Messaging middleware
- G06F 2209/548 .. Queue
- G06F 2209/549 .. Remote execution
  
- G06F 2211/00**      **Indexing scheme relating to details of data-processing equipment not covered by groups 3/00 to 13/00**
  
- G06F 2211/001 . In-Line Device
  
- G06F 2211/002 . Bus
  
- G06F 2211/003 . Mutual Authentication Bi-Directional Authentication, Dialogue, Handshake
  
- G06F 2211/004 . Notarisation, Time-Stamp, Date-Stamp
  
- G06F 2211/005 . Network, LAN, Remote Access, Distributed System
- G06F 2211/006 .. E-Mail
  
- G06F 2211/007 . Encryption, En-/decode, En-/decipher, En-/decypher, Scramble, (De-)compress

- G06F 2211/008     ..     Public Key, Asymmetric Key, Asymmetric Encryption
- G06F 2211/009     .     Trust
- G06F 2211/10     .     Indexing scheme relating to [G06F 11/10](#)
- G06F 2211/1002    ..     Indexing scheme relating to [G06F 11/1076](#)
- G06F 2211/1004    ...     Adaptive RAID, i.e. RAID system adapts to changing circumstances, e.g. RAID1 becomes RAID5 as disks fill up
- G06F 2211/1007    ...     Addressing errors, i.e. silent errors in RAID, e.g. sector slipping and addressing errors
- G06F 2211/1009    ...     Cache, i.e. caches used in RAID system with parity
- G06F 2211/1011    ...     Clustered RAID, i.e. clustered or de-clustered RAID where data and parity are spread over more disks than blocks in a parity group
- G06F 2211/1014    ...     Compression, i.e. RAID systems with parity using compression techniques
- G06F 2211/1016    ...     Continuous RAID, i.e. RAID system that allows streaming or continuous media, e.g. VOD
- G06F 2211/1019    ...     Fast writes, i.e. signaling the host that a write is done before data is written to disk
- G06F 2211/1021    ...     Different size blocks, i.e. mapping of blocks of different size in RAID systems with parity
- G06F 2211/1023    ...     Different size disks, i.e. non uniform size of disks in RAID systems with parity
- G06F 2211/1026    ...     Different size groups, i.e. non uniform size of groups in RAID systems with parity
- G06F 2211/1028    ...     Distributed, i.e. distributed RAID systems with parity
- G06F 2211/103     ...     Hybrid, i.e. RAID systems with parity comprising a mix of RAID types
- G06F 2211/1033    ...     Inactive data in parity groups, i.e. RAID parity groups where parity is calculated on only occupied or busy bits in the stripe
- G06F 2211/1035    ...     Keeping track, i.e. keeping track of data and parity changes
- G06F 2211/1038    ...     LFS, i.e. Log Structured File System used in RAID systems with parity
- G06F 2211/104     ...     Metadata, i.e. metadata associated with RAID systems with parity
- G06F 2211/1042    ...     Nano RAID, i.e. RAID systems using nanotechnology
- G06F 2211/1045    ...     Nested RAID, i.e. implementing a RAID scheme in another RAID scheme
- G06F 2211/1047    ...     No striping, i.e. parity calculation on a RAID involving no stripes, where a stripe is an independent set of data
- G06F 2211/105     ...     On the fly coding, e.g. using XOR accumulators
- G06F 2211/1052    ...     RAID padding, i.e. completing a redundancy group with dummy data
- G06F 2211/1054    ...     Parity-fast hardware, i.e. dedicated fast hardware for RAID systems with parity
- G06F 2211/1057    ...     Parity-multiple bits-RAID6, i.e. RAID 6 implementations
- G06F 2211/1059    ...     Parity-single bit-RAID5, i.e. RAID 5 implementations
- G06F 2211/1061    ...     Parity-single bit-RAID4, i.e. RAID 4 implementations
- G06F 2211/1064    ...     Parity-single bit-RAID3,i.e. RAID 3 implementations
- G06F 2211/1066    ...     Parity-small-writes, i.e. improved small or partial write techniques in RAID systems
- G06F 2211/1069    ...     Phantom write, i.e. write were nothing is actually written on the disk of a RAID system
- G06F 2211/1071    ...     Power loss, i.e. interrupted writes due to power loss in a RAID system

- G06F 2211/1073 . . . Problems due to wear-out failures in RAID systems
- G06F 2211/1076 . . . RAIP, i.e. RAID on platters
- G06F 2211/1078 . . . RAIR, i.e. RAID on removable media
- G06F 2211/108 . . . RAIT, i.e. RAID on tape drive
- G06F 2211/1083 . . . Reserve area on a disk of a RAID system
- G06F 2211/1085 . . . RMW, i.e. Read-Modify-Write method for RAID systems
- G06F 2211/1088 . . . Scrubbing in RAID systems with parity
- G06F 2211/109 . . . Sector level checksum or ECC, i.e. sector or stripe level checksum or ECC in addition to the RAID parity calculation
- G06F 2211/1092 . . . Single disk raid, i.e. RAID with parity on a single disk
- G06F 2211/1095 . . . Writes number reduction, i.e. reducing the number of writes in a RAID array with parity

G06F 2211/1097 . . . Boot, Start, Initialise, Power

G06F 2211/902 . . . Spectral purity improvement for digital function generators by adding a dither signal e.g. noise

**G06F 2212/00      Indexing scheme relating to accessing, addressing or allocation within memory systems or architectures**

- G06F 2212/10 . . . Providing a specific technical effect
- G06F 2212/1004 . . . Compatibility, e.g. with legacy hardware
- G06F 2212/1008 . . . Correctness of operation, e.g. memory ordering
- G06F 2212/1012 . . . Design facilitation
- G06F 2212/1016 . . . Performance improvement
- G06F 2212/1021 . . . Hit rate improvement
- G06F 2212/1024 . . . Latency reduction
- G06F 2212/1028 . . . Power efficiency
- G06F 2212/1032 . . . Reliability improvement, data loss prevention, degraded operation etc
- G06F 2212/1036 . . . Life time enhancement
- G06F 2212/1041 . . . Resource optimization
- G06F 2212/1044 . . . Space efficiency improvement
- G06F 2212/1048 . . . Scalability
- G06F 2212/1052 . . . Security improvement
- G06F 2212/1056 . . . Simplification
  
- G06F 2212/15 . . . Use in a specific computing environment
- G06F 2212/151 . . . Emulated environment, e.g. virtual machine
- G06F 2212/152 . . . Virtualized environment, e.g. logically partitioned system
- G06F 2212/154 . . . Networked environment
  
- G06F 2212/16 . . . General purpose computing application
- G06F 2212/161 . . . Portable computer, e.g. notebook
- G06F 2212/163 . . . Server or database system

- G06F 2212/165 .. Mainframe system
- G06F 2212/17 . Embedded application
- G06F 2212/171 .. Portable consumer electronics, e.g. mobile phone
- G06F 2212/172 .. Non-portable consumer electronics
- G06F 2212/1721 ... Home entertainment system, e.g. television set
- G06F 2212/173 .. Vehicle or other transportation
- G06F 2212/174 .. Telecommunications system
- G06F 2212/175 .. Industrial control system
- G06F 2212/177 .. Smart card
- G06F 2212/178 .. Electronic token or RFID
- G06F 2212/20 . Employing a main memory using a specific memory technology
- G06F 2212/202 .. Non-volatile memory
- G06F 2212/2022 ... Flash memory
- G06F 2212/2024 ... Rewritable memory not requiring erasing, e.g. resistive or ferroelectric RAM
- G06F 2212/2028 ... Battery-backed RAM
- G06F 2212/205 .. Hybrid memory, e.g. using both volatile and non-volatile memory
- G06F 2212/206 .. Memory mapped I/O
- G06F 2212/21 . Employing a record carrier using a specific recording technology
- G06F 2212/211 .. Optical disk storage
- G06F 2212/2112 ... with a removable carrier, e.g. DVD
- G06F 2212/213 .. Tape storage
- G06F 2212/214 .. Solid state disk
- G06F 2212/2142 ... using write-once memory, e.g. OTPROM
- G06F 2212/2146 ... being detachable, e.g.. USB memory
- G06F 2212/217 .. Hybrid disk, e.g. using both magnetic and solid state storage devices
- G06F 2212/22 . Employing cache memory using specific memory technology
- G06F 2212/221 .. Static RAM
- G06F 2212/222 .. Non-volatile memory
- G06F 2212/2228 ... Battery-backed RAM
- G06F 2212/224 .. Disk storage
- G06F 2212/225 .. Hybrid cache memory, e.g. having both volatile and non-volatile portions
- G06F 2212/25 . Using a specific main memory architecture
- G06F 2212/251 .. Local memory within processor subsystem
- G06F 2212/2515 ... being configurable for different purposes, e.g. as cache or non-cache memory
- G06F 2212/253 .. Centralized memory
- G06F 2212/2532 ... comprising a plurality of modules
- G06F 2212/254 .. Distributed memory
- G06F 2212/2542 ... Non-uniform memory access (NUMA) architecture

- G06F 2212/26 . Using a specific storage system architecture
- G06F 2212/261 .. Storage comprising a plurality of storage devices
- G06F 2212/262 ... configured as RAID
- G06F 2212/263 .. Network storage, e.g. SAN or NAS
- G06F 2212/264 .. Remote server
  
- G06F 2212/27 . Using a specific cache architecture
- G06F 2212/271 .. Non-uniform cache access (NUCA) architecture
- G06F 2212/272 .. Cache only memory architecture (COMA)
  
- G06F 2212/28 . Using a specific disk cache architecture
- G06F 2212/281 .. Single cache
- G06F 2212/282 .. Partitioned cache
- G06F 2212/283 .. Plural cache memories
- G06F 2212/284 ... being distributed
- G06F 2212/285 .. Redundant cache memory
- G06F 2212/286 ... Mirrored cache memory
  
- G06F 2212/30 . Providing cache or TLB in specific location of a processing system
- G06F 2212/301 .. In special purpose processing node, e.g. vector processor
- G06F 2212/302 .. In image processor or graphics adapter
- G06F 2212/303 .. In peripheral interface, e.g. I/O adapter or channel
- G06F 2212/3035 .. In peripheral device, e.g. printer
- G06F 2212/304 .. In main memory subsystem
- G06F 2212/3042 ... being part of a memory device, e.g. cache DRAM
- G06F 2212/305 .. being part of a memory device, e.g. cache DRAM
- G06F 2212/306 .. In system interconnect, e.g. between two buses
  
- G06F 2212/31 . Providing disk cache in a specific location of a storage system
- G06F 2212/311 .. In host system
- G06F 2212/312 .. In storage controller
- G06F 2212/313 .. In storage device
- G06F 2212/314 .. In storage network, e.g. network attached cache
  
- G06F 2212/40 . Specific encoding of data in memory or cache
- G06F 2212/401 .. Compressed data
- G06F 2212/402 .. Encrypted data
- G06F 2212/403 .. Error protection encoding, e.g. using parity or ECC codes
  
- G06F 2212/45 . Caching of specific data in cache memory
- G06F 2212/451 .. Stack data
- G06F 2212/452 .. Instruction code
- G06F 2212/453 .. Microcode or microprogram

- G06F 2212/454 .. Vector or matrix data
- G06F 2212/455 .. Image or video data
  
- G06F 2212/46 . Caching storage objects of specific type in disk cache
- G06F 2212/461 .. Sector or disk block
- G06F 2212/462 .. Track or segment
- G06F 2212/463 .. File
- G06F 2212/464 .. Multimedia object, e.g. image, video
- G06F 2212/465 .. Structured object, e.g. database record
- G06F 2212/466 .. Metadata, control data
- G06F 2212/468 .. The specific object being partially cached
  
- G06F 2212/50 . Control mechanisms for virtual memory, cache or TLB
- G06F 2212/502 .. using adaptive policy
- G06F 2212/507 .. using speculative control
  
- G06F 2212/60 . Details of cache memory
- G06F 2212/601 .. Reconfiguration of cache memory
- G06F 2212/6012 ... of operating mode, e.g. cache mode or local memory mode
- G06F 2212/602 .. Details relating to cache prefetching
- G06F 2212/6022 .. Using a prefetch buffer or dedicated prefetch cache
- G06F 2212/6024 .. History based prefetching
- G06F 2212/6026 .. Prefetching based on access pattern detection, e.g. stride based prefetch
- G06F 2212/6028 .. Prefetching based on hints or prefetch instructions
- G06F 2212/603 .. of operating mode, e.g. cache mode or local memory mode
- G06F 2212/6032 .. Way prediction in set-associative cache
- G06F 2212/604 .. Details relating to cache allocation
- G06F 2212/6042 .. Allocation of cache space to multiple users or processors
- G06F 2212/6046 ... Using a specific cache allocation policy other than replacement policy
- G06F 2212/608 .. Details relating to cache mapping
- G06F 2212/6082 ... Way prediction in set-associative cache
  
- G06F 2212/62 . Details of cache specific to multiprocessor cache arrangements
- G06F 2212/621 .. Coherency control relating to peripheral accessing, e.g. from DMA or I/O device
- G06F 2212/622 .. State-only directory, i.e. not recording identity of sharing or owning nodes
  
- G06F 2212/65 . Details of virtual memory and virtual address translation
- G06F 2212/651 .. Multi-level translation tables
- G06F 2212/652 .. Page size control
- G06F 2212/653 .. Page colouring
- G06F 2212/654 .. Look-ahead translation
- G06F 2212/655 .. Same page detection
- G06F 2212/656 .. Address space sharing
- G06F 2212/657 .. Virtual address space management

- G06F 2212/68 . Details of translation look-aside buffer (TLB)
- G06F 2212/681 .. Multi-level TLB, e.g. micro-TLB and main TLB
- G06F 2212/682 .. Multiprocessor TLB consistency
- G06F 2212/683 .. Invalidation
- G06F 2212/684 .. TLB miss handling
  
- G06F 2212/69 . Details of replacement control
  
- G06F 2212/70 . Details relating to dynamic memory management
- G06F 2212/702 .. Conservative garbage collection
  
- G06F 2212/72 . Details relating to flash memory management
- G06F 2212/7201 .. Logical to physical mapping or translation of blocks or pages
- G06F 2212/7202 .. Allocation control and policies
- G06F 2212/7203 .. Temporary buffering, e.g. using volatile buffer or dedicated buffer blocks
- G06F 2212/7204 .. Capacity control, e.g. partitioning, end-of-life degradation
- G06F 2212/7205 .. Cleaning, compaction, garbage collection, erase control
- G06F 2212/7206 .. Reconfiguration of flash memory system
- G06F 2212/7207 .. management of metadata or control data
- G06F 2212/7208 .. Multiple device management, e.g. distributing data over multiple flash devices
- G06F 2212/7209 .. Validity control, e.g. using flags, time stamps or sequence numbers
- G06F 2212/7211 .. Wear leveling
  
- G06F 2213/00** **Indexing scheme relating to interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units**
  
- G06F 2213/0002 . Serial port, e.g. RS232C
- G06F 2213/0004 . Parallel ports, e.g. centronics
- G06F 2213/0006 . Extension to the industry standard architecture (EISA)
- G06F 2213/0008 . High speed serial bus, e.g. Fiber channel
- G06F 2213/0012 . High speed serial bus, e.g. IEEE P1394
- G06F 2213/0014 . Futurebus
- G06F 2213/0016 . Inter-integrated circuit (I2C)
- G06F 2213/0018 . Industry standard architecture (ISA)
- G06F 2213/0022 . Multibus
- G06F 2213/0024 . Peripheral component interconnect (PCI)
- G06F 2213/0026 . PCI express

- G06F 2213/0028 . Serial attached SCSI (SAS)
- G06F 2213/0032 . Serial ATA (SATA)
- G06F 2213/0034 . Sun microsystems bus (SBus)
- G06F 2213/0036 . Small computer system interface (SCSI)
- G06F 2213/0038 . System on Chip
- G06F 2213/0042 . Universal serial bus (USB)
- G06F 2213/0044 . Versatile modular eurobus (VME)
- G06F 2213/0052 . Assignment of addresses or identifiers to the modules of a bus system
- G06F 2213/0054 . Split transaction bus
- G06F 2213/0056 . Use of address and non-data lines as data lines for specific data transfers to temporarily enlarge the data bus and increase information transfer rate
- G06F 2213/0058 . Bus-related hardware virtualisation
- G06F 2213/0062 . Bandwidth consumption reduction during transfers
- G06F 2213/0064 . Latency reduction in handling transfers
- G06F 2213/16 . Memory access
- G06F 2213/1602 .. Memory access type
- G06F 2213/24 . Interrupt
- G06F 2213/2402 .. Avoidance of interrupt starvation
- G06F 2213/2404 .. Generation of an interrupt or a group of interrupts after a predetermined number of interrupts
- G06F 2213/2406 .. Generation of an interrupt or a group of interrupts after a fixed or calculated time elapses
- G06F 2213/2408 .. Reducing the frequency of interrupts generated from peripheral to a CPU
- G06F 2213/2412 .. Dispatching of interrupt load among interrupt handlers in processor system or interrupt controller
- G06F 2213/2414 .. Routing of interrupt among interrupt handlers in processor system or interrupt controller
- G06F 2213/2416 .. Determination of the interrupt source among a plurality of incoming interrupts
- G06F 2213/2418 .. Signal interruptions by means of a message
- G06F 2213/2422 .. Sharing of interrupt line among a plurality of interrupt sources
- G06F 2213/2424 .. Interrupt packet, e.g. event
- G06F 2213/28 . DMA
- G06F 2213/2802 .. DMA using DMA transfer descriptors

- G06F 2213/2804 .. Systems and methods for controlling the DMA frequency on an access bus
- G06F 2213/2806 .. Space or buffer allocation for DMA transfers
- G06F 2213/2808 .. Very long instruction word DMA
  
- G06F 2213/36 . Arbitration
- G06F 2213/3602 .. Coding information on a single line
- G06F 2213/3604 .. Coding information on multiple lines
  
- G06F 2213/38 . Universal adapter
- G06F 2213/3802 .. Harddisk connected to a computer port
- G06F 2213/3804 .. Memory card connected to a computer port directly or by means of a reader/writer
- G06F 2213/3806 .. Mobile device
- G06F 2213/3808 .. Network interface controller
- G06F 2213/3812 .. USB port controller
- G06F 2213/3814 .. Wireless link with a computer system port
- G06F 2213/3852 .. Converter between protocols
- G06F 2213/3854 .. Control is performed at the peripheral side
  
- G06F 2213/40 . Bus coupling
- G06F 2213/4002 .. Universal serial bus hub with a single upstream port
- G06F 2213/4004 .. Universal serial bus hub with a plurality of upstream ports

**G06F 2216/00**      **Indexing scheme relating to additional aspects of information retrieval not explicitly covered by [G06F 17/30](#) and subgroups**

- G06F 2216/01 . Automatic library building
- G06F 2216/03 . Data mining
- G06F 2216/05 . Energy-efficient information retrieval
- G06F 2216/07 . Guided tours
- G06F 2216/09 . Obsolescence
- G06F 2216/11 . Patent retrieval
- G06F 2216/13 . Prefetching
- G06F 2216/15 . Synchronised browsing
- G06F 2216/17 . Web printing

**G06F 2217/00**      **Indexing scheme relating to computer aided design [CAD]**

- G06F 2217/02 . Component-based CAD

- G06F 2217/04 . CAD in a network environment
- G06F 2217/06 . Constraint-based CAD
- G06F 2217/08 . Multi-objective optimization
- G06F 2217/10 . Probabilistic or stochastic CAD
- G06F 2217/12 . Design for manufacturability
- G06F 2217/14 . Design for testability
- G06F 2217/16 . Numerical modeling
- G06F 2217/32 . Cloth
- G06F 2217/34 . Pipes
- G06F 2217/36 . Cables, cable trees, wire harnesses
- G06F 2217/38 . Packaging
- G06F 2217/40 . Chip packaging
- G06F 2217/41 . Molding
- G06F 2217/42 . Sheet material
- G06F 2217/44 . Composites
- G06F 2217/46 . Fuselage
- G06F 2217/62 . Clock network
- G06F 2217/64 . Structured ASICs
- G06F 2217/66 . IP blocks
- G06F 2217/68 . Processors
- G06F 2217/70 . Fault tolerant, i.e. transient fault suppression
- G06F 2217/72 . Spare resources, i.e. permanent fault suppression
- G06F 2217/74 . Symbolic schematics
- G06F 2217/76 . Ageing analysis and optimization
- G06F 2217/78 . Power analysis and optimization
- G06F 2217/80 . Thermal analysis and optimization

- G06F 2217/82 . Noise analysis and optimization
- G06F 2217/84 . Timing analysis and optimization
- G06F 2217/86 . Hardware-Software co-design
- G06F 2219/00** **Indexing scheme relating to application aspects of data processing equipment or methods**
- G06F 2219/10 . Environmental application, e.g. waste reduction, pollution control, compliance with environmental legislation
- G06F 2221/00** **Indexing scheme relating to security arrangements for protecting computers, components thereof, programs or data against unauthorised activity (not used)**
- G06F 2221/03 . Indexing scheme relating to [G06F 21/50](#), monitoring users, programs or devices to maintain the integrity of platforms
- G06F 2221/031 .. Protect user input by software means
- G06F 2221/032 .. Protect output to user by software means
- G06F 2221/033 .. Test or assess software
- G06F 2221/034 .. Test or assess a computer or a system
- G06F 2221/07 . Indexing scheme relating to [G06F 21/10](#), protecting distributed programs or content
- G06F 2221/0702 .. Binding (not used)
- G06F 2221/0704 ... Device
- G06F 2221/0706 .... Domain
- G06F 2221/0708 ... Location
- G06F 2221/0711 ... Token
- G06F 2221/0713 ... User
- G06F 2221/0715 .... Characteristics
- G06F 2221/0717 .... Domain
- G06F 2221/072 .... Knowledge
- G06F 2221/0722 .. Content (not used)
- G06F 2221/0724 ... Editing
- G06F 2221/0726 ... Personalisation (not used)
- G06F 2221/0728 .... Conversion
- G06F 2221/0731 .... On user or administrative requirements
- G06F 2221/0733 .... Watermark
- G06F 2221/0735 ... Restriction at operating system level
- G06F 2221/0737 ... Traceability
- G06F 2221/074 .... Tracing pattern recognition
- G06F 2221/0742 ... Enhanced product
- G06F 2221/0744 ... Unique instance ([G06F 2221/0702](#) takes precedence)
- G06F 2221/0746 .. Emerging technologies

- G06F 2221/0748 .. Hiding
- G06F 2221/0751 .. Key (not used)
- G06F 2221/0753 ... Distribution
- G06F 2221/0755 ... Generation
- G06F 2221/0757 .. Licence (not used)
- G06F 2221/0759 ... Conversion
- G06F 2221/0762 ... Definition (not used)
- G06F 2221/0764 ..... Grace period
- G06F 2221/0766 ..... Language
- G06F 2221/0768 ... Editing
- G06F 2221/0771 ... Revocation
- G06F 2221/0773 ... Recurrent authorisation
- G06F 2221/0775 .. Logging
- G06F 2221/0777 .. Return
- G06F 2221/0779 .. Transfer (not used)
- G06F 2221/0782 ... Backup or restore
- G06F 2221/0784 ... Fragments
- G06F 2221/0786 ... Indirect via third party
- G06F 2221/0788 ... Peer-to-Peer [P2P]
- G06F 2221/0791 ... Superdistribution
- G06F 2221/0793 ... Synchronisation
- G06F 2221/0795 ... Transaction with ACID (Atomicity, Consistency, Isolation and Durability) properties
- G06F 2221/0797 .. using dedicated hardware at the client
  
- G06F 2221/21 . Indexing scheme relating to [G06F 21/00](#) and subgroups addressing additional information or applications relating to security arrangements for protecting computers, components thereof, programs or data against unauthorised activity
  
- G06F 2221/2101 .. Auditing as a secondary aspect
- G06F 2221/2103 .. Challenge-response
- G06F 2221/2105 .. Dual mode as a secondary aspect
- G06F 2221/2107 .. File encryption
- G06F 2221/2109 .. Game systems
- G06F 2221/2111 .. Location-sensitive, e.g. geographical location, GPS
- G06F 2221/2113 .. Multi-level security, e.g. mandatory access control
- G06F 2221/2115 .. Third party
- G06F 2221/2117 .. User registration
- G06F 2221/2119 .. Authenticating web pages, e.g. with suspicious links
- G06F 2221/2121 .. Chip on media, e.g. a disk or tape with a chip embedded in its case
- G06F 2221/2123 .. Dummy operation
- G06F 2221/2125 .. Just-in-time application of countermeasures, e.g., on-the-fly decryption, just-in-time obfuscation or de-obfuscation
- G06F 2221/2127 .. Bluffing

- G06F 2221/2129 .. Authenticate client device independently of the user
- G06F 2221/2131 .. Lost password, e.g. recovery of lost or forgotten passwords
- G06F 2221/2133 .. Verifying human interaction, e.g., Captcha
- G06F 2221/2135 .. Metering
- G06F 2221/2137 .. Time limited access, e.g. to a computer or data
- G06F 2221/2139 .. Recurrent verification
- G06F 2221/2141 .. Access rights, e.g. capability lists, access control lists, access tables, access matrices
- G06F 2221/2143 .. Clearing memory, e.g. to prevent the data from being stolen
- G06F 2221/2145 .. Inheriting rights or properties, e.g., propagation of permissions or restrictions within a hierarchy
- G06F 2221/2147 .. Locking files
- G06F 2221/2149 .. Restricted operating environment
- G06F 2221/2151 .. Time stamp
- G06F 2221/2153 .. Using hardware token as a secondary aspect