European Patent Office 2009/04/29
Registry of the Enlarged Board of Appeal
Referral G 3/08
80298 München
Germany

Dear Sirs,

having worked previously on the question of patentability of programs for computers in terms of possible *legislative* avenues, via a contribution to the 2nd annual conference of the European Policy for Intellectual Property association, I would now like to use the opportunity of third-party statements to Referral G 3/08 to present a short *juridical* analysis of the same field.

Please find below first a general discussion (A-C), followed by corresponding proposed answers to the questions set forth in the referral (D).

Yours sincerely,

(Markus Nullmeier)

# The Patentability of Programs for Computers under the European Patent Convention

## A The status quo

When the original European Patent Convention (EPC) was signed in 1973, few contemporaries would probably have seen any connection between their notion of a computer and the practical aspects of daily dental hygiene. Yet, as of 2009, both a personal computer and an electrically driven toothbrush may share as a controlling instance the same class of device, namely a microprocessor. In the light of the last decades' enormous convergence of technology that made digital techniques permeate virtually any other field, a proper interpretation of those provisions of Art. 52 EPC that exclude programs for computers (computer programs) from patentability, if only applied for as such, has become an ever-increasing challenge. This has been addressed by the EPO's Technical Board of Appeal over the course of time, yet not without problems, as detailed in the referral. And, there are more issues to be raised, as follows.

### A.1 The Problem of discriminating subject-matter regarding computer programs

In contrast to other exempted subject-matter listed in Art. 52(2) EPC, nowadays computer programs play a virtually indispensable role in most fields where innovation takes place — be it as a tool of the creative process or as a part of the creation proper.

Thus, in the context of subject-matter where patentability is without controversy, it appears natural for an inventor to apply for “mixed claims”, which request protection

for the interaction of a computer program with an invention. The EPC does touch this problem in Art. 52(3), in narrowing the exemptions of Art. 52(2) only to cases where they are concerned "as such". But the interpretation of these two infamous words is far from being well-defined, with various proposed solutions.[1] The legitimacy of a tailor-made special meaning of Art. 52(3) for computer programs is another open question. Hence, it appears unclear to what extent a stable application of the law could be based on Art. 52(3).

Due to the inherently abstract nature of computer programs and data (see also Section B.4), they may also *represent* patentable subject-matter in many ways. Does patentability thereby imprint on computer programs? Is this a case of a "mixed claim" as above, or a wholly distinct category? Art. 52(3) might become overstretched in answering these issues.

Programs may be considered (a) in a textual, static form, and (b) with regard to the activities they impose on a computer. Do these two aspects constitute different kinds of subject-matter? Furthermore, should *methods* used by or implemented by computer programs be accounted as formative parts or as separate entities in terms of patentability? It should be relatively easy to shatter the meaning of "programs for computers" into even more fragments, probably pushing the solution to the problem further away in the process.

Finally, the core competence of computers, namely calculation with digital data, would be pointless without adding both input and output of information to the machines by means of peripheral devices, such as keyboards, printers, and monitors. Since computers and thereby programs draw an essential part of their usefulness from this class of devices, the patentability exemption in Art. 52(3 c) and (3) should evidently include the use of input and output devices by computer programs to a meaningful extent. However, the text of the EPC is silent in this respect.

### A.2 The difficulties of the Board's present approach

Whereas the referral specifically pointed out diverging aspects of the Board's decisions, they do have much of a common ground, aptly illustrated by the headnote of T 1173/79:

*"A computer program product is not excluded from patentability under Article 52(2) and (3) EPC if, when it is run on a computer, it produces a further technical effect which goes beyond the 'normal' physical interactions between program (software) and computer (hardware)."*

That decision will therefore serve as a guideline for the present section.

Given the complexities listed in Section A.1, the case law of the Board has been a valiant step towards their resolution. The term "further technical effect" is obviously intended as a means to discern computer programs that are not "as such" related to within a claim, following Art. 52(3) EPC. On the other hand, the respective definition provided in the headnote of T 1173/79 shows a peculiar inconsistency with the requirements of Art. 52(1), where patentable inventions are stipulated to be *new*.
For, it is easy enough to argue that a potentially patentable computer program must at least fulfill the novelty requirements of Art. 54. But then it would also go beyond the state of the art in its interactions with a computer, inescapably including their physical aspects. Thus, in the end, any novelty regarding computer programs would surpass the

1 See, e.g., Thomas Winischhofer, Computersoftware und Patentrecht, PhD thesis (2000). http://www.winischhofer.net/other/patent.pdf

" 'normal' physical interactions" of the headnote, yielding the pertinent exemption provisions of Art. 52(2 c) and (3) meaningless in all cases. This amounts to an inconsistent application of the law, a problem that might be provisionally repaired by erasing the word "normal".

As an example for the last paragraph, a new abbreviation for a word of a human language, in its quality of being stored in a computer, would be patentable in principle following the headnote of T 1173/79. An inventive step may be present for a sufficiently ingenious abbreviation, and, most importantly, it would presumably use less storage space than the full word. Thereby we arrive at the physical level, because the logical storage space in a computer is always physically limited, and a computer program using such an invention would possibly execute faster, or run on a smaller class of computers. It seems hard to imagine how one could defy this kind of reasoning opened up by the headnote, which is, incidentally, not at all limited to the computer program exemption of Art. 52(2). Think of a method of artistic painting saving a certain amount of paint, compared to the state of the art. Industrial applicability is a non-question in the light of the multitude of mass-made products being decorated by hand. The reference to the physical object of paint, by virtue of being the artistic activity's technological basis, would be sufficient to escape the patentability exemption for aesthetic creations of Art. 52(2 b). We conclude that the simple reference to physical reality as a means to narrow Art. 52(2) appears futile, for it will lead to absurdities rather quickly.

In elaborating on Art. 52(3), the Board concluded that (T 1173/79, reasons, 4.1) *"The combination of the two provisions (Article 52(2) and (3) EPC) demonstrates that the legislators did not want to exclude from patentability all programs for computers."*
The essence of this argument is the introduction of a special subclass within the class of all computer programs, designated "programs for computers as such". Only this subclass would then be exempted from patentability. However, the connection of the phrase "as such" (which rather reminds of essential qualities, see Section B.3) to the concept of classification appears somewhat bold. This is especially so since the Board refrained from giving an interpretation of Art. 52(3), in terms of classification, with respect to any remaining item its non-exhaustive list. One would wish that T 1173/79 did contain such an interpretation, because the meaning, e.g., of an aesthetic creation that is not "an aesthetic creation as such" seems elusive. Still, this point is probably of minor importance, since pertinent case law of the Board hinges upon the "further technical effect" quoted above. That effect presumably denotes something distinct from a computer program, and is thus apparently more in line with the wording of Art. 52(3).

The Board defines a "further effect" (T 1173/79, reasons, 6.4) as an effect going beyond the fact that a computer is physically modified during the execution of a program. If such an effect would then (a) be technical (literally, "having a technical character"), one would in total arrive at subject-matter eligible for a patent. Alternatively, the Board (b) deems patentability for "further effects" causing a computer program to solve a technical problem. It is remarkable that for the latter case (b), which is more or less the problem of computer programs representing patentable subject-matter of A.1, no justification is given at all. In substantiating case (a), the Board resorts to the fact that technical character "is generally accepted as an essential requirement for [...] patentability" (T 1173/79, reasons, 5.1). However, from

this *necessary* requirement the implicit conclusion is drawn that technical character is also *sufficient* for patentability (T 1173/79, reasons, 5.3). This reasoning does work after a fashion, but only by stipulating (reasons, 5.2) that computer programs exempted by way of Art. 52(2) and (3) are "lacking in technical character". The choice of words we see here ("may be construed to mean") supposes that the Board itself was unsure in this regard.

In addition, the decision T 1173/79 more or less contradicts itself when it first states, in line with the argument just discussed (reasons, 5.2), that
*"[...] it is assumed that programs for computers cannot be considered as having a technical character for the very reason that they are programs for computers."* (reasons, 6.1)
But later, it ascribes a technical character to programs provided that
*"[...], for instance, a technical effect of that kind is achieved by the internal functioning of a computer itself under the influence of said program."* (reasons, 6.5)
Now the internal functioning of a computer under the influence of a program is nothing else than the series of states a computer exhibits when a program is run, as elementary computer science teaches. Then it is reiterated (reasons, 6.6) that "physical modifications of the hardware" must not be considered in this respect, leaving us with the abstract aspects of the internal functioning of a computer. However, technical character had been denied for "mere abstract creations" before (reasons, 5.2). The consequence of this must be that there is no room for a "further technical effect" in relation to the "internal functioning of a computer" within the logic inherent in decision T 1173/79, despite the prominent appearance in (reasons, 6.5).

The Board also perceives potentially patentable subject-matter in
*"a computer program product having the potential to cause a predetermined further technical effect"* (T 1173/79, reasons, 9.4),
by which it describes a computer-readable medium storing said program (reasons, 9.3). This leads to a serious problem. In order to communicate about computer programs, such as for the purpose of education or science, it is often adequate to quote fragments of real computer programs. These fragments will often be complete small programs that are ready to be executed on a computer in their literal form. Indeed, it is often sufficient to achieve this by the well-known "cut and paste" operation. If corresponding communication material is stored on a computer-readable medium, in an electronic document format (a case that is, today, more of the norm than an exception), all the conditions of the above quote are fulfilled. In this way, patentability finally transpires into the field of computer science and quite probably also engineering literature. We deem this result arcane, although it is unavoidable following decision T 1173/79. While literary works are not expressly mentioned in Art. 52(2), arguments against their patentability are, in all likelihood, not hard to find.

The essence of the Board's present approach appears to be that it remains totally unclear under what concrete provisions subject-matter concerning computer programs may still be exempted from patentability under Art. 52 EPC. The answer could well be the empty set, and the author of the present statement is not alone in this respect:
*"Even if jurisprudence has refused to admit it expressly, patentability of programs as such is now admitted in the practice of the EPO and the letter of the law is nothing but hollow words."*[2]

2 Reto M. Hilty, Christophe Geiger: Patenting Software? A Judicial and Socio-Economic Analysis, International Review of Intellectual Property and Competition Law (IIC) **36**(6), 615–646 (2005) http://beck-online.beck.de/default.aspx?vpath=bibdata%2Fzeits%2FIIC%2F2005%2Fcont%2FIIC%2E2005%2E615%2E1%2Ehtm

The outcome would thus be the effective eradication of the computer program phrase of Art. 52(2 c), being in complete discrepancy to any possible intent of the legislator. It is therefore not very far-fetched to speculate that the Board has been exerting too much judicial discretion in its reasonings, going well beyond what is permitted within the rule of law.

In summary, we do not assess the present approach as a satisfactory solution to any of the problems stated in A.1.

### A.3 The present approach and the European Patent Convention of 2000

The Board's present approach, as exemplified by decision T 1173/79, is based on ascribing a "technical character" to computer programs that are, in principle, eligible for patentability. In other words, they would belong to a field of technology. The European Patent Convention in force today has been adapted to the wording of the TRIPS treaty in 2000, requiring patentability "in all fields of technology" in Art. 52(1). Then, Art. 52(2) introduces its non-exhaustive list of exemptions by
*"The following in particular shall not be regarded as inventions within the meaning of paragraph 1:"*

This language ("shall not be regarded") is a clear sign of *legal fiction*, whereby the quality of belonging to a field of technology, in conjunction with the other requirements for patentability in Art. 52(1), is denied for said list, including programs for computers. It is possible that the intention of TRIPS might have been otherwise for some parties involved,[3] but the implementation within Art. 52 EPC as a whole turns out to be very clear-cut. Any construction again introducing a tenable technical character to computer programs by way of Art. 52(3) would seem a bit fanciful in this context.

Thus the central reasoning of the present approach ceases to work with the EPC of 2000. Hence, the new statutory provisions of Art. 52 EPC overrule the established case law of the Board with respect to future decisions, calling for new ideas.

## B An alternative solution

In addressing the issues of A.1, one would ideally wish to seek for criteria that have the vigor to weather future court rulings. While we naturally cannot claim that much, a recourse to established methods of law interpretation, such as the historical and teleological variants, might help. In contrast to the work treated in A.2 and various other opinions, the new approach attempts to flesh out the patentability exemption itself, rather than defining the character of patentable subject-matter.

### B.1 A historical interpretation of the computer program exclusion of Article 52 EPC

This mode of interpretation in principle asks for the original legislators' intent at the time a law was signed. In the context of the referral, this may be possible in part without too much soul-searching if we just ask for the meaning the term "programs for computers" effectively had in the years leading up to 1973, when the original EPC was drafted. Some might have answered similarly to the terminology of the referral, emphasizing the programmability aspect, with results equivalent to "programs for a programmable apparatus". While perfectly reasonable, this is more an abstract than a plain explanation. Others then would have described typical cases of what computers actually did at the time, under the control of respective programs. As indicated in the

3 *Ibid.*, p. 620.

introduction to part A, these activities had a much restricted breadth in comparison to the uses programmable devices are put to nowadays.

A computer of the early 1970ies of course performed digital calculations, just like today. The objectives of these were in virtually all cases the automation of business processes, scientific and engineering calculations, the occasional game or artistic experiment, and the beginnings of interpersonal communication via computer programs. Data was input to or output from computers via peripheral devices (see A.1) that were oriented towards the human user and were more or less similar to today's keyboards, printers, and monitors. Projects adding audio and video input/output were underway[4]. Digital data was conserved in storage facilities and exchanged (in a small but significant number of cases) between computers by early computer network facilities.

Because computer programs at the time routinely made use of a number of these classes of processes, it is only natural to think that the legislator intended to exempt all of them from patentability in Art. 52(2 c) EPC. This is analogous to the truism that methods for doing business are particularly exempted when they are applied.

Allowing for the evolution of technology — self-evident in the context of patents — all of the above-described activities that computer programs may engage in must be still held unpatentable today, essentially those of calculation, storage and transmission of *digital* data, and interfacing the latter to human beings in terms of information exchange.

Our little electrical toothbrush from the beginning falls clearly short of the last paragraph's notions: its actions are not essentially conveying information to its user, they are doing something completely unrelated to all of the above. And, the main points of Section A.1 are resolved as well. Using programs to represent patentable subject-matter is exempted, since that has been customarily done in the early 1970ies, as well as computer programs under all aspects they were used at the time, thereby restricting input and output of data to the quoted classes of devices.

### B.2 A teleological interpretation of the computer program exclusion of Article 52 EPC

All items of the list in Art. 52(2) EPC share the mental activity of human beings as their focal point. Beginning with discoveries, which relate to the inductive creative means of the mind, and (non-exhaustively) ending with presentations of information, which relate to connections of sensations with the mind. The purpose of Art. 52(2) is therefore to hinder restrictions of the human mind by patents.

At first sight, computer programs may appear as an odd intrusion into this list, inasmuch they are processes that operate on machines and not with human mind(s). However, they are again *fundamentally* closer to the mind than any other process effectuated by technology, since their very essence lies in performing abstractions conceived by and having their equivalent within the human mind. With the latter, they also share an unparalleled malleability. While a machine or progress many improve upon or supplant work done by human *hand*, or a new substance may improve upon things found in raw form in nature, the activities of Art. 52(2) EPC correspond to the furthering of the human mind and the means of its perception of the world and its

4 See, e.g., Douglas C. Engelbart, A research center for human intellect, Stanford Research Institute (1968) http://sloan.stanford.edu/MouseSite/1968Demo.html

expression, including speech, writing, and other forms of communication. In this sense, computer programs are indeed at home in Art. 52(2). The fact that computer programs are today used for the production of art to an extent that is totally unheard of from any technology is further corroborating evidence.

Thus, the computer is very much a tool to offload work form the human mind, and computer programs are the rules how this is to be achieved. As they free humans from tedious repetitive mental acts such as calculations with pen and paper, it is clear that representations of patentable subject-matter by programs are no special case with respect to Art. 52(2).

In terms of input and output of data (I/O), computer programs as an aid to the mind may not only help humans in processing of abstract symbols, but also in substituting the human senses for various purposes, such as giving commands to a computer by signs or voice, for communication, or to support disabled people. This requires non-patentability for computer program use of all I/O devices commensurate with the human mind, brain-computer interfaces so to speak, of course usually mediated by senses or purposeful actions. Of course, these I/O devices must be thought of operating within limits meaningful to the human sensitivity of said senses (such as sight, hearing, touch, smell, taste, temperature, pressure, gravity). In addition, data gained by a process that is not commensurate with the human senses in the above way must be still regarded as commensurate with the human mind, if its entry into the computer is delayed by at least the typical human reaction time. As an aside, the use of hardware random numbers may be also rightfully exempted, because of a (more or less) similar capability of the mind, and the parallel fact that randomness is a key element of many rules for games.

The fact that some of the tasks that purposefully programmed above-defined computer programs are capable of (e.g., image processing) may replace potentially patentable analog processes or custom-built machines does not invalidate this teleological interpretation. For, taking another item of Art. 52(2) as an analogy, proven scientific theories have rendered redundant many an experiment, because the respective results are more easily calculated. This view is also no trick to deprive certain fields of technology of their patent-worthiness, because as a matter of fact computers as objects and the processes that they use to enable digital calculation and communication remain of course fully open to patentability. Our friend the microprocessor-controlled toothbrush is of course more concerned with human teeth than with the human mind, making it, unfortunately, not worthy of the lofty definitions supplied in this section.

We conclude with the remark that, in the teleological point of view, matters of efficiency are natural aspects of computer programs, just as they are for pen and paper calculations or human thinking in general.

### B.3 The provisions of Article 52(3) EPC

Looking at the positive definitions of non-patentability of computer programs in Sections B.1 and B.2, which incidentally introduce definitions of *computers* within the meaning of Art. 52(2) EPC, the interpretation of Art. 52(3) amounts to less of a problem. The exemption from patentability “as such” in Art. 52(3) of items from Art. 52(2) may easily comprise all their essential qualities and immediately associated acts, because these items are now positively defined. The discussion about the limits of patentability

thus shifts to the understanding of the *exclusions*, from the former emphasis put on the *inclusions*. Due to technological progress, the latter will be always hard to describe in general terms.

### B.4 Consequences

The non-patentable subject-matter after Art. 52(2) EPC concerning computer programs elaborated in Sections B.1 and B.2, respectively, shows an extremely far-reaching similarity. In addition, interpretative problems of Art. 52(3) mostly vanish in such an context of positive definitions of non-patentability. The content of this part B should therefore serve as a set of clear guidelines to interpret Art. 52(2) EPC as a whole.

We add the minor remarks that is an established fact of computer science that programs and data are equivalent — in other words, the border between the two may be set arbitrarily. And, a network of communicating computers is again a computer, otherwise the very concept of a computer would become self-contradictory.

## C Conclusions

The present approach that draws the line of patentability in terms of "further" technical effects of computer programs was shown to be inadequate, both in terms of the principles of the rule of law, and due to the changes made to Art. 52 in the EPC of 2000. An alternative solution based on congruent historical and teleological exegeses of Art. 52 develops a definition of the terms "computer program" and “computer” within the meaning of the EPC, i.e., rules and machines furthering the capability of the human mind in certain ways. The consequence is that the exclusion provisions for programs as subject-matter in Art. 52 apply only in conjunction with computers defined in this specific way. The latter make up a broad class of devices, which is nevertheless narrowly defined. Out of necessity, this terminology is at variance with the definition given for in the referral proper (“any programmable apparatus”). We also pointed out that the exclusion of programs for computers must necessarily encompass all information for so-defined computers that are normally called "data", lest a new field of uncertainty should sprout up.

## D Proposed Answers to the referral's questions

We remark that the following statements often draw from the theory presented in Part B, as a consequence of the dissent with the Board's case law.

***1. Can a computer program only be excluded as a computer program as such if it is explicity claimed as a computer program?***

No, firstly because this would open the door to all kinds of easy evasive language. The validity of a claim must rather lie in its meaning, otherwise, it would be trivial to circumvent all exclusions of Art. 52(2) EPC. As an example, it is no problem to express scientific theories about natural phenomena in terms of processes.

Secondly, a computer programs is, as far as digital calculation is concerned, just a possible incarnation of a number of logical formulas. The patentability of logical circuits implementing such formulas is established, however. Patents claiming essentially logical formulas are thus of a limited applicability. This is not contradictory, for their malleability confers qualities to computer programs that logical circuits lack.

***2.(a) Can a claim in the area of computer programs avoid exclusion under Art. 52(2)(c) and (3) merely by explicitly mentioning the use of a computer or a computer-readable data storage medium?***

No, because firstly a data storage medium is just an item a computer program is expected to use freely in the way explained in Sections B.2 and B.3. Secondly, this would ensue all the unresolvable problems concerning patented stored data discussed in Section A.2.

***(b) If question 2(a) is answered in the negative, is a further technical effect necessary to avoid exclusion, said effect going beyond those effects inherent in the use of a computer or data storage medium to respectively execute or store a computer program?***

Yes, in the sense that the term "further technical effect", shown to be ill-defined by the Board in Section A.2, be reinterpreted as effects going beyond a meaningful interpretation of the patentability exclusions of Art. 52(2)(c) and (3). Section B provides an example of such an interpretation.

***3.(a) Must a claimed feature cause a technical effect on a physical entity in the real world in order to contribute to the technical character of the claim?***

Yes, if "the real world" should mean entities outside the computer, its purposefully associated peripheral devices, and the human mind. Otherwise, all of the last three items will be, of course, considered real enough by many.

***(b) If question 3(a) is answered in the positive, is it sufficient that the physical entity be an unspecified computer?***

Certainly no, for this would render the exclusions of Art. 52(2)(c) and (3) null and void, as detailed at the end of Section A.2.

***(c) If question 3(a) is answered in the negative, can features contribute to the technical character of the claim if the only effects to which they contribute are independent of any particular hardware that may be used?***

Although we answered question 3(a) in the positive, a comment is in order here. An positive answer to this question would, in the end, stipulate patentability for a claim only because it directly or indirectly refers to physical reality. In this way, everything would become patentable (not just all computer programs), amounting to an all but fundamentally cynical interpretation of Art. 52(2)(c) and (3).

***4.(a) Does the activity of programming a computer necessarily involve technical considerations?***

In some cases, possibly yes. After all, nobody appears to question the fact that computers are technical objects. However, just the same answer must be given for several other activities and objects exempted from patentability in Art. 52(2), such as aesthetic creations. For example, a sculptor would need to consider technical qualities of the material used for a particular sculpture in order to allow for the desired artistic results.

Still, the arguments of Section B.2 fundamentally weaken the above cautionary "yes", since they imply that the essential aspects of an (above-defined) computer's specifications being relevant for programs are *abstract*. It would be thus arbitrary to link a computer program to any kind of specific technology — its essence lies in its interaction with the human mind. The latter we presume not to be a field of technology, and for this one might argue independently of the EPC.

In summary, any answer, either in the positive or in the negative, appears too arguable to draw conclusions from.

***(b) If question 4(a) is answered in the positive, do all features resulting from programming thus contribute to the technical character of a claim?***

No, since there appears to be no legal basis for this kind of reasoning. The only place where the EPC comes even close to the process of creating an invention is its definition of an inventive step in Art. 56. But the quality of an inventive step is an additional requirement for subject-matter, next to belonging to a field of technology as per Art. 52(1). Also, Art. 56 is void of any allusions to the character of a claim. Thus, the technical character of claims are independent from any processes (mental or otherwise) that created said claims, as far as patentability under the EPC is concerned. Finally, even if this kind of contribution to the technical character of a claim held true, the interpretation given in Section A.3 above would clearly take precedence: programs are not considered to belong to a field of technology as of Art. 52(1) and 52(2 c).

***(c) If question 4(a) is answered in the negative, can features resulting from programming contribute to the technical character of a claim only when they contribute to a further technical effect when the program is executed?***

No, not even in the case said features would contribute to a further technical effect (possibly understood in the sense of the answer to question 2(b)), since the creative process of computer programs constitutes nothing but mental act. At this point, the reasoning of the answer to question 4(b) applies just the same.