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Advanced Software and Patents: A Patentability Balance for Fostering Technology

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Abstract. Technology advances have usually brought wealth and health to society, while also raising ethical and policy issues. Technology and patents are linked to each other in that patents have been conceived also as a tool for rewarding and motivating the inventor's endeavors. Patents have been subject to critical views, especially in the era of software where the innovation might be based on non-technological improvements, sometimes arising from new business models, social behavior or trends. For patents to support innovation in its beneficial contribution to society and avoid abuse, a high-quality patent system should be ensured. Many people believe that this requires in the first place to exclude from patent protection those inventions that are purely non-technical. In this paper, the authors analyze the legal situation at the European Patent Office (EPO), considered as setting amongst the worldwide strictest standards in terms of software patentability, and wherein patents are granted only to technology advances. Within this context, the case of software simulators is discussed, since this is directly linked to intangible software inventions and since it is the subject of a case on a point of law pending before the EPO highest instance, such that its outcome may impact patentability of modern software technologies. In conclusion, the authors argue in favor of maintaining the present EPO practice on simulators, as this is seen as a fair balance in Europe between patent protection for intangible inventions based on technology while excluding from patent protection those inventions that are non-technical arrangements.

Keywords: Patents. Patentability. New software technologies.

1 Introduction

Software innovations are increasingly decoupled from tangible systems. The social value of these innovations will necessarily increase with more human effort and the leverage of technologies such as artificial intelligence (AI).

Patents have been usually justified as an incentive to inventors to make and publish their innovations. Yet, the foundation of patents has been often challenged, and perhaps even more in the era of software, with many of the arguments in favor or against patenting being unsurprisingly and understandably biased by the economic interests and business models of the parties bringing such arguments forward.

Against the above background, the issue of whether and how certain software inventions can be patented is herein discussed, believing that the patent system must provide fair and balanced opportunities for patent protection. More in detail, focus will be on software inventions that do not necessarily produce a tangible result, like for instance in the field of bioinformatics, artificial intelligence, modeling of systems beyond the physical world.

The focus of the present contribution is thus on whether and under which conditions legal provisions should make patent protection available to software inventions, believing that society may benefit from such patents when a right balance is found. We focus here on patentability as seen at the European Patent Office (EPO) [1]. The main reasons are two-fold: the EPO is generally considered as applying the strictest standards in terms of patent eligibility of software, and it links such eligibility to an invention being technical [2].

2 Patentability of Software at the EPO

The EPC limits patentability of software inventions by stipulating that inventions relating to computer programs "as such" [3] shall not be eligible to patent protection. The meaning of "as such" has been clarified by and developed through case law, the main aspects of which are here summarized.

2.1 General Requirements and Technical Character

The Enlarged Board of Appeal (EBoA) [4] has previously held in G2/07 [5] that using forces of nature belongs to the core of an invention. It follows that using forces of nature is a prerequisite for an invention to be patent eligible.

A computer program executed on a computer relies on electrical signals that certainly represent forces of nature and would thus not to be in contradiction with G2/07. However, in milestone decision T1197/97 [6] the Board found that for such a computer program to be patentable it is necessary to produce a technical effect that goes beyond the effect lying in the mere exchange of signals between computer components [7], and must in fact cause the solution of a technical problem. This reflects a public policy decision.

EPO case law has then established that a software invention is patentable if it has technical character, without having provided a definition for technical [8,9], on grounds that any definition may become obsolete and then not anymore in line with technological progress [10]. It thus appears that the intent of the legislator was to allow room for patent protection of new technologies that could not be foreseen at the time of drafting

the EPC. As a general guidance, it can be fairly said that, under the EPC, an invention is technical if it is based on technical considerations and motivations [11].

2.2 Intangible Solutions

Software inventions may be directly applied to the control of a technical system or parts thereof, e.g., controlling the braking of a vehicle, or controlling of a production line or manufacturing process. In such cases, it is rather straightforward to show technicality, since the software is directly applied on or to a real object wherein both the object and the action on the same are immediately recognized as technical.

Certain software inventions are patentable if they produce a technical effect within a physical object. In addition, a computer invention may be technical and patentable if the technical advantage brought about is on an intangible new functionality. Furthermore, a computer invention which uses forces of nature by virtue of the execution on a computer may be patentable also if relates to an intangible technical solution, and not necessarily to the modification or creation of a physical item, at least as long as considerations and knowledge of the functioning of a computer play a role in the conception of such invention [12].

3 Beyond the Physical World: Patentability of Software Simulations

In T1227/05, in the following also Infineon [13], the BoA sets a general condition under which a computer-based software simulation can be regarded as patentable, which was also reflected in the EPO Guidelines for Examination and to which Examiners are expected to abide. This condition, which we name the “Infineon condition”, was deemed necessary and sufficient for an invention to have technical character. However, the Infineon approach came later under criticism by other Boards, culminating in one Board expressly criticizing its reasoning and conclusions to a point where it referred some questions to the EBoA under case G1/19. Thus, the point of law under scrutiny by the EBoA may be summarized as to whether the Infineon condition is also a sufficient condition, or whether other condition(s) need to be met for a claim to be technical (at the time of writing, the G1/19 is pending). The situation can be summarized as in Figure 2, and is addressed in the following.

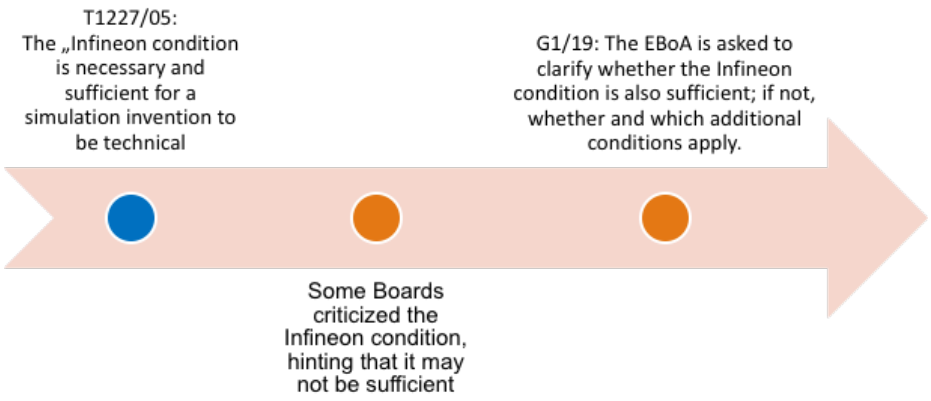

Figure 1

3.1 The Infineon decision

The German company Infineon filed a patent application directed to a method for the numerical simulation of an electronic circuit subject to 1/f noise, wherein the circuit is described by a model featuring input channels, noise input channels and output channels. The simplified claim recites:

> Computer-implemented method for the numerical simulation of a circuit with a step size δ which is subject to 1/f noise, wherein:
> the circuit is described by a model (1) featuring input channels (2), noise input channels (4) and output channels (3);
> […] input channels (2) and the output channels (3) […] described by […] equations;
> an output vector (OUTPUT) is calculated for an input vector (INPUT) […] and for a noise vector (NOISE) […];
> [steps for generating the noise vector].

The invention can be better understood by referring to Figure 1, showing an electronic circuit as a sort of black box (1) having input (2) and output (3) and being subject to noise (4), wherein mathematical equations are used to describe its behavior. The computer performs a simulation in the sense of executing a method wherein the equations are calculated.

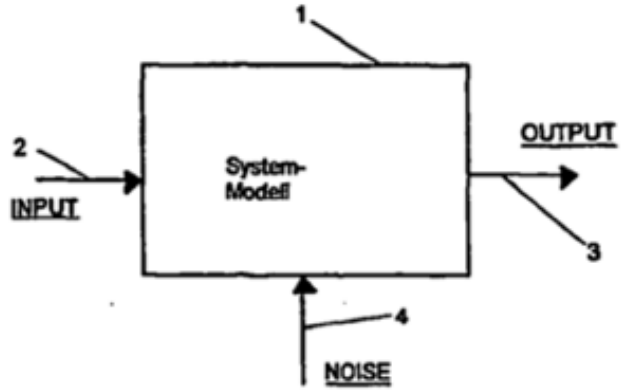

Figure 2

Hence, the method allows obtaining an (estimated or simulated) output corresponding to an input and noise. In this way, it is possible anticipating the behavior of a circuit design before the circuit is realized; this may considerably shorten the development cycle of a circuit, since less or virtually no prototype needs to be built.

The Examining Division refused the claim directed to a "method for the numerical simulation of a technical system subject to 1/f noise" on grounds that its steps could also be executed mentally, and that mental activities are not patentable [14]. Further, the Division objected that steps like generating a series of random numbers or defining a noise having a predetermined frequency spectrum are non-technical features since they are based on mathematical models without providing a technical effect. In addition, the first instance decision argued that the terms referring to the technical system (by defining for instance input channels of a model of the system) do not provide the required technical character to the simulation. In summary, the claimed method was considered as merely resulting in mathematical steps without providing technical character.

During appeal, certain claim amendments were made, in particular to specify that the method is a “computer implemented method for the numerical simulation of a circuit... which is subject to 1/f noise”, that “the circuit is described by a model featuring input channels, noise input channels and output channels” and that “the performance of the input channels and the output channels is described by a system of differential equations”.

The Board found such amended claim to be adequately defining a technical purpose for a computer implemented method, in particular that the simulation of a circuit more precisely specifies the technical ambit of the claim and implicitly the technical considerations involved, and that the simulation by means of a computer make clear that the invention does not anymore encompass a purely mental simulation.

The Board also noted that the mathematical expression mentioned in the claim are not to be regarded as abstract or mathematical formulae as such, but rather as being

relevant to the circuit simulation and thus as contributing to the technical character of the simulation. It can be broadly said that, once the technical ambit of the claim is acknowledged, then the mathematical aspects therein mentioned should be also regarded as technical, at least as far as they contribute to achieving the technical effect and object of such claim.

Summarizing, T12275/05 sets out that a simulation claim is technical if it is limited to the simulation of an adequately defined class of technical items. In the following, we will call this the "Infineon condition", representing at least a necessary condition to be fulfilled for a simulation to be technical and patent eligible.

3.2 Criticism to the Infineon Decision

After the decision in T1227/05 Infineon was rendered, also the Guidelines for Examination at the EPO were correspondingly updated, and its approach generally followed.

However, criticism started to emerge as at least indirectly mentioned or hinted in a few decisions by the Boards of Appeal.

For instance, in case T1265/09 dealing with a computer simulation for determining an efficient schedule for call center agents, the Board seemed to outline that the Infineon condition may represent only a necessary condition for acknowledging technical character, but that it may not be sufficient to that effect [15]. However, the Board found that simulating a call center in view of the agents' schedule and skills would not pertain to the simulation of a technical system, such that the Infineon test would already fail; as such, the Board did not investigate further or comment on whether the Infineon condition would also be sufficient to justify technicality of the simulation.

In case T625/11, the Board was called to deal with a computer simulation method for establishing a limit value for an operational parameter of a nuclear reactor, wherein the limit value is based on simulation of the reactor. One concern expressed by the Board related to the fact that the claim is not limited to a use that leads to a technical effect, as the claim would also encompass a simulation having non-technical objectives, like for instance checking compliance with legal requirements which would thus represent an exclusively administrative purpose [16]. Having expressed such concerns, the Board nevertheless decided to follow the earlier approach by Infineon, without further elaborating on possible criticism or hypothetical weaknesses of the Infineon reasoning.

In short, while it was main practice to acknowledge technicality of a claim as long as the Infineon condition was satisfied, some (though minor in number) criticism started to emerge, in particular that some additional conditions may need to be shown by a computer simulation in order to qualify as a technical patentable invention.

3.3 Pending Clarification of the Law: The G1/19 Referral

The G1/19 Referral may be said to further develop and highlight the criticism expressed by other Boards or decisions. Let us look first into what the underlying invention is about.

The invention underlying the G1/19 Referral. The invention at issue deals with the computer simulation of pedestrians moving through a building structure, like train stations or airports. The results of the simulation can be used to verify the engineering design of the building, and possibly to assist the same engineers in modifying the design, before the structure is built, in order to meet certain criteria, like for instance the number of passengers the station (or people the building) can handle, or how easily the building structure can be evacuated. The patent application was refused by the patent examiners, and then subject to appeal under case T0489/14 [17]. During the appeal phase, it was acknowledged that the case at issue shares quite several similarities with the Infineon case, since they both relate to the simulation or modelling of an adequately specified class of technical items, a circuit and a building, respectively. However, the Board deciding on the simulation of building structure did not feel comfortable with the Infineon approach, and even stated that it would have decided differently as in that earlier case. Since this could lead to divergence in case law, which is highly undesirable (to say the least), the deciding Board referred the following three questions to the Enlarged Board of Appeal:

1. In the assessment of inventive step, can the computer-implemented simulation of a technical system or process solve a technical problem by producing a technical effect which goes beyond the simulation's implementation on a computer, if the computer-implemented simulation is claimed as such?
2. If the answer to the first question is yes, what are the relevant criteria for assessing whether a computer-implemented simulation claimed as such solves a technical problem? In particular, is it a sufficient condition that the simulation is based, at least in part, on technical principles underlying the simulated system or process?
3. What are the answers to the first and second questions if the computer-implemented simulation is claimed as part of a design process, in particular for verifying a design?

In the following, we attempt to simplify and address some of the issues raised by the referring Board, trusting in the reader's understanding for any inaccuracy inevitably introduced by the simplifications.

The Reasoning of the Referring Board. The referring Board essentiality starts from a premise, namely ignoring that the claimed method recites a computer implementation, with the consequence that the remaining method – deprived of its computer implementation context – can, at least hypothetically, be performed mentally. Within this extrapolated context, the Board considers whether the remaining method requires non-trivial features for being implemented on a computer and finds in the negative on grounds that only knowledge of common data structures and algorithms is needed.

The Board also considers whether the design of the remaining method can be motivated by the internal functioning of the computer; also in this case, the Board finds in the negative on grounds that the implementation on the computer is straightforward.

Then, the Board moves on to discuss whether a further technical effect is provided, and state that it would likely conclude also here in the negative. However, the Board acknowledges similarities with the earlier T1275/07 Infineon decision, wherein the

Board found in favor of technicality on grounds that a computer simulation directed to "an adequately defined class of technical items" is technical. The referring Board however disagrees with the earlier decision, hence the above questions to the EBoA. We focus on the following two aspects arising from the referral.

4 Possible consequences from G1/19 on new software technologies

4.1 The "Infineon condition": Why not a suitable solution?

As anticipated, the referring Board apparently disagrees with the Infineon condition, at least in that it is not a sufficient condition for acknowledging technical character of a computer simulation and expresses doubts with regard to that approach [18].

In particular, the referring Board states that a computer-implemented simulation "assists the engineer only in the cognitive process of verifying the design of the circuit or environment, i.e. of studying the behavior of the virtual circuit or environment designed. The circuit or environment, when realized, may be a technical object, but the cognitive process of theoretically verifying its design appears to be fundamentally non-technical", reason 15 (emphasis added).

In other words, the Board seems concerned that a computer simulation – and indeed many other types of computer inventions like in bioinformatics and AI [19] – often produces an intangible solution that can be used at a cognitive or abstract level.

We would like however to make a parallel between a computer simulator of a circuit and an oscilloscope, both available as tools for an electronic circuit designer.

A conventional way for verifying a circuit design is using an oscilloscope, through which the engineer can measure electrical values or voltage waveforms exhibited at certain points of the circuit. What the engineer conceptually and mentally elaborates on the basis of the measured results is not relevant to how the oscilloscope works or how it is internally built to measure the values. In addition, the measurements obtained by the oscilloscope may be used for activities different from design, e.g., confirming whether the product complies with certain legal requirements foreseen for a certain signal.

Nevertheless, there should be no doubts that oscilloscopes are technical, from a patentability point of view. The cognitive activities or administrative purposes that would follow from the usage of a tester or oscilloscope would normally play no role in assessing whether a specific design of the instrument is technical or not.

In the authors' view, there is at least a strong similarity between the computer circuit simulator and common testers and oscilloscopes, in that they are all tools assisting the engineer in verifying the design, wherein the cognitive process – even if itself non-technical – plays no role and comes only after the tool's output is provided.

Thus, the only difference between a simulator and an oscilloscope lies in that a simulator estimates or predicts the behavior of on a non-tangible (or not yet tangible) circuit, while an oscilloscope measures (though with a degree of estimation depending on accuracy) the behavior of a tangible circuit.

There are decisions recognizing that an invention, in the EPC sense of having technical character, need not necessarily result in a physical modification of a tangible part of an object, see e.g. the T423/03 Microsoft discussed above. Leaving aside whether a simulator may be taken to represent a further functionality of a computer in the sense of T423/03 Microsoft (as in fact a simulator may be argued to provide a new functionality to a computer like in Microsoft above), it seems correct stating at least that a simulator creates a new or improved tool available to the engineer for performing his/her tasks. The considerations necessary for programming the simulator appear to the authors as being indeed technical, since at least knowledge of the technical functioning of the simulated system and how this can be modeled to intangibly reproduce its behavior are required in the conception and development of the simulator.

On July 15, 2020, oral proceedings took place before the Enlarged Board of Appeal, with over 1600 registrations for the online streaming of the event having been recorded by the office. During the hearing [20], the parties [21] argued that the practice based on the Infineon decision should be confirmed and in particular that requiring a link to the physical world would not be necessary and not be commensurate especially when having regard of new technologies. It was also argued that it would be desirable lowering the bar, i.e. not mandating that the claim should necessarily specify a "class of technical items". In general, parties also argued in favor of a positive answer to the questions. During the hearing, the Chairman of the Enlarged Board of Appeal indicated – in a preliminary way, though – that the first question and the second part of the second question may be answered in the affirmative; if this is confirmed by the written opinion, and also depending on the actual reasons that will be given, the outcome of G1/19 may indeed be seen as confirming the Infineon practice and as perhaps even allowing to lower that bar, in that the conditions set out by Infineon are sufficient but not strictly necessary to justify technicality of a computer simulation. Which would be the minimum criteria necessary for conferring technical character to a software simulation may however likely remain an open issue subject to further development of case law. Such outcome may allow room for protecting new technologies without necessarily requiring a link to the real world, and thus allowing to possibly reflect the increased intangibility of modern inventions.

4.2 The EPO practice of separating features within a claim: Is this appropriate in view of new technologies?

As well known to practitioners in the field of computer inventions, in claims including a mix of technical and non-technical features, the EPO considers only the technical features in the assessment of inventive step. The split between technical and non-technical features is done at the very initial stage of examining patentability and without having regard of the prior art and usually; features may thus be determined to be non-technical without resorting to evidence to support such findings. It is thus a crucial point for patent examination of software inventions.

In line with this common EPO practice, the Referral starts with the premise of "ignoring for a moment" the computer implemented limitation from the claim. The referring Board also states that such simulation can be performed purely mentally, however

recognizing that this would be possible “at least in principle”. In fact, we believe that no one would ever consider running a mental simulation of an electronic circuit, even within a large team of experts, and possibly with the user of pen and paper.

The authors contend the general approach of “ignoring for a moment” certain features related to the computer implementation and asserting that these could be hypothetically be performed mentally, on grounds that such assertion is not based on evidence (and would thus lead to legal uncertainty) and would further overlook that, at least under certain circumstances, certain software claim features are conceived because of the existence of a computer [22]. Furthermore, such an approach becomes untenable when the claim defines the scope of the simulation in terms beyond the scope of human solution, even given billions of people working for thousands of years.

In other words, the existence of computers may be a part of the creative process leading to an invention [23]. In further other words, without a computer, a person dealing with a technical activity would have not conceived those particular features because – without a computer – there would be no prospects of making a useful and practical technical use of the same; rather, that person would have recurred to other solutions, including those really suitable for mental performance when carrying out that technical activity.

Hence, when considering the advanced level of intangibility reached by modern technologies, consistently applying a separation between technical and non-technical features may not always be appropriate, in particular in those circumstances where a mental execution of certain features is undisputedly not feasible and where instead the existence of a computer leads to the conception of an invention [24].

5 Conclusions

As a result of the authors’ analysis, especially in relation to the intangible nature of modern technologies, it seems correct still following the Infineon condition, namely that computer implemented simulations, when directed to an adequately specified class of technical items, represent a technical tool available to a skilled person dealing with a technical activity. The features of such a simulation tool should thus be considered technical and examined as for other types of inventions.

Also, separating certain features from their computer implemented context may not always be the correct way for assessing inventions, since it could ignore that the invention conceiving process finds motivations in the existence of the computer, and that the conceived solution makes practical sense and has actual applicability only because there is a computer to execute the same.

The above conclusion is believed not to be in contradiction with the basic requirements that an invention must be based on forces of nature (see G2/07), since the simulator makes use of a computer that functions thanks to such forces. The conclusion is also believed not to be in contradiction with the logic of the further technical effect underlying T1173/97 IBM [**Error! Bookmark not defined.**]: In fact, a simulator provides a new computer-based technical functionality, wherein such functionality goes

beyond the mere interaction between computer components when running any computer instructions. Still further, whether the simulation tool can be used in mental activities, including those of technical designing, should not be relevant to the present discussion in the same way as the use of a tangible tool like an oscilloscope does not deprive the technical character inherent to the oscilloscope. Last but not least, claiming the "adequately specified class of technical items" would put the simulator into its technical context and highlight the presence of certain technical considerations about the causal relationships underlying the "technical item" to be simulated, since otherwise without such technical considerations the simulator would not be capable of producing the intended output.

The founders of the EPC did not define what is technical or not and thus left somewhat open what should to excluded from patentability, exactly to allow the case law to develop in parallel with technological advances, which are embodied nowadays in the form of intangible software solutions. Putting additional conditions beyond those already set out by the Infineon decision would thus carry the risk of potentially excluding certain modern technologies from patent protection.

In summary, the authors believe that the Infineon condition should be considered as a necessary and also sufficient condition for acknowledging technicality, and that it in fact provides a fair and balance criteria for allowing protection to those intangible inventions that are still based on technology, while excluding from patent protection those software solutions that owe their innovations to non-technical recognitions and insights. Based on the oral presentations made during the recent hearing held in case G1/19 on July 15, 2020, it seems reasonable expecting that the Infineon condition and practice may be confirmed valid without any need for increasing the bar by requiring to specify a link to the real world. It cannot be excluded that the bar may even be lowered in the future, though the minimum criteria necessary for conferring technical character to a software simulation may likely remain an open issue subject to further development of case law.

References

1. The EPO legal provisions are set out in the European Patent Convention (EPC). The text of the EPC can be found at https://www.epo.org/law-practice/legal-texts/epc.html.
2. With the term software inventions, reference is made to those inventions that make use of a computer. The EPO uses however the term Computer Implemented In-vention (CII) to refer to "claims which involve computers, computer networks or oth-er programmable apparatus, whereby at least one feature is realised by means of a pro-gram", see the Guidelines for Examination at the EPO, F-IV 3.9.
3. Article 52 EPC: (1) European patents shall be granted for any inventions, in all fields of technology, provided that […]. (2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1: […] (a) discoveries, scien-tific theories and mathematical methods; […] (c) schemes, rules and methods for per-forming mental acts, playing games or doing business, and programs for computers; (d) presentations of information. (3) Paragraph 2 shall exclude the patentability of the subject-matter or activities

referred to therein only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.

4. The Board of Appeal represents the second instance of the EPO entrusted with reviewing decisions issued by patent examiners; unless otherwise stated, reference will be made to decisions of the Technical Boards of Appeal. The EBoA can be said to represent the highest instance of the EPO entrusted with ensuring a uniform applica-tion of the law and with clarifying any point of law that is of fundamental im-portance; a Board of Appeal (or the EPO president, but not directly a party to proceed-ings) may refer questions to the EBoA if it considers that a decision is required for ensuring uniform application of the law, or if a point of law of fundamental im-portance arises.Decisions of the BoA and of the EBoA can be found at http://www.epo.org/patents/appeals/search-decisions.html. BoA and EBoA cases are numbered according to the format T1234/YY and G12/YY, respectively.
5. G 2/07, reasons 6.4.2 “[h]uman intervention, to bring about a result by utilizing the forces of nature, pertains to the core of what an invention is understood to be".
6. T1173/97, IBM, see e.g. r. 6.4 “[the technical character of a computer program] could be found in the further effects deriving from the execution (by the hardware) of the instructions given by the computer program. When said further effects have a technical character or where they cause the software to solve a technical problem, an invention which brings about such an effect may be considered an invention which can, in principle, be the subject-matter of a patent”.
7. Borrowing the conclusion from T1227/05, Infineon, r. 3.3: for a computer pro-gram to be patentable, it needs to show “the potential for a technical effect going be-yond basic hardware/software interaction in a computer”.
8. In r. 9.2 of G3/08 dealing with patentability of computer implemented inven-tions, the Enlarged Board of Appeal stated: “We do not attempt to define the term "technical". […]the Enlarged Board only makes the assertions that "a computer-readable data storage medium" and a cup have technical character and that designing a bicycle involves technical considerations […]. It is to be hoped that readers will ac-cept these assertions without requiring a definition of exactly what falls within the boundaries of "technical".”.
9. It is noted that the German Federal Court of Justice (Bundesgerichtshof, the German highest instance) adopted a general definition of technical in the Rotetaube decision, and that this has been referred to and recognized as still holding valid in r. 6.4.2.1 of G2/07: “The term technical teaching was characterised as "a teaching to me-thodically utilize controllable natural forces to achieve a causal, perceivable result" […]”.
10. More precisely, the term technology “was deliberately not defined by the legislator in order not to preclude that adequate protection would be available for the results of developments in the future in fields of research which the legislator could not fore-see”, see G2/07, r. 6.4.2.1.
11. For a general discussion on EPO case law, see e.g. Computer Implemented Inven-tions under the European Patent Convention and Practice in Japan, M. Baccelli, M. Hiratsuka, AIPPI e-News No. 1, April 2018, https://aippi.org/enews/2008/edition01/computer_implemented_inventions_japan.html.
12. T423/, Microsoft.
13. The German company Infineon applied for a European patent that then became subject of appeal case T1227/05.
14. In fact, Article 52 EPC prohibits patentability of mental activities, see Article 52(2) EPC: “(2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1: […] (c) schemes, rules and methods for performing mental acts”, see also note 3 above.

15. T1256/09, IEX, reason 1.13: “Leaving aside the question of whether these condi-tions are indeed sufficient to contribute to a technical character, […]”.
16. T625/11, Areva, reason 8.1 (reading translation from the French language in which the decision was issued): “[…] the process claimed […] could serve non-technical ob-jectives or technical objectives, but not necessarily linked to the functioning of a nu-clear reactor. […] The claimed process could also, as a second example, be implement-ed in order to establish, with competent authorities, that a given reactor fulfills the re-quirements in force required for its operation. The operation, entrusted to a design of-fice, would then have an exclusively administrative purpose. […] ”.
17. The text of the referral can be found at: https://www.epo.org/law-practice/case-law-appeals/pdf/t140489ex1.pdf. The patent application underlying the referral is EP03793825.5.
18. See also “Zur Patentierung von Entwurfs- und Simulationsverfahren in der EPA-Rechtsprechung”, Rainer Moufang, GRUR Int. 2018, pages 1146ff (the author is also the legal member of the referring Board in case G1/19).
19. On the interrelationship, at least for question of patentability, between computer simulations and AI, see e.g. section II of “Software and Artificial Intelligence – Old and New Challenges for Patent Law – Conference Report on the 3rd Binational Semi-nar of the TU Dresden and the Charles University in Prague, November 20, 2018”, in GRUR Int. 6/2019, pages 560ff, wherein reference is expressly made to the Infineon decision when discussing whether patentability of AI has been already clarified by the current legal framework.
20. Official minutes of the hearing are not available at the time of writing; hence, the present notes reflect the authors’ views and impressions from the online attendance to the hearing.
21. The representatives of appellant and the representatives of the President of the EPO, who is party to the proceedings.
22. In the amicus curiae brief submitted by Siemens, the following is noted under (ii) on page 3: “With regard to the explosively increasing importance of software in […] the Internet and digitization, there is a serious risk that a criterion that is too tradi-tional and without recognizable justification as "necessary" will exclude the entire field of digital future technologies from patent protection could be.” (informative translation from German).
23. In “Framing new technical problems in AI inventions”, by Rachel Free, CIPA Journal, October 2018, it is argued that there are a number of new technical problems arising from AI inventions, which are not properly reflected in the classic formulation of technical problems. It thus seems important adapting existing examination practice to reflect the central role of computers in the conception of new inventions.
24. In “Autonomous Machines and their Inventions”, Ryan Abbott, Mitteilungen der deutschen Patentanwälte, October 2017, pages 429ff, the author addresses the sce-natio where the invention is directly conceived by the computer and argues that „crea-tive computers require a rethinking of the criteria for inventiveness, and potentially of the entire patent system”.