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- The ins and outs of extending pharma lifecycles
- How to keep IAs safe when cutting staff
- Why IP is the key to global economic recovery
- Playing patent politics in the USA



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The hows and whys of software patent protection

Obtaining patent protection for software can be challenging since requirements vary from jurisdiction to jurisdiction – as historical and prevailing trends in the United States, Europe and China bear out

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It is now some 50 years since the dawn of the digital age. For example, IBM set up its computer business in 1953, with its 701 machine. By the mid-1960s, still no more than a few ten thousand IBM computers were in use worldwide.

Since then, the world has changed immeasurably. In industrialised countries almost everybody owns, or at least has access to, a personal computer, and software has become ubiquitous in our daily lives.

It is thus no surprise that there is big money in software, and managers are keen to protect their software businesses as robustly as possible. So what can one do to obtain such protection?

First, one can try to keep the software secret. This is sometimes possible: for instance, where the software is installed on a device that is sold to end users, such as a mobile telephone, the chip storing the software can be made tamper resistant such that it will be difficult for competitors to access its content.

However, even then there may be situations where it is difficult to hide the content to be protected from competitors. Sometimes, by offering functionality to end

users, the operations of the software become evident from the usage. In such circumstances it is not difficult for a competitor to “steal” the idea behind the software. Moreover, employees who know the coding may leave the company and start working for a competitor – something which again makes the option of keeping the software secret less viable.

Second, one can rely on copyright. Software is not automatically protected by copyright: it must meet the requirement of originality. However, a shortcoming of copyright protection is that its scope extends only to the coding: it does not protect the underlying idea. So copyright is useful only in preventing the copying of software.

Third, one can obtain a patent. The great advantage of software patents is that they protect the functionality of the software; so a patent also guards against competitors trying to sell software that has different coding, but offers the same functionality. The disadvantages are that it may take some time before a patent is granted and substantial costs may be involved.

Moreover, it is not always easy to obtain a software patent, since requirements may differ substantially from jurisdiction to jurisdiction. This article analyses the trends in the United States, Europe and China.

United States

The US Constitution provides the basis of the patent system: “The Congress shall have the power ... to promote the progress of science and useful arts, by securing for limited times to ... inventors the exclusive right to their ... discoveries.”

US patent laws, which were enacted before the modern computer age, provide that “any new and useful process, machine, manufacture, or composition of matter, or

any new and useful improvement thereof” can be patented.

The US Supreme Court has considered a trilogy of cases involving the patentability of software-implemented inventions. *Gottschalk v Benson*, decided in 1972, concerned a method for programming a general-purpose computer using an algorithm to convert binary-coded decimal numbers into pure binary numbers. The court observed that natural phenomena, mental processes and abstract ideas are not patentable, but that new and useful inventions derived from such discoveries are patentable. The *Benson* invention was held not patentable because “the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself”. The court added: “It is said that the decision precludes a patent for any program servicing a computer. We do not so hold.”

Parker v Flook, decided in 1978, involved the use of an algorithm to update alarm limits of a chemical process. The chemical process, the monitoring of process variables, the use of alarm limits to trigger alarms and the algorithm itself were found to be well known. Observing that the line between a patentable “process” and an unpatentable “principle” is not always clear, the court held the invention to be unpatentable: “Even though a phenomenon of nature or mathematical formula may be well known, an inventive application of the principle may be patented. Conversely, the discovery of such a phenomenon cannot support a patent unless there is some other inventive concept in its application.” The addition of conventional post-solution activity, using the updated number to adjust the alarm limit, is not enough: “Yet it is equally clear that a process is not unpatentable simply because it contains a law of nature or a mathematical algorithm.”

Diamond v Diehr, decided in 1981, dealt with a rubber-curing process controlled by a computer program. The invention was held to be patentable. Although the invention employed a well-known mathematical equation, it did “not pre-empt the use of that equation except in conjunction with all of the other steps in [the] claimed process”.

Further guidance has been given by the patent appeals court, the US Court of Appeals for the Federal Circuit (CAFC). A claim to a computer-readable medium storing a computer program is allowed as an “article of manufacture” pursuant to its 1995 *Beauregard* decision, although a claim to a computer program apart from a tangible medium is not.

The 1998 CAFC decision in *State Street Bank & Trust Co v Signature Financial Group, Inc* is widely cited as overturning the exception to patentability of business methods, although the claims were directed not to a process, but to a data processing system programmed to implement a financial management scheme. *State Street* established for nearly a decade the principle that an invention is eligible for patent protection if it involves some practical application and “produces a useful, concrete and tangible result”.

In 2008, the CAFC’s landmark *In re Bilski* decision dramatically changed course by dropping the useful-concrete-tangible test. The claimed invention was a method for hedging risk in the field of commodities trading, not tied to a particular machine. Applying the analysis of the Supreme Court’s trilogy, the CAFC articulated a “machine-or-transformation” test: to be patentable, the invention must be tied to a specific machine or transform an article to a different state or thing.

Careful patent drafting to meet changing requirements will be key to obtaining useful patent protection in the United States.

Europe

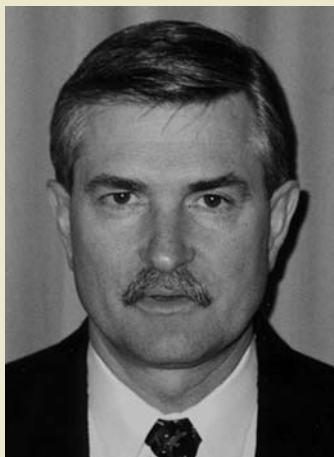
In 1973 a group of European countries adopted the European Patent Convention (EPC). Today, 35 countries are member states of the EPC. It was negotiated in the late 1960s and early 1970s – a time when, even in the most industrialised countries, computers were used only for calculation purposes either in companies or in universities. The first preliminary drafts of the EPC showed that computer programs were not excluded from patent protection; but in the final wording of the EPC as adopted in 1973, computer programs were in fact excluded. The argument was that a computer program was not, in essence, an invention and was therefore no more than the application of a mathematical method, which was also excluded from patent protection.

Even then, many felt that an absolute prohibition on the patentability of computer program inventions was inappropriate, because the evolution of this nascent technical field was so dynamic. Therefore, a Swiss proposal to specify in the EPC that only computer programs “as such” were to be excluded from patent protection was accepted. Since then, this wording has been the basis of many decisions of the Boards of Appeal of the European Patent Office (EPO) defining what software can be protected under the EPC and how the protection may be defined.



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Some 10 years after the adoption of the EPC, in the mid-1980s, the Boards of Appeal had to deal with the first appeals against rejections of patent applications directed to computer systems running computer programs.

The first basic decision dates back to 1986 (*VICOM*). The Board of Appeal held that a patent application concerning a method for digitally processing images related to a technical process: "The Board, therefore, is of the opinion that even if the idea underlying an invention may be considered to reside in a mathematical method a claim directed to a technical process in which the method is used does not seek protection for the mathematical method as such." Since then, the EPO has allowed patents claiming protection for a computer (or a device or system with a processor) that has a computer program installed on it which has a technical effect or solves a technical problem, and for (technical) processes performed by such a computer program.

Neither the EPC nor the Boards of Appeal have ever defined what is meant by a "technical" effect or problem. However, case law provides the following examples:

- Computer program inventions that control industrial processes, such as the production of end-user products (eg, cars, mobile telephones, medicines) or semi-manufactured products, are patentable in principle.
- Computer program inventions essentially solving a mathematical equation may be patentable, provided that they solve a technical problem – for instance, where they concern the encryption of telecommunication messages, the compression of data or signal processing.
- Computer program inventions relating only to non-technical areas, such as computer games, internet auctions, financial operations and business operations, cannot be protected by patents in Europe.

Since the mid-1980s the scope of protection has extended to both computers and processes performed by computer programs. However, in the late 1990s the Boards of Appeal also decided to allow patent claims to computer programs and data carriers (eg, DVDs) that store such computer programs, provided that the computer programs concerned, when loaded on a computer, solve a technical problem or have a technical effect.

China

The Chinese patent system is heavily influenced by the German Patent Law and the EPC, due to the fact that the German Patent and Trademark office supported China in establishing its patent system. As China has no case law, the basis for examination at the State Intellectual Property Office is the Patent Law, its Implementing Regulations and the Examination Guidelines. According to Article 25(2) of the Chinese Patent Law, rules and methods for mental activities are not patentable subject matter. Rule 2 of the Implementing Regulations further provides that an "invention" for purposes of the Patent Law means any new technical solution relating to a product, a process or an improvement thereto. Article 25 and Rule 2 constitute the legal basis for determining whether computer software-implemented inventions can be patented in China.

In the mid-1980s, when patent practice began in China, computer software had already become an essential element of technological development. Therefore, the first edition of the Examination Guidelines, issued in 1993, did not exclude computer software-implemented inventions from patent protection. According to the 1993 guidelines, if the subject matter of an invention can provide a technical solution and produce a technical effect, the invention should be patentable. Of course, in order to be patentable, a computer software-implemented invention must also satisfy other requirements, such as novelty and inventive step. This "technical" standard is still in use today and resembles the situation in Europe.

As with the EPC, there is no definition in China of what constitutes a "technical effect" or a "technical solution". Accordingly, even though there have been no substantive changes to the technical requirement for computer software in different editions of the Examination Guidelines, in practice the technical requirement standard has been relaxed and examiners have some leeway in complying with it. Today, however, inventions involving pure business methods are still considered to be unpatentable, because they do not constitute a technical solution and produce no technical effect. A "pure business method" here means that all features distinct from the prior art are not technical.

Although computer-software implemented inventions are patentable and there is no requirement for an improvement as to hardware, computer software *per se* is

considered to constitute rules and methods of mental activities and cannot be protected. In addition, any computer program product such as a storage medium defined just by a program recorded on the medium is not patentable. Consequently, in China, computer-implemented inventions can be protected only in the form of a claim to a method performed by the software or a device (system) running on the software.

It is not difficult to obtain a method claim in China. However, there is considerable debate about device claims. For computer-implemented inventions, a description of the steps in a flowchart is usually used in order to illustrate the functions of the software. Even if the software is implemented in firmware, in most patent applications the block diagram of the electric circuit of the firmware is not described. The device claim is then also defined by the functional modules of the flowchart. Prior to 2006, because there was no block diagram of hardware corresponding to the functional modules in the device claim, such device claims were rejected for lack of support in the description

The 2006 Examination Guidelines provide that such device claims are allowable. However, each component of the device claim must correspond fully to each step in the flowchart or in the method claim reflecting the flowchart. Specifically, each component in the device claim is considered as the functional module for carrying out each step of the flowchart or each step of the method. According to the 2006 Examination Guidelines, "the device claim defined by such functional modules should be interpreted as realizing the technical solution mainly by the computer software recited in the specification, rather than hardware device realized mainly by hardware". This expression leaves a very important question open: can such a device claim cover a device with firmware having all functional modules of the claim? The State Intellectual Property Office has not yet addressed this question, so it cannot be answered with any certainty until such a case arises.

Conclusion

Software can be protected in three different ways: by keeping it secret (if possible), through copyright or through a patent. Software patents are available in all major countries, but the scope of protection available differs from jurisdiction to jurisdiction, as the above examples illustrate. Advice can be given by your local (patent) attorney. ■



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