

# PATENTING SOFTWARE INVENTIONS<sup>1</sup>

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## **I. Distinguishing Discovery, Invention, and Ordinary Knowledge and Skill**

We will first explore the nature of ideas as discoveries and inventions, of discovering or creating something new, what distinguishes discovery from invention, and briefly analyze how these activities are viewed under the provisions of the copyright, patent, and trade secret laws to protect or acknowledge the rights of the author, discoverer, and inventor.

The terms “discovery,” “invention,” and “creation” are all forms of human mental or intellectual activity, sometimes accidental but often intentional.

Sometimes when we engage in some activity our minds will become conscious of a new thought, often while working on a problem to improve a product or service in our business or in our home. Or, while just looking at or examining a thing some new aspect is revealed to us as a new idea or thought.

If the idea or thought is a new awareness of something that existed but was unknown, such as when a researcher identifies a protein in living tissue that was not previously known, it may be called a “*knowledge discovery*,” of a new fact or knowledge that existed all along until it was discovered. Another type of discovery is finding a new and original way to solve a problem. Since this type of discovery possesses utility, we may call this type of discovery a “*utility discovery*.”

Conceiving or creating a new solution to a problem – a utility discovery – may be an act of invention. Often the solution results from combining two or more things – elements or steps – to form a new combination. For example, when a person seeks a way to detect tampering with a lock (the problem to be solved), and creates a feature of the lock that indicates tampering (the solution), that is an invention. Before the invention, the feature did not exist in the lock. Thus, to combine the new feature with the lock is an act of invention.

Summarizing the distinction between discovery and invention: a discovery is an idea or insight about something that *existed* before anyone became aware of it. An invention is an idea or insight about something that (A) *did not exist* before becoming aware of it; and (B) that has the quality of utility – it is useful for some purpose.

Ideas and discoveries that were known or existed previously are called “prior art,” and fall within the broad category of professional or ordinary useful knowledge and skill.

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<sup>1</sup> The sole purpose of this article is to provide general information. It should not be relied upon for legal advice. Readers with specific questions should confer with their independent legal counsel. The opinions expressed herein are the author’s own and do not reflect policies of the City Club or Whitaker, Chalk, Swindle & Schwartz PLLC.

## II. Intellectual Property and its Protection

Things discovered and things invented can have value and should be protected . . . or at least, the originator should be acknowledged. The United States Constitution recognized this in Article 1, Section 8, ¶ 8, which states that one of the powers of Congress is: “To promote the progress of science and the useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.”

Notice the parallel association of the phrases (a) “authors and their writings,” and (b) “inventors and their useful discoveries.” This passage clearly applies to works of authorship, discoveries, and inventions because both the copyright laws and the patent laws are authorized by this passage. Notice also that both “knowledge” and “useful” discoveries are encompassed by this clause of the Constitution, and that inventions include “useful discoveries.”

Copyright applies to works of authorship fixed in a medium of expression. The copyright laws permit a discoverer of new knowledge to make it known by publishing it, while protecting that author’s written work from unauthorized copying by others. Regarding software authorship, in addition to including a statement of copyright ownership in the source code such as: © 2017 John Doe, All Rights Reserved, the copyright may be registered by application to the Library of Congress. Typically, software is registered as an unpublished work by submitting a limited portion of its source code with the application.

Patent protection may be obtained for inventions – ideas having utility – by disclosing details of the invention in the form of an application for patent to the U. S. Patent and Trademark Office. The application must contain full disclosure of the invention and how to build and use it. In return for such disclosure, a patent may be granted to the applicant. A patent grants to the applicant the right, for a limited time, to exclude another person or entity from the use of the invention defined in the patent claims.

Intellectual property that is not disclosed to the public through publication or patenting may be called a trade secret, information that its owner decides to hold privately. The owner takes steps to ensure that the trade secret does not become public, thus preserving a competitive advantage in productivity, operating costs, or product performance. Software programs or operating processes are typical examples which, if kept secret, are less likely to be copied or reverse engineered.

While trade secrets are creatures of State Law, a new Federal law, Public Law No. 114-153 (May 11, 2016), known as the “Defend Trade Secrets Act of 2016” (“DTSA”), now codified under 18 U.S.C. §130, is authorized under the Commerce Clause, Article I, Section 8, ¶ 3. The Act provides that “[a]n owner of a trade secret that is misappropriated may bring a civil action . . . if the trade secret is related to a product or service used in, or intended for use in, interstate or foreign commerce.”

In the discussion that follows, we shall see that inventions involving computers – especially those where the software is created to organize the operations of the computer in a specific new way – are susceptible to all three kinds of protection regimes. Registration of a copyright, grant of a patent, and the DTSA enable access to the Federal Court system to enforce the owner’s IP rights.

### III. IP Statutes: Copyright, Patent, Trade Secret

“**Copyright** protection subsists . . . in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced or otherwise communicated, either directly or with the aid of a machine or device.” 17 U. S. C. §102. Works of authorship that may be copyrighted include literary, musical, and dramatic works; pantomimes and choreographic works; pictorial, graphic and sculptural works; motion pictures and other audiovisual works; sound recordings, and architectural works. The category of literary works includes computer programs.

Inventions that are **eligible** for patenting are generally defined by 35 U. S. C. §101 as follows: “Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.” Note how the phrasing of this statutory provision uses the term “discovers” in the sense of “useful discoveries.”

An invention that is eligible for patenting may be **patentable** if it satisfies two additional provisions of the Patent Statute, 35 U. S. C. §102 and §103. Section 102, which includes the requirement that an invention be **novel**, states, in part: “A person may be entitled to a patent unless . . . the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.” Section 103, which includes the requirement that the invention be ‘**nonobvious**,’ states, in part: “A patent for a claimed invention may not be obtained . . . if the differences between the subject matter to be patented and the prior art are such that the subject matter as a whole would have been obvious . . . to a person having ordinary skill in the art.”

The term **Trade Secret**, as defined in the *Texas Uniform Trade Secrets Act*, Section 134A.002(6) means: “information, including a formula, pattern, compilation, program, device, method, technique, process, financial data, or list of actual or potential customers or suppliers, that: (A) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by other persons who can obtain economic value from its disclosure or use; and (B) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy. The Federal Statute, 18 U. S. C. Ch. 90, § 1839 defines Trade Secret similarly but more broadly.

### IV. Issues of Patent Eligibility

#### (A) The Role of Computers and Software in Innovation

A **computer** is a general purpose machine that is configured to respond to a sequence of program instructions by executing the instructions in order, to perform logical operations such as calculations and comparisons on data provided to the computer.

**Data** is encoded information – typically text or images – that is reduced, i.e., digitized, to binary form. The computer program instructions are likewise expressed in binary encoded form in a format known as machine language or machine code. When a program is created, this expression of authorship is written in human-readable language called source code. The source code is then converted to machine or “object” code in an assembler or converter for use by the computer.

Computers are extremely versatile devices that are susceptible to an almost limitless variety of ways to configure them for a particular purpose. Invention may be called into play to conceive a solution to a particular problem. Sometimes the solution resides in the operating program; other times the solution is a unique combination of the structural elements of the computer, i.e., the architecture of the computer. In still other forms, the solution resides in the combination of the software and the hardware it controls. Inventive combinations may also exist in processes that are governed by a programmed computer.

**Software inventions** are subject to an additional scrutiny under the utility requirement of the Patent Statute, 35 U. S. C. §101, because they inherently contain or embody an abstract idea such as an algorithm, a mathematical formula, or a mental step, none of which – by itself – is considered patentable under the Patent Statute. Thus, if a patent claim is wholly directed to an abstract idea it is not eligible for patenting because to patent it would foreclose all applications of the abstract idea, not just a particular one conceived by the inventor.

In developing new products or materials, or more efficient ways to manufacture something or control a machine, the computer software plays a major part in so many innovations. Inventions for such processes necessarily include the software as part of their “structure.”

The software is a component part of the computer, which is a machine. Further, the machine may be a part of a system. The system may include a network, communications channels and terminals for sending and receiving information and commands. The system may include other components such as sensors, displays, etc. that facilitate the operation of the system. Thus, the software is just a part of the system. Even though the software itself embodies an abstract concept, the combination of the software with the machine it controls and other necessary elements of the system that together provide the solution to the problem has utility. The combination is eligible for patenting if the solution meets certain criteria as defined by the recent court cases discussed below.

(B) Is Software developed for business applications eligible for patenting?

Recent case law and Regulations of the U. S. patent and Trademark Office have singled out two categories of software for special scrutiny under 35 U. S. C. § 101, the “**Utility**” provision of the Patent Statute. (1) Software inventions used in a “Fundamental Economic Practice” is deemed to be a “Judicial Exception” to eligible inventions under the decision in *Alice Corp. v. CLS Bank International*, 134 S. Ct. 2347 (2014). (2) Software patents that fall within the “Covered Business Methods” category may be reviewed for validity by the U. S. Patent & Trademark Office under the provisions of 37 C. F. R § 42.300 – 42.304.

Unfortunately, the term **Fundamental Economic Practice** is not defined by the Court, other than the strong implication that it is by nature an abstract concept and therefore ineligible for patenting under Section 101 of the Patent Statute. Thus, the reasoning emerges that any patent claim that covers a method of doing business cannot be patented because it is an abstract concept.

A **Covered Business Method** patent “means a patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that the term does not include patents for technological inventions.” 37 C.F.R. § 42.301.

The problem with these characterizations is that they focus on the origin of the idea – the problem that cries out for a solution or the purpose of the invention – that led to the patent or

application for a patent. All ideas are abstract; but when a solution is found, i.e., the method or apparatus is “reduced to practice” in concrete form, it is not reasonable to categorically deny a patent because the idea that led to the solution is an abstract idea. Nor is it reasonable to deny patent protection for a claimed solution that involves an abstract idea such as software that is only a part of the solution, unless the patent claim is directed only to that abstract idea and not to the application of that idea to an actual problem.

By analogy it is instructive to consider another kind of fundamental practice that has led to millions of inventions over the lifetime of the U. S. patent system. We will call it a “**Fundamental Engineering Practice.**” The development of new products and services begin with an idea, followed by engineering effort to apply the laws of science to find a practical implementation of the idea that results in something useful. There is no logical reason to characterize a fundamental economic practice any differently. As long as the result is something useful – i.e., has utility within the meaning of the Patent statute 35 U.S.C. § 101 – then whether it arose from engineering practice or economic practice should not matter.

Perhaps, then, the better question to ask is: “What is a *fundamental practice*, in any field of use?” Some possible definitions of fundamental practices include (a) application of laws or theories to concrete problems; or (b) application of rules, regulations, or policies to resolve differences; or (c) application of known techniques or procedures to reach an expected result; or (d) application of common sense or logical reasoning to new questions. All of these share a common element – they are the application of abstract ideas to particular circumstances. Invention is no different – it is the *end result* of applying abstract ideas and imagination to a problem.

### (C) Patent Office Guidelines for Patenting Software Inventions

To aid in reviewing inventions that embody software the U. S. Patent and Trademark Office has issued its *July 2015 Update to its 2014 Interim Guidance* (hereinafter “Guidelines”). Step one asks whether the claim at issue is directed to an “abstract idea.” If so, the review advances to step two, which asks: if an abstract idea is contained in the claim at issue, then it must be determined if the claim contains “something more” than a generic computer that executes routine instructions. During this analysis, the claim as a whole must be considered, not just a portion of it.

The Guidelines give examples of the “something more.” For example, the “something more” might be “an inventive concept” that transforms the abstract idea into “improvements to the functioning of the computer itself.” However, since these terms are not defined by the Court, the determination of eligibility for patenting by the examiner often proceeds on a case-by-case basis.

Software inventions in the field of business transactions are subject to even more limited scrutiny by characterizing them as the “fundamental economic practices” or “certain methods of organizing human activity” that we discussed above. Both of these classifications approach categorical denial of patent eligibility to inventions in these areas.

However, it is well known that innovation continually occurs in business. Business people that provide products and services in all kinds of industries are primarily concerned about engaging in and facilitating commercial and non-commercial transactions – i.e., “commerce with foreign nations, and among the several states, and with the Indian Tribes.” See: The United States Constitution, Article I, Section 8, Clause 3. Thus, there exists an ongoing justification for ways to protect innovation and new ideas in the business arena, especially those having clear utility.

The policies implemented by the Guidelines mentioned above have thus far had a substantial chilling effect on the granting of patents directed to software, business methods, and various transactional practices because they are considered as mere processes that can be carried out mentally, or manually, by paper and pencil, or by a generic computer executing routine steps.

## **V. Recent Decisions of the Court of Appeals for the Federal Circuit**

### **(A) Cases that Found Software Inventions Eligible for Patenting**

*DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014). The invention overcame a problem with Internet hyperlink protocol that transported a user, who clicked on a third party advertisement on a host website, to the third party's website, thereby losing access to the host website. The inventive solution provided a way to avoid this loss of access while still being able to purchase a product from the third party website.

The court held that “the claims recite a specific way to automate the creation of a composite webpage . . . that incorporates elements from multiple sources . . . to solve a problem faced by websites on the Internet.” The invention embodies “an inventive concept for resolving [a] particular Internet-centric problem,” which “overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink.”

*Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016). The invention was directed to solving a problem with storing and retrieving data in/from a conventional database structure.

The court held that “the claims . . . are specifically directed to a self-referential table for a computer database . . . that functions differently than the conventional database structure.” “The self-referential table . . . is a specific type of data structure designed to improve the way a computer stores and retrieves data in memory” . . . , which is a “specific implementation of a solution to a problem in the software arts,” and an example that “[s]oftware can make non-abstract improvements to computer technology just as hardware improvements can.”

*Bascom Global Internet v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016). “Corporations had the need [for filtering] to prevent their employees from accessing websites with certain types of information, such as ‘entertainment oriented sites,’ while allowing them to continue to access network and Internet components.” The inventive concept described and claimed in the ‘606 patent is the installation of a filtering tool at a specific location, remote from the end-user, with customizable filtering features specific to each end user.

The court held that the claims “recite a specific, discrete implementation of the abstract idea of filtering content . . . and the patent describes how its particular arrangement of elements is a technical improvement over prior art ways of filtering such content.” Further, “an inventive concept can be found in non-conventional and non-generic arrangement of known, conventional pieces” . . . or “the ordered combination of claim limitations that transform the abstract idea of filtering content into a particular, practical application of that abstract idea.”

*McRo, Inc. v. Bandai Namco Games America*, 837 F.3d 1299 (Fed. Cir. 2016). Prior art computer-aided animation of facial topology corresponding to spoken phenomes involved close interaction between a computer and animation personnel, requiring numerous calculations and estimates by the animators to create a sequence of topological frames of data. The process became

“very tedious and time-consuming, as well as inaccurate due to the large number of ‘key frames’ necessary to depict speech.”

The court held that “[t]he computer here is employed to perform a distinct [,rules based] process to automate a task previously performed by humans.” Further, “the claimed process uses a combined order of specific rules that renders information into a specific format that is used and applied to create desired results: a sequence of synchronized, animated characters.” The court also stated that “[i]t is the incorporation of the claimed rules, not the use of the computer, that improved [the] existing technological process.”

*Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288 (Fed. Cir. 2016). The invention solves “an accounting and billing problem faced by network service providers” in which “all the network information flows to one location, making it very difficult to keep up with the massive flows from the network devices and requiring huge databases.” The claimed invention solves this problem by “enhancing the data in a distributed fashion” even though it operates generic components “in an unconventional manner to achieve an improvement in computer functionality” to “reduce congestion in network bottlenecks.”

The court held “claim 1 of the ‘065 patent is tied to a specific structure of various components . . . that purposefully arranges the components in a distributed architecture to achieve a technological solution to a technological problem specific to computer networks.” It also found that “[c]aim 1 of the ‘065 patent depends upon a specific enhancing limitation that necessarily incorporates the invention’s distributed architecture – an architecture providing a technological solution to a technological problem.”

#### (B) What do These Cases Teach?

There is a pattern in the outcomes of these cases. (1) In all of them, the patent claims that were found eligible recited a specific way to solve a particular problem, with Internet function; database storage and retrieval; with content filtering, with computer animation; and network bottlenecks. (2) In most cases, the solution improves the way a computer operates, providing a technological solution to a technological problem. (3) The solution usually embodies an inventive concept – a non-trivial solution or a unique combination of known components – that amounts to something more than a routine or generic use.

(4) In one example, the solution incorporates a rules-based process into a computer-aided system to automate a tedious manual portion of a method. (5) In another example, the solution rearranged accounting and billing data in a distributed fashion to reduce congestion in network bottlenecks.

## VI. Take-Aways for Businesses Needing to Patent a Software Invention

While the law regarding the eligibility for patenting of software inventions is currently evolving, the recent cases are clarifying the criteria as we have discussed in this article. It is important to remember that transactions and processes are susceptible to innovation, even when software is chosen as a part of a concrete mechanism or process for implementing the invention. Thus, we can outline a process for solving problems that can lead to innovations that are eligible for patenting.

The first step is to define the problem. This includes understanding the context of the problem – the system in which the problem occurs – and characterizing what is wrong with the system. Break down existing processes into a sequence of discrete steps, ask how each step is carried out, and identify short cuts or more efficient alternatives.

The second step is to analyze why the problem is occurring, whether it is because the system is being operated improperly or because there is an inherent deficiency in the system. Software is most often a functional component, so looking for alternate ways to fulfill its function(s) can lead to a solution. Some of these solutions will apply known techniques. But it is nearly always helpful to ask whether there are new ways, using new technology, to provide a solution. This is where another use of the computer may be the answer, especially if a part of the system can be automated.

The third step is to devise a structure for the solution that is keyed specifically to the purpose of the solution – assemble the components or outline the software needed to accomplish the specific function(s) that will solve the problem. Identify what parts of the process – software or hardware – can be omitted, replaced, or modified? What part(s) can be automated, or accomplished without human effort? This step leads to the concrete structure that satisfies the utility requirement (Section 101 of the Patent Statute).

Finally, as a check, how does the solution improve the operation of the computer, or the network, or the process? Does the improvement create a new machine, or result in a new and useful combination of components that did not exist previously, or accomplish something useful that was not available before?

## Summary and Examples

A patentable invention is made up of a whole, ordered combination of distinguishing limitations (elements of an apparatus, system, or composition of matter; or steps of a process) that should include one or more of the following attributes:

- specific and articulated purpose
- technical solution to a technical problem
- something more than a routine or trivial improvement.
- specific technological improvement
- specific inventive concept
- statement of the practical application of the inventive concept
- specific improvement in another technical field
- application of a concept that does not pre-empt other applications of the concept.

Examples of software inventions that are probably eligible for patenting:

- new ways of organizing data
- new connections between modules or modules of data
- new ways of providing access to data
- new locations on a computer or network not previously known
- deletion of steps or elements previously considered necessary



- method or apparatus that results in faster screening or searching, use of less storage space, or more flexibility in organizing or using data.

## **Conclusion**

This overview of patenting software inventions has considered the question of “What is an invention?” and how invention is distinguished from ordinary skill.

We have taken a high-level view of the landscape of intellectual property law, especially in the area of patenting inventions.

We have seen how software, though subject to close scrutiny by the U. S. Patent & Trademark Office and the courts in recent years, is nevertheless patentable. Some important criteria for obtaining a patent, in addition to the statutory conditions of novelty and non-obviousness, are that the claimed invention is part of an ordered combination of elements or steps, that is claimed in specific terms, and that embodies a technological solution to a technological problem in the computer arts.

So proceed with your development of software-driven solutions to problems with confidence. If questions do arise, contact your patent attorney.

## **VII. Resources for Additional Discussion**

The following items can be found at [www.whitakerchalk.com](http://www.whitakerchalk.com).

(A) Essays on Related topics:

1. What Can You Do With a New Idea?
2. Are Fundamental Practices Ineligible for Patenting?
3. Claiming Your Intellectual Property Rights in Software Inventions

(B) Patenting Software Inventions (Full Text Version)

(C) Patenting Software Inventions (PowerPoint version)

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