The Patent Eligibility Trilogy

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Paper

Over the course of less than a decade between 1972 and 1981, the series of Supreme Court cases collectively known as the "patent eligibility trilogy" established a framework for classifying computer programs under patent law that was, at the time of the rulings, the only comprehensive legal guideline for the treatment of software patents in the United States.[1] By initially confirming the concept that inventions involving computer programs are fundamentally unpatentable, then controversially contradicting this idea in the final case, the patent eligibility trilogy set a conflicting, yet technically unified, precedent for software patent law. These three cases created an enduring tension between the United States government's responsibility to issue patents in order to protect the intellectual property rights of inventors in emerging fields and its responsibility to encourage innovation by ensuring that patent law, in the interest of defending developers' rights, would not limit the growth of the computing industry as a whole.

In the United States, defending the intellectual property rights of inventors has long been considered a central responsibility of the government. Even before the American Revolution, various colonial governments utilized a system of patent law that gave strengthened rights, for a limited time, to those who discovered new inventions.[2] After the Declaration of Independence was adopted in 1776, the importance of patent law only increased as America struggled to gain the economic independence that political independence from Britain necessitated. Twelve states out of thirteen independently passed acts pertaining to intellectual property rights before the ratification of the United States Constitution in 1789.[3] It was the Constitution's unanimously

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[1] Rochelle Magri, and Tonio Ellul, *Patenting and Copyright of Software – With Particular Reference to Maltese Law, EU Law and US Law,* Mondaq Ltd, http://www.mondaq.com/default.asp?product_id=0&topic_id=11 (Aug. 9, 2011).
[2] Pat Choate, *Hot Property: The Stealing of Ideas in an Age of Globalization* (New York: Knopf, 2005), 27.
[3] Choate, 27.

approved Copyright and Patent Clause[4] that mandated government responsibility for providing

protections for inventors as a matter of federal law.[5]

 The Patent Act, passed by Congress less than a year later in 1790, created a strict system

for granting patents based on the framework provided by the Constitution, giving the

responsibility of approving patent applications to a committee made up of members of the

president's cabinet.[6] This system was extremely inefficient[7] and between 1790 and the passage of

the Patent Act of 1793 only fifty-seven patents were issued. Where the Patent Act of 1790 had

been overly strict, the Patent Act of 1793 was overly lenient: it placed essentially no restrictions

on registering patents, and more than 9,500 patents, many of which were intentional or

unintentional duplicates, were registered between 1790 and 1836.[8] At this point a much more

effective method for approving patents was put in place by the Patent Act of 1836, which created

a library of existing innovations and appointed clerks, examiners, technicians, and a

commissioner of patents to ensure the novelty of new inventions and to grant patents only to

those found to be legitimate.[9] Patent law underwent yet more changes during the century and a

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[4] James Madison, *Notes of Debates in the Federal Convention of 1787*, Ashbrook Center at Ashland University, http://teachingamericanhistory.org/convention/ (2012). On August 18, 1787, South Carolina delegate Charles Pinckney proposed adding "To grant patents for useful inventions" and "To secure to Authors exclusive rights for a certain time" to the list of Congressional powers in Article VII, Section 1 of the Committee of Detail's first draft of the U.S. Constitution. Approval was unanimous and when the later Committee of Style brought forward the revised Copyright and Patent Clause on September 14, it was passed without debate.

[5] "The Constitution of the United States" Article I, Section 8, Clause 8. "The Congress shall have the Power…To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries"

[6] *Patent Act of 1790, Ch. 7, 1 Stat. 109-112*, University of New Hampshire School of Law Intellectual Property Library, http://www.ipmall.info/hosted_resources/lipa/lipa_patent_index.asp (2004).

[7] Thomas Jefferson, letter to Hugh Williamson, April 1, 1792. Jefferson expressed regret that he had neither the time nor the ability to grant patents fairly and effectively: "The subjects are such as would require a great deal of time to understand and do justice by them, and … [I have] been obliged to give crude and uninformed opinions on rights often valuable, and always deemed so by the authors."

[8] Choate, 33.

[9] *Patent Act of 1836, Ch. 357, 5 Stat. 117*, University of New Hampshire School of Law Intellectual Property Library, http://www.ipmall.info/hosted_resources/lipa/lipa_patent_index.asp (2004).

half leading up to the patent eligibility trilogy, but with the Patent Act of 1836, its essential dynamic had been established.

By creating an effective method of protecting the rights of inventors, the Patent Act of 1836 "unleashed the innovative capacities of an entire nation on a scale never before attempted."[10] Preserving the integrity of intellectual property laws thus became an even more critical responsibility of the federal government during this time period. As the number of patent applications increased, a growing number of legal conflicts pertaining to patent law arose, and cases dealing with patent infringement, expiration, and eligibility were soon being brought before the United States Supreme Court.[11] In *O'Reilly v. Morse* (1854) the Supreme Court made its first decision with particular relevance to patent eligibility in the field of computer software. In this case it was determined that Samuel F. B. Morse, inventor of the telegraph, could not patent "the use of the motive power of the electric or galvanic current... however developed for marking or printing intelligible characters, signs, or letters, at any distances."[12] In this ruling the Supreme Court placed the technological significance of the telegraph above Morse's right to restrict use of the invention, holding that the intellectual property in question was an abstract description of a process rather than an implementation thereof, and was therefore patent-ineligible.[13]

For more than a century the precedent set by *O'Reilly* prevailed and no patents were issued for inventions consisting of abstract ideas alone. As computer technology began to develop rapidly in the mid-twentieth century following World War II, however, the United States

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[10] Choate, 34.

[11] Charles Sidney Whitman, *Patent Cases Determined in the Supreme Court of the United States: Including Copyright and Trade-mark Cases, and a Table of All American Patent, Copyright, and Trade-mark Cases Which Have Been Cited, Affirmed, or Reversed,* vol. 1 (Washington: W.H. & O.H Morrison, 1878), iii.

[12] Whitman, 813

[13] O'Reilly v. Morse, 56 US 62, 115 (1854).

Patent and Trademark Office was forced to formalize its stance on the eligibility of patents

involving computer software. Initially the U.S.P.T.O. issued formal guidelines which agreed

with the *O'Reilly* ruling, stating in 1968 that it viewed standalone computer programs as patent-

ineligible mental steps.[14] However in the coming decades three new rulings of the Supreme

Court would mark a critical transition in the history of intellectual property rights and the

computing industry. The patent eligibility trilogy at first reaffirmed the precedent set by *O'Reilly*

but eventually established its own enduring, if controversial, precedent for the eligibility of

patents involving computer software.

The first case of the patent eligibility trilogy, *Gottschalk v. Benson* (1972), sought to

apply the existing standard of abstract ideas as patent-ineligible to computer software. In this

case, Benson et al. attempted to patent "a method for converting binary-coded decimal…

numerals into pure binary numerals."[15] The Supreme Court chose to view this algorithm in the

same light it viewed the patent-ineligible electromagnetic process in the *O'Reilly* decision, ruling

that the claim was too abstract and sweeping to be considered patentable.[16] Though preserving

the rights of inventors was still a major concern, in this case the Supreme Court placed greater

weight upon their responsibility to avoid limiting technological progress. In the opinion of the

Court delivered by Chief Justice William O. Douglas, the Supreme Court confirmed its solidarity

with a public that valued progress above individual intellectual property rights, denying any

involvement in limiting technological growth: "It is said we freeze process patents to old

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[14] U.S. Congress, Office of Technology Assessment, *Finding a Balance: Computer Software, Intellectual Property, and the Challenge of Technological Change* (Washington, DC: U.S. Government Printing Office, 1992), 46. "In 1968 the PTO…issued another set of guidelines in which it stated that computer programs, however claimed, were not patentable unless combined with an apparatus which caused the physical transformation of matter…if the process could be carried out purely in one's mind, the invention was not patentable."
[15] Gottschalk v. Benson, 409 US 63, 64 (1972).
[16] Gottschalk, 409 US at 67. "Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work… Here the 'process' claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion"

technologies, leaving no room for the revelations of the new, onrushing technology. Such is not our purpose."[17]

While in a strict legal sense *Gottschalk* did nothing to change the legal treatment of software patent applications, the growing ambivalence present in the *Gottschalk* Court opinion paved the way for the rulings of the other cases in the patent eligibility trilogy. Even as Chief Justice Douglas defended the rejection of the Benson et al. patent, he was expressing doubts about the patent-ineligibility of software as a whole, conceding that "it may be that the patent laws should be extended to cover [computer] programs."[18] And when speaking about an earlier Supreme Court case which deemed software unpatentable, [19] Douglas acknowledged that "the [previous] decision precludes a patent for any program servicing a computer," but immediately went on to say that the current justices "do not so hold," [20] implying that inventions involving computer software were no longer necessarily excluded from being patent-eligible. Although the implications of this caveat would not be fully realized until *Diamond v. Diehr* (1981), it set the stage for the next case of the patent eligibility trilogy, *Parker v. Flook* (1978).

In the case *Parker v. Flook* (1978) a decision similar to that of *Gottschalk* was made to reject patents which differed from previous inventions only in their use of a mathematical formula or algorithm. The invention being challenged in this case was "a method for updating an alarm limit (used to signal abnormal conditions) in a catalytic conversion process".[21] Since the

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[17] Gottschalk , 409 US at 71.
[18] Gottschalk, 409 US at 72. Here Douglas quotes the President's Commission on the Patent System as having rejected computer- related patents in the past, but even in this official document no clear stance on the patentability of software is established: "Uncertainty now exists as to whether the statute permits a valid patent to be granted on [computer] programs."
[19] Waxham v. Smith. 294 US 20, 22 (1935).
[20] Gottschalk, 409 US at 71.
[21] Dan Tysver, *The History of Software Patents: From Benson, Flook, and Diehr to Bilski and Mayo v. Prometheus*, Beck & Tysver Bitlaw, 2013 (http://www.bitlaw.com/software-patent/history.html).

catalytic converter itself had been invented in 1956,[22] the invention to which Flook claimed a

sole right consisted of no more than "a formula for computing an updated alarm limit."[23]

Looking to *O'Reilly* and to the more-recently determined *Gottschalk*, the Supreme Court found

this early piece of computer software patent-ineligible. This decision was also partially a result

of the U.S government's desire to use caution in granting rights for which the only set precedents

were either more than a century old[24] and therefore technologically, if not legally, obsolete, or

were than less a decade old and therefore too recent to be of reliable value. In the *Parker* Court

opinion, Justice John P. Stevens stated that "It is our duty to construe the patent statutes as they

now read, in light of our prior precedents, and we must proceed cautiously when we are asked to

extend patent rights into areas wholly unforeseen by Congress."[25] While this ruling was, like

Gottschalk, technically opposed to increasing the scope of inventor rights, the reasoning behind

this decision as described in the Court's opinion diverged from previous rulings in a significant

way:

> "[The] process is unpatentable… not because it contains a mathematical algorithm as one
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> component, but because once that algorithm is assumed to be within the prior art [scope
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> of previous discoveries], the application…contains no patentable invention." [26]

In stating this, the Supreme Court made clear that the use of a mathematical computing algorithm

in an invention did not preclude that invention from being patent-eligible, subtly expanding the

right of inventors to obtain computing-related patents. Following the trend started by *Gottschalk*,

the *Parker* decision even more clearly did not hinge on whether or not the invention in question

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[22] Tim Palucka, "Doing the Impossible," *Invention and Technology Magazine*, 2004
(http://web.archive.org/web/20081203124718/http://www.americanheritage.com/articles/magazine/it/2004/3/2004_3
_22.shtml).
[23] Parker v. Flook, 437 US 584, 586 (1978).
[24] O'Reilly, 56 US at 62.
[25] Parker, 437 US at 596.
[26] Parker, 437 US at 594.

involved a computer program. The patent eligibility trilogy's final case, *Diamond v. Diehr*

(1981), continued this trend to an even greater degree, significantly and controversially changing

the treatment of computer software under patent law.

Unlike in *Gottschalk* and *Parker,* the Supreme Court in *Diamond v. Diehr* (1981) ruled in

favor of inventor rights, establishing the patent-eligibility of mathematical formulas or software

driving or controlling physical processes.[27] In this case, it was the patentability of a computer

program used to monitor heating times in the curing and molding rubber that was called into

question.[28] If the precedent set by the first two cases of the patent eligibility trilogy had been

followed strictly, this would not have been sufficient grounds for granting a patent, as it differed

from the previously invented mechanism for curing and molding rubber only in the application

of a computer program to the process. In the *Diamond* majority opinion, however, Justice

William Rehnquist claimed that the presence of a physical process, novel or otherwise, made any

invention involving newly-created computer software patentable.[29] This would seem to directly

contradict the rulings of the previous two cases in the patent eligibility trilogy. As Justice John P.

Stevens, author of the majority opinion in *Parker*, wrote in his dissenting *Diamond* opinion, "no

program-related invention is a patentable process…unless it makes a contribution to the art that

is not dependent entirely on the utilization of a computer."[30] However the Supreme Court

technically avoided invalidating or reversing either of the earlier decisions in *Diamond*; in his

majority opinion, Justice Rehnquist stated that "we do not view respondents' claims as an attempt

to patent a mathematical formula, but rather to be drawn to an industrial process for the molding

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[27] Diamond v. Diehr, 450 US 175, 192 (1981).

[28] Diamond, 450 US at 177. The majority opinion of the Court describes it as "a process for curing synthetic rubber which includes in several of its steps the use of a mathematical formula and a programmed digital computer" in order to highlight the physical, rather than mathematical, aspects of the invention.

[29] Diamond, 450 US at 187. Rehnquist claims that "it is now commonplace that an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."

[30] Diamond, 450 US at 219.

of rubber products."[31] Any software which controlled a physical process, novel or otherwise, was now considered patentable under the law, even though neither of the earlier cases in the patent eligibility trilogy lent credence to this claim. This caused untold confusion as inventors, lawmakers, and attorneys tried to reconcile the three cases.

In the years following *Diamond* and the conclusion of the patent eligibility trilogy, federal courts initially attempted to follow the trilogy's final ruling as closely as possible. They allowed patents to be granted to inventions utilizing computer software[32] so long as the invention also involved a physical process.[33] This concept continued to inform patent eligibility cases into the mid-nineties,[34] but as technology evolved, new cases began to change the definition of a "physical process". With the decision *In re Lowry* (1994), purely abstract mathematical tools and methods of organization, such as data structures, became patent-eligible.[35] The patentability of computer programs was further confirmed by *In re Alappat* (1994)[36] and *State Street Bank v. Signature Financial Group* (1998), which ruled that any software yielding "a useful, concrete and tangible result,"[37] was considered patentable. The broad definition of patent-eligible software these cases established stood for a number of years, but more recently cases

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[31] Diamond, 450 US at 191.

[32] Arrhythmia Research Technology v. Corazonix Corp, 958 F.2d 1053, 1056 (Fed. Cir. 1992). According to Federal Circuit Judge Pauline Newman, "computers came to be generally recognized as devices capable of performing or implementing process steps, or serving as components of an apparatus, without negating patentability of the process or the apparatus".

[33] In re Iwahashi, 888 F.2d 1370, 1374 (Fed. Cir. 1989). A patent application for an auto-correlation circuit used in pattern recognition was ruled patent-eligible on the grounds that "the mathematical algorithm is implemented in a specific manner to define structural relationships between the physical elements of the claim".

[34] In re Schrader, 22 F.3d 290, 292 (Fed. Cir. 1994). In this case it was determined that a method of manipulating bidding data in order to win auctions of related items did not involve a physical process and was therefore unpatentable.

[35] In re Lowry, 32 F.3d 1579, 1580 (Fed. Cir. 1994).

[36] In re Alappat, 33 F.3d 1529, 1544(Fed. Cir. 1994). Using language similar to that of *Diamond,* the Federal Circuit Court deemed an anti-aliasing method used for creating smooth waveforms in a digital oscilloscope display patentable: "The fact that [the invention]… may be viewed as a series of mathematical calculations does not alone justify a holding that the claim as a whole is directed to nonstatutory [unpatentable] subject matter."

[37] State Street Bank v. Signature Financial Group, 149 F.3d 1369, 1373 (Fed. Cir. 1998). In this case a method of calculating share prices was ruled patent-eligible, despite the abstract nature of the end result it produced. It was argued that inventions of this kind fulfilled the "useful, concrete and tangible" criteria first proposed by *In Re Alappat* even if "the useful result is expressed in numbers, such as price, profit, percentage, cost, or loss."

complicating this inclusive treatment of patents involving computer software and harkening back to the first two cases of the patent eligibility trilogy, rather than *Diamond*, have emerged. Rulings within the last decade, such as *In re Comiskey* (2007)[38] and *Bilski v. Kappos* (2010),[39] have begun to controversially[40] challenge software engineers' right to patent their inventions, regardless of the physical, electronic, and computational elements these inventions involve. As the legal struggles associated with the patent-eligibility of software extend into the 2010s and beyond, it becomes increasingly complicated and ever more critical for the United States government to balance the rights of software developers to their intellectual property with the need to avoid limiting innovation.

The patent eligibility trilogy, in establishing the basis for modern software patent law in the United States, called for the government to uphold both its responsibility to protect the rights of inventors and its responsibility to prevent the computing industry's progress from being restricted by patent law. Since the patent eligibility trilogy was completed in 1981, the United States government has struggled in vain to reconcile the competing interests of large

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[38] In re Comiskey, No. 09-461(Fed. Cir. 2007). Although this case dealt with a patent claim for a process of arbitrating the distribution of legal documents rather than for a piece of software, Judge Paul Michel raised issues pertaining to patentability of computer programs in the opinion of the Court. He challenged the notion that "the routine addition of [physical] modern electronics to an otherwise unpatentable invention" made that invention patentable, suggesting that the physical aspects of a program's design should be ignored in determining its patent-eligibility. If taken as good law, this could potentially render all forms of computer software patent-ineligible.
[39] Bilski v. Kappos, 130 S. Ct. 3223, 3225 (2010). In the precursor to this case, *In re Bilski*, the Federal Circuit court rejected a patent for a non-software financial risk-reduction procedure, abandoning the "useful, concrete, and tangible" criteria for patentability established by the *State Street Bank* decision and proposing that a piece of software is patentable only if "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing." In *Bilski v. Kappos* the Supreme Court upheld the Federal Circuit's decision to reject the patent, but refused to accept either test for determining patentability. It provided no alternative guidelines for the treatment of software under patent law, however, and left serious doubt as to the patent-eligibility status of computer programs.
[40] Bilski, 130 S. Ct. at 3223.The first patent-eligibility case heard by the Supreme Court in almost thirty years, the *Bilski* decision was so controversial that no opinion was fully adopted by a majority of Court. One justice of five refused to accept certain sections of Justice Anthony Kennedy's majority opinion, and two separate concurring Court opinions, each garnering support from a different subset of the justices, were published.

corporations wanting their intellectual property rights to be legally protected,[41] small businesses

and independent developers wanting to be able to innovate without risking financially ruinous

patent litigation,[42] and consumers wanting to see technological growth remain unchecked.

Recent government attempts at reform to reduce the threat of so-called "patent trolls" that

aggressively sue other companies on dubious patent infringement claims,[43] for example, have

been repeatedly stymied by companies holding significant software patent portfolios. IBM,

which held more than 40,000 computer-related patents as of 2004,[44] earns more than $1 billion

annually from licensing its technology to other companies,[45] and has registered more U.S.

patents each year than any other company in the world for the past two decades,[46] is one of the

fiercest opponents of patent reform legislation.[47] The government's responsibility to mediate

such disputes is only increasing in importance and in difficulty as the scale of technological

innovation expands and the magnitude of the financial interests involved grows ever larger.[48]

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[41] Adobe Systems, et al., letter to Chuck Grassley, Bob Goodlatte, John Conyers Jr., and Patrick Leahy, 19 Sept. 2013. Technology corporations such as Microsoft, IBM, and General Electric stated that a recent initiative to expand a program designed to subject software patent claims to closer scrutiny "could harm U.S. innovators – a driving force of economic growth and job creation in this country – by unnecessarily undermining the rights of patent holders."

[42] Timothy B. Lee, "Here's What It Feels Like to Be Sued by a Patent Troll," *Washington Post*, 20 Nov. 2013 (http://www.washingtonpost.com/blogs/wonkblog/wp/2013/07/18/heres-what-it-feels-like-to-be-sued-by-a-patent-troll/). Lee paraphrases an interview with the creator of a small business that has been targeted by patent litigation: "The [startup] CEO says that after paying his employees' salaries, his top expense is legal bills. And the vast majority of those legal costs relate to a single patent lawsuit."

[43] David A Boag, "Rep. Bob Goodlatte's 43-Day Assault on the Patent Troll," *Tech Crunch*, 13 Dec. 2013 (http://techcrunch.com/2013/12/13/rep-goodlattes-43-day-assault-on-the-patent-troll/). Patent trolls, also known as non-practicing entities or NPEs, are companies which do not actually invent products, but rather amass large portfolios of patents for the sole purpose of suing legitimate companies and profiting from the exorbitant legal fees. This has proven incredibly damaging to the technology industry: "By one estimate, companies that have been targeted by NPEs spend $29 billion a year in direct costs… an amount that the authors concede is conservative."

[44] Choate, 49.

[45] Choate, 40.

[46] Alex Barinka, "IBM Wins Most U.S. Patents for 21st Year in a Row," *Bloomberg*, 14 Jan. 2014, (http://www.bloomberg.com/). IBM registered a record 6,809 patents in 2013 and spends more than $6 billion on research and development each year.

[47] Timothy B. Lee, "Software Patent Reform Just Died in the House, Thanks to IBM and Microsoft," *Washington Post*, 20 Nov. 2013 (http://www.washingtonpost.com/blogs/the-switch/wp/2013/11/20/software-patent-reform-just-died-in-the-house-thanks-to-ibm-and-microsoft/).

[48] Vincent Tivett, "25 US Mega Corporations: Where They Rank If They Were Countries," *Business Insider*, 2011. (http://www.businessinsider.com/25-corporations-bigger-tan-countries-2011-6?op=1). Microsoft's yearly revenue

The future of software patent law in the United States is far from certain. Each week brings new developments the full technological, economic, and legal implications of which are impossible to predict. With the coming months and years poised to see more software-related patent disputes than ever before, [49] the significance of the patent-eligibility trilogy and the numerous interrelated legal conflicts which surround it has never been greater. It is only by looking to the historical conflict between the government's responsibility to protect the rights of inventors and its responsibility to encourage technological progress, that we can understand not only how the history of software patent law has helped shape the present system, but also begin to gain insight into its future.

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exceeded the GDP of the entire country of Croatia in 2010 and General Electric, if it were a country, would have the 52nd largest economy in the world.

[49] Rob Tiller, "The Supreme Court Jumps into the Software Patent Thicket," *Open Source*, March 4, 2014 (http://opensource.com/law/14/3/supreme-court-software-patents). Oral arguments for *Alice Corp. v. CLS Bank International,* the first Supreme Court case to deal directly with a software patent in thirty-three years, were heard on March 31st, 2014. The court's decision, which will be issued sometime before the end of its session in June, has the potential to critically alter the treatment of software under patent law.

Annotated Bibliography

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　　　　Leahy. 19 Sept. 2013. *Politico*. Web. 16 Mar. 2014.
　　　　<http://images.politico.com/global/2013/09/22/final_-
　　　　_letter_opposing_cbm_expansion_2013-09-c.html>.

This letter, signed by approximately ninety different corporations, including technology giants
such as Adobe Systems, Dolby Laboratories, Microsoft, General Electric, and IBM, was sent to
members of the House and Senate Judiciary Committees in fall of 2013. It urges the legislators to
avoid expanding the CBM ("covered business method") program, aimed to protect small
businesses from patent troll threats by making it easier for courts to reject low-quality software
patents, on the grounds that the program would also undermine the legitimacy of large
corporations' software patent portfolios. It proved useful in determining the attitude of large
corporations towards patent reform in the twenty-first century.

Arrhythmia Research Technology v. Corazonix Corp. 958 F.2d 1053-66. Fed. Cir. 1992. *Google
　　　　Scholar*. Google, n.d. Web. 16 Mar. 2014.
　　　　<http://scholar.google.com/scholar_case?case=204952289152101012&hl=en&as_sdt=6
　　　　&as_vis=1&oi=scholarr>.

This primary source is a record of the Federal Circuit Court case *Arrhythmia Research
Technology v. Corazonix Corp* (1992). The information it provided proved useful in

summarizing the history of patent law after the patent eligibility trilogy, supporting the idea that patent law during this period initially followed directly in the footsteps of *Diamond v. Diehr* (1981). It was not as critical a source as the three main court cases or *O'rielly v. Morse* (1854) but it still was beneficial in a secondary fashion.

Barinka, Alex. "IBM Wins Most U.S. Patents for 21st Year in a Row." *Bloomberg*. Ed. Nick
   Turner. Bloomberg, 14 Jan. 2014. Web. 16 Mar. 2014. <http://www.bloomberg.com/>.
This article confirms the statistics presented in Choate's *Hot Property* in regards to the scale of IBM's enormous patent portfolio. It also presents more recent information about the number of patents registered by various technology companies over the course of the past two decades, providing information that was particularly useful in examining how the importance of software patents has expanded in recent years.

Bilski v. Kappos. 130 S. Ct. 3223-59. Supreme Court of the US. 2010. *Google Scholar*. Google,
   n.d. Web. 15 Mar. 2014.
   <http://scholar.google.com/scholar_case?case=2277797231762274855&hl=en&as_sdt=4
   0000006&as_vis=1>.
The *Bilksi v. Kappos* decision, the most recent case cited besides the present-day *Alice Corp v. CLS Bank*, proved very significant in examining changes to patent law that have occurred in the past five years. While this case did not involve computer software directly, but rather dealt with an abstract business administration method, its court opinion provided a wealth of information about the changing criteria for patent-eligibility.

Boag, David A. "Rep. Bob Goodlatte's 43-Day Assault on the Patent Troll." *Tech Crunch*. AOL,
   13 Dec. 2013. Web. 9 Mar. 2014. <http://techcrunch.com/2013/12/13/rep-goodlattes-43-
   day-assault-on-the-patent-troll/>.
The information this article provided was most helpful in defining the concepts of "patent trolls" and non-practicing entities (NPEs). It also presented statistics relating to the damaging effects of NPE legislation that proved useful in determining the importance of present-day software patent reform and gave a summary of recent attempts to rein in patent trolls.

Diamond v. Diehr. 450 US 175-220. Supreme Court of the US. 1981. *Google Scholar*. Google,
> n.d. Web. 18 Dec. 2013.
> <http://scholar.google.com/scholar_case?case=18347506438226183982&q=diamond+v.
> +diehr&hl=en&as_sdt=40000006>.

This primary source gives both majority and dissenting court opinions for the Supreme Court
Case *Diamond v. Diehr* (1981), providing a detailed and complete picture of the judges'
reasoning on this most controversial case. Since this case is the third and most important case in
the trilogy, this source was particularly useful and provided a wealth of information. Both direct
quotations and paraphrasing with citations were used to explain how this case is both
contradictory to and cohesive with the other cases of the patent-eligibility trilogy.

Gottschalk v. Benson. 409 US 63-74. Supreme Court of the US. 1972. *Google Scholar*. Google,
> n.d. Web. 24 Nov. 2013.
> <http://scholar.google.com/scholar_case?case=14331103368635133702&hl=en&as_sdt=
> 40000006&as_vis=1>.

This report details completely the Supreme Court Case *Gottschalk v. Benson* (1972), providing
both majority and dissenting opinions. Since this primary source concerns the first case in the
patent eligibility trilogy, it proved to be second in usefulness only to the *Diamond v. Diehr*
(1981) case. Multiple quotations and paraphrases with citations were utilized in the two
paragraphs discussing this case.

In re Alappat. 33 F.3d 1526-85. Fed. Cir. 1992. *Google Scholar*. Google, n.d. Web. 9 Jan. 2014.
> <http://scholar.google.com/scholar_case?q=in+re+alappat&hl=en&as_sdt=40000006&ca
> se=457196026823961395&scilh=0>.

This primary source is a record of the Federal Circuit Court case *In re Alappat,* and presents
arguments both from earlier appeals cases, which had deemed the invention patent-ineligible due
to its heavy reliance on mathematical algorithms, and from the the Federal Circuit Court's
reversal of these previous decisions. This source proved useful in determining the origins of the
phrase "to produce a useful, concrete, and tangible result" and in further supporting the
movement towards software as patent-eligible which occurred in the 1990s.

In re Comiskey. No. 09-461. Fed. Cir. 2007. *US Court of Appeals Case Files*. US Court of
      Appeals for the Federal Circuit, 2013. Web. 15 Mar. 2014.
      <http://www.uspto.gov/web/offices/com/sol/fedcirdecision/06-1286.pdf>.
This primary source provides a record of the court opinion of the case *In re Comiskey,* which is
as-yet unpublished in a print case reporter. This relatively modern court case regards, not an
attempt to patent a piece of software, but an attempt to patent a method of arbitrating the
distribution of legal documents. Even so the source was valuable in that it discusses the
patentability of abstract ideas and provides evidence for the changing attitude of the Federal
Courts towards software patent law.

In re Iwahashi. 888 F.2d 1370. Fed. Cir. 1989. *Justia US Law*. Justia Company, 2011. Web. 13
      Mar. 2014. <http://law.justia.com/cases/federal/appellate-courts/F2/888/1370/203489/>.
This source presents the Federal Circuit Court Case *In re Iwahashi (1989)* , which dealt with the
patent-eligibility of a data-storage method. This was one of three cases that referenced in order to
indicate the continuation of the *Diamond v. Diehr* (1981) precedent, so individually it was not
particularly useful. It was the combination of all three cases, which occurred over a span of
multiple years, that effectively proved the point.

In re Lowry. 32 F.3d 1579. Fed. Cir. 1994. *Digital Law Online*. University of Utah, 2007. Web.
      9 Jan. 2014. <http://digital-law-online.info/cases/32PQ2D1031.htm>.
This Federal Circuit Court Case deals with the patentability of data structures within a
computer's memory. It proved to be one of the more useful primary sources for the post-trilogy
history of patent law, giving valuable information regarding the changing idea of what
constituted a "physical process". It was also one of the most modern cases, and having the
complete text allowed for it to be quoted in order to prove the increasing lenience of software
patent law.

In re Schrader. 22 F.3d 290. Fed. Cir. 1994. *Digital Law Online*. University of Utah, 2007. Web.
      9 Jan. 2014. <http://digital-law-online.info/cases/30PQ2D1455.htm>.
This primary source is a record of the Federal Circuit Court case *In re Schrader* (1994), which
preceded *In re Lowry* (1994) by just a few months. The two cases don't directly contradict each

other, but *In re Lowry* did alter the way physical processes were defined and so this first source was less helpful than that secondary case. Similar to the other more recent cases, *In re Schrader* was helpful in summarizing a small portion of post-trilogy patent law.

Jefferson, Thomas. Letter to Hugh Williamson. 1 Apr. 1792. National Archives. *Founders Online*. Web. 11 Dec. 2013. <http://founders.archives.gov/documents/Jefferson/01-23-02-0312>.
This letter, sent from Thomas Jefferson to Hugh Williamson, expresses Jefferson's discontent with the original patent system established by the Patent Act of 1790. It was a useful primary source that provided proof of the inconvenience of this early system. It proved to be more useful than the earlier letter from 1791, which did not contain as much applicable information.

Jefferson, Thomas. Letter to Robert R. Livingston. 4 Feb. 1791. National Archives. *Founders Online*. Web. 11 Dec. 2013. <http://founders.archives.gov/documents/Jefferson/01-19-02-0019>.
This earlier letter, sent by Thomas Jefferson to Robert Livingston in 1791, was largely about issues unrelated to the original "patent board" of which Jefferson was a member. While it did contain some direct evidence for Jefferson's dislike for the amount of work that serving on the board required, it was much less useful than the second letter. Because of the second letter, this source was slightly redundant, but it did provide information that supported the author's characterization of the first patent system.

Lee, Timothy B. "Here's What It Feels Like to Be Sued by a Patent Troll." *The Switch*. Washington Post, 18 July 2013. Web. 16 Mar. 2014. <http://www.washingtonpost.com/blogs/wonkblog/wp/2013/07/18/heres-what-it-feels-like-to-be-sued-by-a-patent-troll/>.
Of the articles authored by Timothy B. Lee, this one proved most useful in determining the impact of patent trolls on small startup companies. It contains a firsthand account of one startup CEO's experience with the frustrations and expenses involved in being sued by a patent troll, and describes how damaging these types of litigation can be to be to the growth of even the most financially sound companies.

Lee, Timothy B. "Software Patent Reform Just Died in the House, Thanks to IBM and
     Microsoft." *The Switch*. Washington Post, 20 Nov. 2013. Web. 9 Jan. 2014.
     <http://www.washingtonpost.com/blogs/the-switch/wp/2013/11/20/software-patent-
     reform-just-died-in-the-house-thanks-to-ibm-and-microsoft/>.

This article discusses the recent failure of a software patent reform bill due to the lobbying of
corporations, and talks about other issues that surround patent law in modern times. It presented
a substantial amount of useful information regarding the current state of patent law in the United
States. This proved very valuable in the writing of the paper's conclusion, allowing the author to
reference modern issues and real-world, present-day events relating to her thesis.

Madison, James. "Notes of Debates in the Federal Convention of 1787." 1787. Ashbrook Center
     at Ashland University. *Teaching American History*. Web. 13 Mar. 2014.
     <http://teachingamericanhistory.org/convention/>.

This primary source was very helpful in determining the exact circumstances surrounding the
unanimous approval of the Copyright and Patent Clause (Article I, Section 8, Clause 8) of the
U.S. Constitution. James Madison's comprehensive notes record in detail the day-to-day
proceedings of the 1787 Constitutional Convention, providing direct support for claims made in
Choate's *Hot Property* in regards to the process by which the Copyright and Patent Clause was
approved. It also presents further background information about the earlier versions of the clause
(as drafted by the Committee of Detail versus the Committee of Style) and subsequent revisions
to it.

O'Reilly v. Morse. 56 US 62-136. Supreme Court of the US. 1854. *Google Scholar*. Google, n.d.
     Web. 17 Dec. 2013.
     <http://scholar.google.com/scholar_case?q=o%27reilly+v.+morse&hl=en&as_sdt=40000
     006&as_vis=1&case=2271286876963919117&scilh=0>.

This Supreme Court Case was the earliest court case referenced, and it concerns Samuel B.
Morse's patent of the telegraph. While not directly related to software patents, this case was
extremely influential in the later software patent rulings due to its statements about the patent
ineligibility of abstract ideas. For this reason it proved to be one of the most useful sources. Only
the main three court cases and the *Hot Property* book were more useful.

Parker v. Flook. 437 US 584-600. Supreme Court of the US. 1978. *Google Scholar*. Google, n.d.

    Web. 24 Nov. 2013.

    <http://scholar.google.com/scholar_case?case=12542933152070861616&q=parker+v+fl

    ook&hl=en&as_sdt=40000006>.

The second case of the patent eligibility trilogy, *Parker v. Flook* confirmed the ideas presented in Gottschalk v. Benson. This primary source contains both the majority opinion and the dissenting opinion as well as background information pertaining to the invention being challenged. Even though this case may be considered the least significant member of the trilogy, it was frequently quoted in this paper and serves as a useful indication of the transition that occurred between the first case in the patent eligibility trilogy and the last.

Patent Act of 1836, Ch. 357, 5 Stat. 117. 4 July 1836. Intellectual Property Lib., Durham.

    University of New Hampshire Law Intellectual Property Mall. Web. 17 Dec. 2013.

    <http://www.ipmall.info/hosted_resources/lipa/lipa_patent_index.asp>.

The Patent Act of 1870 was an important event in the early history of patent law, but the exact details of the legislation were not necessary to understanding its implications in the later patent eligibility trilogy. In this sense Choate's *Hot Property*, which contained an extensive summary of the act's historical significance, was a more useful source than the Patent Act of 1870 itself. While having the original primary source helped to confirm the information found in *Hot Property* and to verify its historical accuracy, it did little beyond that.

Patent Act of 1790, Ch. 7, 1 Stat. 109-112. 10 Apr. 1790. Intellectual Property Lib., Durham.

    University of New Hampshire Law Intellectual Property Mall. Web. 17 Dec. 2013.

    <http://www.ipmall.info/hosted_resources/lipa/lipa_patent_index.asp>.

While the passage of the Patent Act of 1790 was an important event in the introduction and context paragraphs near the beginning of the paper, the *Hot Property* book was a more useful source than the Act itself. While having the original primary source was a good way of confirming the information for *Hot Property*, it was otherwise not very useful. It was cited once or twice, but only for straightforward information that was readily attainable in either source.

State Street Bank v. Signature Financial Group. 149 F.3d 1369-77. Fed. Cir. 1998. *Google Scholar*. Google, n.d. Web. 18 Dec. 2013. <http://scholar.google.com/scholar_case?case=4678936614949330705&hl=en&as_sdt=6&as_vis=1&oi=scholarr>.

This Federal Circuit Court case *State Street Bank v. Signature Financial Group* (1988) was a case which followed the more lenient patent laws for software which In re Lowry developed. This case was particularly important among those following the patent eligibility trilogy because it presented the "useful, concrete, and tangible" rule which would be the software patent law's guiding principle for a number of years, establishing a very broad interpretation of software's patentability.

Tiller, Rob. "The Supreme Court Jumps into the Software Patent Thicket." *Open Source*. Red Hat, 4 Mar. 2014. Web. 9 Mar. 2014. <http://opensource.com/law/14/3/supreme-court-software-patents>.

This contemporary primary source discusses the most current development in the history of software patent law, the Supreme Court case *Alice Corporation v. CLS Bank International*. This case, which will rule upon the patent-eligibility of a program designed to assess risks in financial transactions, proved useful in illustrating the modern relevance and the dynamic nature of software patent law.

Tivett, Vincent. "25 US Mega Corporations: Where They Rank If They Were Countries." *Business Insider*. Business Insider, 27 June 2011. Web. 16 Mar. 2014. <http://www.businessinsider.com/25-corporations-bigger-tan-countries-2011-6?op=1>.

This article was useful in illustrating the massive size of the economic interests that are affected by software patent law. While not all of the corporations that this article discusses are directly involved in technology or software, most have at least some reason to be interested in the future of software patents in the United States. Some, such as Microsoft and Apple, are among the largest stakeholders in the industry.

Waxham v. Smith. 294 US 20-23. Supreme Court of the US. 1935. *Google Scholar*. Google, n.d. Web. 13 Mar. 2014.

<http://scholar.google.com/scholar_case?case=13805096955510944011&hl=en&as_sdt=
40000006&as_vis=1>.

This primary source is a record of the Supreme Court Case *Waxham v. Smith,* and was used largely to support the presence of ambivalence regarding the treatment of software patents in the *Gottschalk* decision. The text of the case itself did not prove a significant source of information, but it was necessary to understand its complexities in order to comprehend the implications of the references to it in the *Gottschalk* decision.

Whitman, Charles Sidney. *Patent Cases Determined in the Supreme Court of the United States:
     Including Copyright and Trade-mark Cases, and a Table of All American Patent,
     Copyright, and Trade-mark Cases Which Have Been Cited, Affirmed, or Reversed*. Vol.
     1. Washington: W.H. & O.H Morrison, 1878. Print.

This book is an anthology of Supreme Court Cases relating to not only patent law, but also trade-mark law, copyright law, and the like. Since separate copies of the necessary cases, with the official volume/page numbers included, are more easily accessible elsewhere, this source was generally only used for the information given in the introduction. Information from this section helped fill in the gaps left by other sources in tracing the history of early patent law in America.

Secondary Sources

Choate, Pat. *Hot Property: The Stealing of Ideas in an Age of Globalization*. New York: Knopf,
     2005. Print.

This book, which covers intellectual property law of all kinds, not just patent law, proved to be one of the most useful sources researched. The majority of the book was focused on topics less relevant to this particular paper, but the introduction and first few chapters were extremely useful, providing information that proved invaluable in investigating the very early history of patent law in the United States. It also contained interesting modern statistics which were helpful in examining the present-day implications of patent law.

Magri, Rochelle, and Tonio Ellul. "Patenting and Copyright of Software - With Particular
	Reference to Maltese Law, EU Law and US Law." *Mondaq*. Mondaq Ltd, 9 Aug. 2011.
	Web. 13 Mar. 2014. <http://www.mondaq.com/default.asp?product_id=0&topic_id=11>.
This article, written largely to explain the differences between patenting and copyrighting
intellectual property in various countries, provided a succinct and comprehensive summary of
the three cases in the patent eligibility trilogy. Many of the details this secondary source
discussed were available in a number of other sources as well (most notably Tysver's Bitlaw
website), but it was still useful in confirming information found elsewhere. It was also in this
article that a reference to the three cases as a unified "trilogy" was first found, making it critical
to the naming of this paper.

Palucka, Tim. "Doing the Impossible." *Invention and Technology Magazine*. American Heritage,
	Winter 2004. Web. 18 Dec. 2013.
		<http://web.archive.org/web/20081203124718/http://www.americanheritage.com/articles/
		magazine/it/2004/3/2004_3_22.shtml>.
This source describes an invention that was relevant to the court case *Parker v. Flook* (1978), the
catalytic converter. The article provided extra information which was of no relevance to the case
or the author's study of it. At the same time it did help establish that the catalytic converter had
been invented long before Flook tried to patent his improvement upon the catalytic converter,
which was useful in justifying its patent ineligibility.

Tysver, Dan. "The History of Software Patents: From Benson, Flook, and Diehr to Bilski and
	Mayo v. Prometheus." *Bitlaw*. Beck & Tysver, 2013. Web. 24 Nov. 2013.
		<http://www.bitlaw.com/software-patent/history.html>.
This website, written by the lawyer Dan Tysver, covers a wide range of legal topics including,
but not limited to, a history of software patent law. His summaries of many of the major cases
proved to be extremely valuable in determining the gist of each case before having to analyze the
case reports themselves in depth. The timelines provided were very also helpful, giving a big-
picture view of the history of patent law in the United States that guided much of the author's
subsequent research.

U.S. Congress, Office of Technology Assessment. *Finding a Balance: Computer Software,*
Intellectual Property, and the Challenge of Technological Change. Washington, DC:
U.S. Government Printing Office, 1992. Print.

This book, published by the United States Congress' Office of Technology Assessment, proved
in useful in tracking the history of software patent law after the *O'Reilly* decision in 1854 and
before the beginning of the patent eligibility trilogy in 1972. Other facts it provided about the
relationship between technology and intellectual property, including copyright as well as patent
law, were interesting, but not particularly useful to the writing of this paper.