NOTE

PATENTABLE SOFTWARE: ANALYZING *ALICE* UNDER A LAW-AND-ECONOMICS FRAMEWORK AND PROPOSING A NEW APPROACH TO SOFTWARE CLAIMS

Christian R. Ruiz

I. INTRODUCTION

Software is a pervasive component in modern inventions, and companies are interested in using patents to protect software. By the early 1990s, the Court of Appeals for the Federal Circuit (the "Federal Circuit") established that software was patentable.¹ This article analyzes the discernable contours of what falls within patentable subject matter regarding software technology in view of *Alice v. CLS Bank*² and its precedent. This note also applies policy arguments and a cost-benefit analysis to argue what patent doctrine should dictate regarding the patentability of software.

Today, after *Alice*, what may constitute a patentable software claim is not entirely clear. *Alice* made it harder to patent software technology.³ The majority opinion in *Alice* indicates that attaching an abstract method to a computer, which is a physical machine, is not enough to render a claim patentable.⁴ Further, the Supreme Court (the "Court") subjected patent claims containing software elements to a higher scrutiny than the scrutiny used for patent claims that do not

¹ See Diamond v. Diehr, 450 U.S. 175, 192-93 (1981) (affirming the Federal Circuit decision that a claim for technology including computer software is patent eligible); *In re* Lowry, 32 F.3d 1579, 1582 (Fed. Cir. 1994) (finding that a memory containing a data structure should be considered patentable subject matter); State St. Bank & Tr. Co. v. Signature Fin. Grp., Inc., 149 F.3d 1368, 1373 (Fed. Cir. 1998) (finding that software and other processes yielding a useful, concrete, and tangible result should be patentable).

² Alice Corp. Pty. Ltd. v. CLS Bank Intern, 573 U.S. (2014).

³ Erin Coe, 7 *Ways to Survive an Alice Patent Challenge*, LAW360 (Dec. 15, 2015, 2:10 PM) http://www.law360.com/articles/736051/7-ways-to-survive-an-alice-patent-challenge [https://perma.cc/Y78U-TPAL].

⁴ *Alice*, 573 U.S. at 12 (quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. (2012)).

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contain software elements.5

Under a cost-benefit analysis and other policy considerations, the Court has been mostly correct in its approach to determine the patent eligibility of software technology. By considering the Court's precedent and the need for uniformity within patent law, however, strong arguments emerge against the Court's special treatment of software claims. The analysis to determine whether a claim is directed to patent-eligible subject matter should not automatically subject claims reciting software elements to a higher scrutiny than the scrutiny used for other technologies. Instead, the analysis should focus on the inventive concept, not a piecemeal approach to the claim language. Finally, the Court in *Alice* conflated the analysis for patent-eligible subject matter and a non-obviousness analysis, thus creating redundancies, discrepancies, and inefficiencies within patent doctrine.

Section II discusses algorithms, software, and their importance in the U.S. economy.

Section III discusses legal precedent related to software patents that preceded *Alice*. This section focuses on the takeaway points from each of the cases, attempts to reconcile any discrepancies in the case law where observed, and provides a critique of the opinions where the author noted possible improvements to patent doctrine. For example, the portion of the text critiquing *Flook*⁶ also discusses the conflation of § 101 and § 103 in depth.

Section IV discusses the facts of *Alice*, its rationale, and its two-pronged test. This section also attempts to reconcile any discrepancies where observed.

Section V sets forth a cost-benefit analysis of patent doctrine regarding subject-matter eligibility. First, this section discusses a law-and-economics framework and applies it to current patent doctrine in view of *Alice*. This section then proposes a different approach regarding the subject-matter eligibility of software claims. Finally, the text applies the law-and-economics framework to obtain a cost-benefit analysis for the proposed approach.

Section VI discusses the Court's conflation of § 101 and § 103 in *Alice*. The discussion is closely related to the discussion of *Flook* presented in Section III.

II. SOFTWARE AND ITS IMPORTANCE

Software is a major contributor to the U.S. economy. In 2008, the value added to the United States' gross domestic product ("GDP") by "information communications technology producing" industries was \$535.7 billion, or 3.8% of the entire GDP.⁷ Around 50,000 U.S. companies are involved in computer software

⁵ *Id.* at 11-12.

⁶ Parker v. Flook, 437 U.S. 584 (1978).

⁷ Brief for Entrepreneurial Software Companies as Amici Curiae Supporting Petitioner, Bilski v. Doll, 556 U.S. 1268 (2009) (No. 08-964), 2009 WL 2418474, at *4.

development, with a combined annual revenue of about \$180 billion.⁸ In 2008 alone, nearly 10% of all patents issued to U.S. companies were related to data processing.⁹ Therefore, any laws that affect investment in software technology would also have an impact on the economy at large. Because patent law can directly influence incentives to invest in particular technologies,¹⁰ patent law as applied to software could have a large impact on the software industry,¹¹ which would in turn have a significant impact on the U.S. economy.

Software usually means a computer program. Merriam Webster's Dictionary defines software as "the entire set of programs, procedures, and routines associated with [the operation of] a computer system."¹² In other words, software is the set of instructions that conveys to a computer what it should do. This definition differentiates these features from hardware, i.e., the physical components of a computer system.¹³ Two main types of software are system software, which controls a computer's internal functioning, and application software, which directs the computer to execute commands that solve practical problems.¹⁴

Most of the time, software involves an algorithm. "Informally, an *algorithm* is any well-defined computational procedure that takes some value, or set of values, as *input* and produces some value, or set of values, as *output*."¹⁵ The Court has defined an algorithm as "[a] procedure for solving a given type of mathematical problem."¹⁶ Software and algorithms are closely related.¹⁷ The

¹² Software, MERRIAM–WEBSTER'S COLLEGIATE DICTIONARY (11th ed. 2003).

¹³ See id.

¹⁴ *Application*, MERRIAM–WEBSTER'S COLLEGIATE DICTIONARY (11th ed. 2003); *compare Software, supra* note 12.

¹⁵ THOMAS H. CORMEN, CHARLES E. LEISERSON, RONALD L. RIVEST & CLIFFORD STEIN, INTRODUCTION TO ALGORITHMS 1 (1st ed. 1990) (emphasis in original).

¹⁶ Gottschalk v. Benson, 409 U.S. 64, 65 (1972).

¹⁷ See Algorithm, WIKIPEDIA, THE FREE ENCYCLOPEDIA http://en.wikipedia.org/wiki/Algorithm [https://perma.cc/26UN-HCAV] (last visited Nov. 20, 2016) ("[M]ost algorithms are usually implemented on particular hardware / software platforms [....]"); NIKOLAS WIRTH, ALGORITHMS AND DATA STRUCTURES 5 (2012) ("Programs, after all, are concrete formulations of abstract algorithms based on particular representations and structures of data.") (available at: http://www.inr.ac.ru/~info21/ADen/AD2012.pdf and http://freecomputerbooks.com/Algorithms-and-Data-Structures-by-Niklaus-Wirth.html); David Garlan and

⁸ *Id.* at *5.

⁹ Id.

¹⁰ See RONALD A. CASS & KEITH N. HYLTON, LAWS OF CREATION 49-75 (Harvard Univ. Press 2013) (discussing the incentives for discovery and development created by patent law).

¹¹ Diamond v. Diehr, 450 U.S. 175, 217 n.42 (1981) ("The need of the incentive of patents for software is at least as great as that of the incentive available for hardware To prospective investors a patent or the possibility of obtaining one may be the principal element in the decision whether to invest.") (citing Brief for ADAPSO as Amicus Curiae, Parker v. Flook, 437 U.S. 584 (1978) (No. 77-642)).

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Court has recognized this principle as well, stating that "[algorithms] are a generalized formulation for programs to solve mathematical problems From the generic formulation, programs may be developed as specific applications[, *i.e.*, software]."¹⁸ In patent applications claiming a computer program within a process where the computer is executing the program's instructions, those claims are treated as process claims.¹⁹

III. LEGAL PRECEDENT

To have a meaningful discussion regarding *Alice* and software patents, it is necessary to review the Court's opinions grappling with the patentability of software technology. The most important cases dealing with the patentability of software claims are Gottschalk v. Benson, 20 Parker v. Flook, 21 Diamond v. Diehr, 22 and Bilski v. Kappos.²³ In Benson, the Court held that a patent claim consisting of an algorithm by itself, with no substantial practical application, is not eligible for patent protection under 35 U.S.C. § 101.24 In Flook, the Court found that a patent application for a process does not automatically fall within the patentable subject matter of § 101 when the claimed process implements a principle in some specific fashion.²⁵ Further, the Court found that when an algorithm is the only difference between prior art and a patent application for a process, the process does not qualify as patentable subject matter under § 101.26 In Diehr, the Court held that even when a claim contains patent-ineligible subject matter, like mathematical formulas, the claim is patent-eligible if it implements or applies that patent-ineligible subject matter "in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed

- ¹⁸ Benson, 409 U.S. at 65.
- ¹⁹ MPEP § 2106, at 2100-18-2100-19 (9th ed. Rev. 11, Mar. 2014).
- ²⁰ Benson, 409 U.S. at 63.
- ²¹ Parker v. Flook, 437 U.S. 584 (1978).
- ²² Diamond v. Diehr, 450 U.S. 175 (1981).
- ²³ Bilski v. Kappos, 561 U.S. 593 (2010).
- ²⁴ Benson, 409 U.S. at 71-72.
- ²⁵ *Flook*, 437 U.S. at 593.

Mary Shaw, *An Introduction to Software Architecture*, Adances in Software Engineering and Knowledge Engineering, Volume I, Dec., 1993, at 1 ("As the size and complexity of software systems increases, the design problem goes beyond the algorithms and data structures of the computation [...]") (available at: http://www.worldscientific.com/doi/suppl/10.1142/2207/suppl_file/2207_chap01.pdf | http://www.worldscientific.com/worldscibooks/10.1142/2207 | http://www.cs.cmu.edu/afs/cs/project/able/ftp/intro softarch.pdf).

²⁶ *Id.* at 587.

to protect."²⁷ Finally, in *Bilski*, the Court found that a method may not be patentable if it is not tied to a specific device and does not transform matter from one physical state to another.²⁸

Although the discussion above has mentioned the highlights of each case, the discussion below of the Court's precedent is necessary to understand fully the doctrine governing the patent-eligibility of software.

A. GOTTSCHALK V. BENSON

The Court first considered whether computer program processes could be patented in its 1972 decision in *Gottschalk v. Benson*. Benson applied for a patent on a method for transforming binary coded decimals (BCD) to pure binary form.²⁹ Claim 8 described the algorithm, and claim 13 described the steps implementing the algorithm in, presumably, a digital computer.³⁰ The main takeaway from *Benson* is that a patent claim consisting of an algorithm by itself, with no substantial practical application, is not eligible for patent protection under § 101 because it would preempt a mathematical formula and, were such a claim eligible for protection, it would result in ideas becoming patent-eligible.³¹

Prior to *Benson*, the Court's precedent had indicated that patentable processes were those that transformed matter from one physical state to another.³² The Court had excluded laws of nature, mathematical and scientific principles, mental processes, and abstract ideas from patent protection.³³ Although Benson's algorithm was a process, the Court explained

[O]ne may not patent an idea. But in practical effect that would be the result if [Benson's] formula for converting BCD numerals to pure binary numerals were patented The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if [the patent claims are sustained], the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.³⁴

The rest of the opinion provides clues regarding the patentability of software and business methods. It suggests that a software or business method claim

²⁷ *Diehr*, 450 U.S. at 192.

²⁸ Bilski, 561 U.S. at 606.

²⁹ Benson, 409 U.S. at 64.

³⁰ *Id.* at 73-74 (Appendix to Opinion of the Court).

³¹ *Id.* at 71-72.

³² *Id.* at 70-71 (citing Tilghman v. Proctor, 102 U. S. 707, 721 (1880); Expanded Metal Co. v. Bradford, 214 U. S. 366 (1909); Smith v. Snow, 294 U. S. 1 (1935); and Waxham v. Smith, 294 U. S. 20 (1935)).

³³ *Id.* at 67.

³⁴ *Id.* at 71-72.

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should at least be limited to a particular art or technology, to a particular apparatus or machinery, or to a particular end use.³⁵ The opinion also provides a clue as to what is an abstract idea: "A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right."³⁶ The opinion also suggests that a patenteligible claim including a natural phenomenon must apply the law of nature to a new and useful end.³⁷ It further suggests that the "machine or transformation" test is not outcome-determinative in patent applications.³⁸ In other words, a process patent need not meet the machine or transformation requirements to qualify for process patents.³⁹ However, the opinion does state that "transformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines."⁴⁰

B. Parker v. Flook

In 1978 in *Parker v. Flook*, the Court considered the patentability of a method for calculating and updating an alarm limit (which is a number) in a chemical process in an oil refinery.⁴¹ In summary, the main findings of the Court were: (1) if a patent application for a process implements a principle in some specific fashion, it does not automatically fall within the patentable subject matter of § 101;⁴² and (2) when the only difference between the prior art and the patentable subject matter under § 101.⁴³ Further, the dicta in *Flook* helps clarify the notion

1. A method for updating the value of at least one alarm limit on at least one process variable involved in a process comprising the catalytic chemical conversion of hydrocarbons wherein said alarm limit has a current value of

 $B_0 + K$

wherein B_0 is the current alarm base and K is a predetermined alarm offset which comprises:

(1) Determining the present value of said process variable, said present value being defined as PVL;

(2) Determining a new alarm base B₁, using the following equation:

 $B_1 = B_0(1.0-F) + (PVL(F))$

(3) Determining an updated alarm limit which is defined as $B_1 + K$; and thereafter

(4) Adjusting said alarm limit to said updated alarm limit value.

Id. at 596-97 (Appendix to Opinion of the Court).

³⁵ *Id.* at 69-71.

³⁶ *Id.* at 67 (quoting Le Roy v. Tatham, 55 U.S. 156, 175 (1852)).

³⁷ *Id.* (quoting Funk Bros. Seed Co. v. Kalo Co., 333 U.S. 127, 130 (1948)).

³⁸ *Id.* at 71.

³⁹ Id.

⁴⁰ *Id. at* 69-70.

⁴¹ Parker v. Flook, 437 U.S. 584 (1978). Claim 1 in Flook's patent application reads as follows:

⁴² *Id.* at 593.

⁴³ *Id.* at 594.

of preemption in a § 101 analysis; the Court noted, quoting *Benson*, that "[t]he mathematical formula involved here ha[d] no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself."⁴⁴

The Court supported its first main finding on two grounds. First, the Court concluded that a contrary holding "would make the determination of patentable subject matter depend simply on the draftsman's art and would ill serve the principles underlying the prohibition against patents for 'ideas' or phenomena of nature."⁴⁵ The Court was concerned with the possibility that "[a] competent draftsman could attach some form of post-solution activity to almost any mathematical formula."⁴⁶ Thus, the Court explained that "[t]he notion that a post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process exalts form over sub-stance."⁴⁷

However, the Court's analysis regarding this first ground seems to relate to a § 103-non-obviousness-analysis rather than a § 101 analysis. Justice Stevens' dissent in Parker v. Flook noted the Court's conflation of § 103 with § 101.48 Regarding the *Flook* decision, when the Court tried to compare the claims in a patent to what is "conventional" or "obvious," the Court should not have applied § 101; instead, it should have applied precedent and legal principles that have been robustly developed under § 103. § 103 states, "A patent for a claimed invention may not be obtained . . . if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious ... to a person having ordinary skill in the art to which the claimed invention pertains."49 The inquiry regarding obviousness in light of the prior art and the ordinary skill in that art has been extensively developed in cases grappling with § 103 issues. For example, the Graham factors, set forth in Graham v. John Deere Co., 50 provide "the framework for the objective analysis for determining obviousness."51 The Court in KSR International Co. v. Teleflex Inc.⁵² further defined grounds for rendering patent claims obvious over the prior

⁴⁴ *Id.* at 589 (citing Gottschalk v. Benson, 409 U.S. 63, 71-72 (1972)).

⁴⁵ *Id.* at 593.

⁴⁶ *Id.* at 590.

⁴⁷ Id.

 $^{^{48}}$ *Id.* at 600 (Stevens, J., dissenting). This article will return to the Court's conflation of the § 103 and § 101 analyses in a later section because this conflation is something that the Court has done more than once. *See infra* Section VI.

⁴⁹ 35 U.S.C. § 103 (2012) (emphasis added).

⁵⁰ Graham v. John Deere Co., 383 U.S. 1 (1966).

⁵¹ MPEP § 2141(ii), 2100-140 (9th ed. Rev. 11, March 2014).

⁵² KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 419-20 (2007).

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art.⁵³ Finally, *In re GPAC*⁵⁴ stated the factors used to resolve the level of ordinary skill in an art.⁵⁵

A § 101 analysis and its related precedent are ill-suited for an obviousness inquiry because a § 101 analysis is confined to finding whether an invention is a "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."⁵⁶ An inquiry into novelty or utility is different from an inquiry into obviousness.⁵⁷ In other words, an invention may be a new implementation of an engineering principle, but at the same time, it may be an obvious implementation of that engineering principle. In *Flook*, by applying an unsystematic obviousness analysis under § 101, the Court ignored the rigors of an obviousness analysis to a § 101 novelty inquiry without addressing the precedent developed for a § 103 analysis and the scrutiny required for a finding of obviousness.

Because the patentability of a claim will always be scrutinized for obviousness under § 103,58 the Court's fear that patentability could depend on a draftsman's art, as stated in Flook,59 is not a real concern. The Court's fear would not be realized even if the Court held that a patent application for a process implementing a principle in a specific fashion would automatically be patent-eligible under § 101.60 The Court may dispel its fears because a patent application must clear both hurdles imposed by § 101 and § 103 before a patent is issued.⁶¹ Thus, assuming arguendo that the Court was correct in Flook when it stated that "a competent draftsman could attach some form of post-solution activity to almost any mathematical formula"62 and that such practice could overcome a § 101 analysis, such patent claims would fail a § 103 analysis if they were indeed obvious or conventional implementations of the mathematical formulas in a postsolution activity.⁶³ On the other hand, if such hypothetical patent claims were non-obvious and unconventional implementations of the mathematical formulas in a post-solution activity, the patent system should incentivize such innovative and particular implementations by granting them patent protection. Therefore, the Court was wrong to fear that, had it decided Flook differently, "[a] post-

⁵³ MPEP § 2141(i), 2100-139-2100-1400 (9th ed. Rev. 11, Mar. 2014).

⁵⁴ *In re* GPAC, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

⁵⁵ MPEP § 2141(ii)(c), 2100-142 (9th ed. Rev. 11, Mar. 2014).

⁵⁶ 35 U.S.C. § 101 (2012).

⁵⁷ See, e.g., Roberts v. Sears, Roebuck & Co., 723 F.2d 1324, 1332 n. 9 (7th Cir 1983) (distinguishing an inquiry into obviousness from an inquiry into novelty).

⁵⁸ See Parker v. Flook, 437 U.S. 584, 588 (1978).

⁵⁹ *Id.* at 590, 593.

⁶⁰ See *id.* at 593.

⁶¹ See id. at 600.

⁶² *Id.* at 590.

⁶³ See id.

solution activity, no matter how conventional or obvious in itself, [could] transform an unpatentable principle into a patentable process."⁶⁴ A § 103 inquiry would prevent such a result.

This paper now turns to the second ground that the Court used to bolster its finding that a patent claim for a process implementing a principle in some specific fashion does not automatically fall within the patentable subject matter of § 101.65 The Court simply regurgitated one of the tenets of intellectual property law: "The rule that the discovery of a law of nature cannot be patented rests, not on the notion that natural phenomena are not processes, but rather on the more fundamental understanding that they are not the kind of 'discoveries' that the statute was enacted to protect."66 This statement only tangentially touches upon the issue in *Flook* because patenting the *specific implementation* of an algorithm to solve a particular problem is not the same as patenting the discovery of a law of nature or the discovery of an algorithm.⁶⁷ It is true that an algorithm is equivalent to a basic computational principle or a law of nature.⁶⁸ However, implementing an algorithm in a specific fashion to solve a particular problem, as long as the implementation is not obvious (and obviousness is the realm of a § 103 analysis, not a § 101 analysis), may be the precise type of innovative activity that Congress intends to incentivize with patent law.69

The Court did not articulate a persuasive reason for finding that a patent application claiming a process that implements a principle—be it an algorithm or a law of nature—in a specific fashion, does not automatically fall within patentable subject matter under § 101. Rather, the Court's finding in *Flook* seems at odds with its dicta in *Benson*:

He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be [a patentable] invention from such a discovery, *it must come from the application of the*

⁶⁹ See Diamond v. Diehr, 450 U.S. 175, 197-8, 187-8 (1981) (finding that the interpretation of the Court of Customs and Patent Appeals of 35 U.S.C. § 101 lead to the conclusion that computer programs were within the categories of inventions to which Congress intended to extend patent protection; "[o]ur earlier opinions lend support to our present conclusion that a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer [...] *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*") (emphasis added); Diamond v. Chakrabarty, 447 U.S. 303, 308 (1980) (discussing Congress's intent regarding 35 U.S.C. § 101 and finding that "Congress took a permissive approach to patent eligibility to ensure that "ingenuity should receive a liberal encouragement").

⁶⁴ Id.

⁶⁵ *Id.* at 588.

⁶⁶ Id.

⁶⁷ See id. 599.

⁶⁸ In re Meyer, 688 F.2d 789, 794-95 (C.C.P.A. 1982).

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law of nature to a new and useful end.⁷⁰

Thus, *Benson* suggests that a new and useful process is patentable as long as it implements a principle in a specific fashion.

Regarding the second finding in *Flook—i.e.* when the only difference between the prior art and the patent application for a process is an algorithm, the process does not qualify as patentable subject matter under § 101—the Court provided the following analysis for processes using a law of nature or a mathematical algorithm:

The process itself, not merely the mathematical algorithm, must be new and useful. Indeed, the novelty of the mathematical algorithm is not a determining factor at all. Whether the algorithm was in fact known or unknown at the time of the claimed invention, \dots [the algorithm] is treated as though it were a familiar part of the prior art.⁷¹

The Court found that Flook's process was "unpatentable under § 101, not because it contains a mathematical algorithm as one component, but because once that algorithm is assumed to be within the prior art, the application, considered as a whole, contains no patentable invention."⁷² The Court then went on to describe Flook's patent claim as comprising elements that were "well known" in the art and Flook's application as "simply provid[ing] a new and presumably better method for calculating alarm limit values."⁷³ The Court seems to have based its decision, at least in part, on the patent examiner's rejection, who found that the mathematical formula was the only difference between Flook's claim and the prior art.⁷⁴

Again, the argument against conflating a § 103 analysis—dealing with obviousness issues in light of the prior art and the ordinary skill in that art—with a § 101 analysis applies with equal force to the Court's rationale. Looking at § 103 the Court stated in *Graham v. John Deere Co.* that the inquiry for obviousness under § 103 involves: (A) determining the scope and content of the prior art; (B) ascertaining the differences between the claimed invention and the prior art; and (C) resolving the level of ordinary skill in the pertinent art.⁷⁵ In *Flook*, when the Court determined patentability under § 101 by finding that the elements in Flook's patent application were well known in the prior art, the Court necessarily stepped out of a § 101 analysis and into a § 103 analysis using the *Graham* factors. In other words, to find that the elements in Flook's patent application were well known in the art, the Court was supposed to (A) determine the scope and

⁷⁰ Gottschalk v. Benson, 409 U.S. 63, 67 (1972) (citing Funk Bros. Seed Co. v. Kalo Co. 333 U.S. 127, 130 (1948)) (emphasis added).

⁷¹ *Flook*, 437 U.S. at 591-92 (citation omitted).

⁷² *Id.* at 594.

⁷³ *Id* at 594-95.

⁷⁴ *Id.* at 587.

⁷⁵ MPEP § 2141(ii), 2100-129 (9th ed. Rev. Nov. 2015); see Graham v. John Deere Co., 383 U.S. 1, 17 (1966).

content of the prior art that applied to Flook's claims, (B) ascertain the differences between Flook's claims and the prior art, and (C) resolve whether an ordinarily skilled artisan would have been able to produce from the prior art the same combination of elements that Flook claimed.⁷⁶

The analysis applied by the Court is worrisome, especially because the Court stated, "[*Flook*] turns entirely on the proper construction of § 101 of the Patent Act It does not involve the familiar issues of novelty and obviousness that routinely arise under §§ 102 and 103 when the validity of a patent is challenged."⁷⁷ Yet, throughout its rationale in *Flook*, the Court conflates the § 101 and § 103 analyses.

C. Diamond v. Diehr

In 1981 in *Diamond v. Diehr*, the Court considered the patentability of a process involving a computer program.⁷⁸ Initially, the patent examiner rejected the

1. A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:

providing said computer with a data base for said press including at least, natural logarithm conversion data (ln),

the activation energy constant (C) unique to each batch of said compound being molded, and

a constant (x) dependent upon the geometry of the particular mold of the press, initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure,

constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding, constantly providing the computer with the temperature (Z),

repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is

 $\ln v = CZ + x$

where v is the total required cure time,

repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and

opening the press automatically when a said comparison indicates equivalence.

2. The method of claim 1 including measuring the activation energy constant for the compound being molded in the press with a rheometer and automatically updating said data base within the computer in the event of changes in the compound being molded in said press as measured by said rheometer.

11. A method of manufacturing precision molded articles from selected synthetic rubber compounds in an openable rubber molding press having at least one heated precision mold, comprising:

⁷⁶ See MPEP § 2141(ii), 2100-129 (9th ed. Rev. Nov. 2015).

⁷⁷ *Flook*, 437 U.S. at 588.

⁷⁸ Diamond v. Diehr, 450 U.S. 175, 177 (1981). "Respondents' application contained 11 different claims. Three examples are claims 1, 2, and 11 which provide:

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claims because the claims recited steps "carried out by a computer under control of a stored program,"⁷⁹ which constituted "nonstatutory subject matter."⁸⁰ The examiner explained that "[t]he remaining steps—installing rubber in the press and the subsequent closing of the press—were 'conventional and necessary to the process and cannot be the basis of patentability."⁸¹

The Court ruled that although a mathematical formula is not subject to patent protection, "when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect . . . then the claim satisfies the requirements of § 101."⁸² Therefore, the process at issue, which involved a computer program that continuously calculated temperatures inside the mold to determine when the rubber was properly cured, was a patent-

(d) initiating an interval timer upon the closure of said press for monitoring the elapsed time of said closure,

(e) heating said mold during said closure to maintain the temperature thereof within said range approximating said rubber curing temperature,

(f) constantly determining the temperature of said mold at a location closely adjacent said cavity thereof throughout closure of said press,

(g) repetitively calculating at frequent periodic intervals throughout closure of said press the Arrhenius equation for reaction time of said rubber to determine total required cure time v as follows:

 $\ln v = cz + x$

wherein c is an activation energy constant determined for said rubber being molded and cured in said press, z is the temperature of said mold at the time of each calculation of said Arrhenius equation, and x is a constant which is a function of said predetermined geometry of said mold,

(h) for each repetition of calculation of said Arrhenius equation herein comparing the resultant calculated total required cure time with the monitored elapsed time measured by said interval timer,

(i) opening said press when a said comparison of calculated total required cure time and monitored elapsed time indicates equivalence, and

(j) removing from said mold the resultant precision molded and cured rubber article."

Id. at 179-180 n.5.

⁽a) heating said mold to a temperature range approximating a pre-determined rubber curing temperature,

⁽b) installing prepared unmolded synthetic rubber of a known compound in a molding cavity of predetermined geometry as defined by said mold,

⁽c) closing said press to mold said rubber to occupy said cavity in conformance with the contour of said mold and to cure said rubber by transfer of heat thereto from said mold,

⁷⁹ *Id.* at 180.

⁸⁰ Id. at 179.

⁸¹ Id. at 180-81.

⁸² *Id.* at 176.

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able process because the claim described a detailed, step-by-step method for accomplishing the transformation of an article into a different state or thing.⁸³ The Court sustained the process claims because "[i]ndustrial processes such as this are the types which have historically been eligible to receive [patent] protection."⁸⁴ Diehr and Lutton did not seek to patent a mathematical formula but instead a process of curing synthetic rubber by a process that transformed matter from one physical state to another.⁸⁵ The process employed a well-known mathematical equation but did not seek to preempt the use of that equation.⁸⁶

Justice Stevens's dissent in *Diehr* raises two important points. First, the dissent states that had the majority opinion applied *Flook* correctly in this case, the patent claims would have been rejected. In a § 101 analysis, the dissent notes that what Diehr and Lutton claimed to have developed was a "new method of programming a digital computer in order to calculate—promptly and repeatedly—the correct curing time in a familiar process."⁸⁷ Since such a method is regarded as an algorithm, and because no other inventive concept is disclosed in the patent application, then the method should not be patentable subject matter under the test applied in *Flook*.⁸⁸ This is consistent with the rejection of the patent examiner who found that the claim in *Flook*, aside from the algorithm, was well known in the art.⁸⁹ Also, this would be in accordance with the majority opinion in *Flook* which indicates that an algorithm, whether novel or not, should be treated as part of the prior art.⁹⁰

Therefore, at first glance, the majority opinion in *Diehr* seems to abrogate, or at least to contradict, the majority opinion in *Flook*. However, the two opinions can be reconciled by distinguishing *Diehr* from *Flook*. The claims in *Flook*, as a whole, are not directed to one of those processes that have been historically thought of as deserving patent protection.⁹¹ The claim in *Flook* is directed to a method of updating a value, which is a number in a computer.⁹² In fact, that the claim in *Flook* involves "a process comprising the catalytic chemical conversion

⁸⁸ *Id.* at 213-14.

⁹¹ *Id.* at 595.

 92 *Id.* at 584. The preamble indicates that the method is directed to updating the value of an alarm limit.

⁸³ *Id.* at 184.

⁸⁴ *Id.* at 184.

⁸⁵ *Id.* at 176.

⁸⁶ Id.

⁸⁷ Id. at 212-13.

⁸⁹ *Id.* at 179-181 (discussing that the examiner determined that the steps carried out by a computer constituted nonstatutory subject matter while "the remaining steps—intalling rubber in the press and the subsequent closing of the press—were '*conventional* [....]'") (emphasis added).

⁹⁰ Parker v. Flook, 437 U.S. 584, 585(1978).

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of hydrocarbons" seems ancillary to the patent claim.⁹³ On the other hand, the claim language in *Diehr*, as a whole, is directed to one of those industrial processes that transform articles of manufacture and which have historically been thought of as deserving patent protection.⁹⁴ The role of the computer seems to aid in operating the mold and in realizing the industrial process, *i.e.*, the role of the computer is very closely related to the process of transforming the article.⁹⁵

Under this lens, patent law practitioners likely could benefit from including in their claim language many steps or elements that involve historically accepted processes.⁹⁶ It seems that in performing a § 101 analysis, the Court bases, at least in part, its decision regarding patentability on whether a claim substantially involves subject matter that has been historically thought of as deserving patent protection.⁹⁷ If the significance of claim elements involving such historically accepted processes is similar to the significance of those elements in the *Diehr* claims, then the Court likely would consider those claims patent eligible under § 101.⁹⁸ On the other hand, if the significance of the elements involving such historically accepted processes is more similar to the significance of such elements in the *Flook* claims, then the Court likely would consider those claims unpatentable.⁹⁹

Justice Stevens's dissent raises a second important point regarding a § 101 analysis. Justice Stevens indicates that "proper analysis . . . must start with an understanding of what the inventor claims to have discovered."¹⁰⁰ Further, "we must assume that the sequence of steps in [a] programming method is novel, unobvious, and useful."¹⁰¹ Although Justice Stevens went on to apply the § 101 analysis used in *Flook*, his dissent provides a sound approach to a § 101 analysis that avoids the pitfalls of intermingling § 103 with § 101, like the Court did in *Flook*.¹⁰²

⁹³ See *id.* at 596-597 (disclosing the claim language at issue which describes a method of updating the value of an alarm limit, where the method happens to be used in a process involving the catalytic chemical conversion of hydrocarbons but does not directly interact with or depend on the catalytic conversion).

⁹⁴ *Diehr*, 450 U.S. at 184..

⁹⁵ *Id.* at 187.

⁹⁶ *Id.* at 192.

⁹⁷ *Id.* at 184.

⁹⁸ Id. at 187-188.

⁹⁹ *Id.* at 185-186.

¹⁰⁰ Id. at 212 (Stevens, J. dissenting).

¹⁰¹ Id. at 213 (Stevens, J. dissenting).

¹⁰² See supra notes 75-77 and accompanying text.

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D. Bilski v. Kappos

In *In re Bilski*, the Federal Circuit rejected Bilski's patent application and established the machine-or-transformation test.¹⁰³ Under the machine-or-transformation test, a method claim is invalid unless "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing."¹⁰⁴ The mere mention of a machine or a transformation may not be sufficient if what is involved is merely "insignificant postsolution activity."¹⁰⁵ Because Bilski's method was not tied to an implementation in a specific device and did not transform matter from one physical state to another, the method did not pass the machine-or-transformation test. The Federal Circuit thus held that Bilski claimed an unpatentable process.¹⁰⁶

On June 28, 2010, the Court addressed the questions raised in *Bilski v. Kappos*.¹⁰⁷ The Court decided that the machine-or-transformation test is not the sole test for patentability under §101; instead, the test is only a clue to patentability.¹⁰⁸ According to Justice Stevens's concurring opinion, "even if the machine-or-transformation test may not define the scope of a patentable process, it would be a grave mistake to assume that anything with a 'useful, concrete and tangible result'... may be patented."¹⁰⁹ Instead, the court held that the method claimed in *Bilski* was ineligible for being "an abstract idea."¹¹⁰ The court rejected the idea of a categorical exclusion of business methods as patent-eligible subject matter.¹¹¹ Therefore, the *Bilski* decision allows room for patents containing method claims related to software algorithms because business methods are closely related.¹¹² However, the *Bilski* decision is not without uncertainties. For example, the Court did not clarify how applicants can determine whether a method is an abstract idea.¹¹³

IV. ALICE AND THE TWO-PRONGED TEST

§ 101 provides that "[w]hoever 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 therefore."¹¹⁴ However, the Court has

¹⁰⁶ *Id.* at 943.

¹⁰³ In re Bilski, 545 F.3d 943, 943 (Fed. Cir. 2008), *aff'd but criticized sub nom*. Bilski v. Kappos, 561 U.S. 593 (2010).

¹⁰⁴ *Id.* at 954.

¹⁰⁵ *Id.* at 957.

¹⁰⁷ Bilski v. Kappos, 561 U.S. 593 (2010).

¹⁰⁸ *Id.* at 604.

¹⁰⁹ Id. at 614 n.1 (Stevens, J., concurring).

¹¹⁰ *Id.* at 609.

¹¹¹ Id.

¹¹² See id. at 605-606.

¹¹³ Id. at 609.

¹¹⁴ 35 U.S.C. § 101 (2012).

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long held that § 101 contains an implicit exception that makes any law of nature, natural phenomena, or abstract ideas ineligible for patent protection.¹¹⁵ The Federal Circuit and patent practitioners have long struggled to interpret the eligibility requirement under § 101.¹¹⁶ In *Alice*, the Court declared that it "need not labor to delimit the precise contours of the 'abstract ideas' category in this case,"¹¹⁷ thereby declining to provide any additional guidance to the practitioners on this critical issue.

The relevant facts in *Alice* are as follows: CLS Bank International and CLS Services Ltd., facilitators for currency transactions, brought a declaratory judgment action seeking to invalidate several patents held by Alice Corp., an Australian non-practicing entity.¹¹⁸ The patents disclosed a computerized means of mitigating the risk that one party to a financial transaction may not have sufficient funds to complete the transaction; this risk is referred to as "settlement risk."¹¹⁹ The claims included (1) method claims for exchanging obligations in such transactions; (2) system claims for using a computer system to automate the exchanging obligations; and (3) computer-readable medium claims directed to computer code for performing the method of the exchanging such obligations.¹²⁰

¹¹⁸ *Id.* at 1-3.

A method of exchanging obligations as between parties, each party holding a credit record and a debit record with an exchange institution, the credit records and debit records for exchange of predetermined obligations, the method comprising the steps of:

- (a) creating a shadow credit record and a shadow debit record for each stakeholder party to be held independently by a supervisory institution from the exchange institutions;
- (b) obtaining from each exchange institution a start-of-day balance for each shadow credit record and shadow debit record;
- (c) for every transaction resulting in an exchange obligation, the supervisory institution adjusting each respective party's shadow credit record or shadow debit record, allowing only these transactions that do not result in the value of the shadow debit record being less than the value of the shadow credit record at any time, each said adjustment taking place in chronological order, and
- (d) at the end-of-day, the supervisory institution instructing on[e] of the exchange institutions to exchange credits or debits to the credit record and debit record of the respective parties in accordance with the adjustments of

¹¹⁵ Alice Corp. Pty. v. CLS Bank Int'l, 573 U.S. ____, 5 (2014) (citing Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 569 U.S. ___, ___ (2013) (slip op., at 11)).

¹¹⁶ See, eg., Michael Macagnone, Fed. Cir. Wrestles with Abstraction in Network Patent Case, LAW360 (Oct. 8, 2015, 5:05 PM), http://www.law360.com/articles/712549/fed-circ-wrestles-with-abstraction-in-network-patent-case [https://perma.cc/CH3D-RYVY].

¹¹⁷ *Id.* at 10.

¹¹⁹ *Id.* at 2-3.

¹²⁰ *Id.* at 3; *see also id.* at 2 n.2 (stating that the parties agree that claim 33 of the '479 patent is representative of the method claims). Claim 33 recites:

To determine the patent eligibility of the claims in *Alice*, the Court first applied the framework set forth in *Mayo Collaborative Servs. v. Prometheus Labs.*¹²¹ for "distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts."¹²² The *Mayo* test has two prongs: (1) determine whether the patent claims are directed to a patent-ineligible concept, such as a law of nature, a natural phenomenon, or an abstract idea; and (2) if so, determine whether the elements of each claim, individually or in combination, transform the claim into a patent-eligible application.¹²³

A. Alice test Step 1 – whether A claim IS drawN TO an Abstract Idea

In applying the first step of the *Mayo* test in *Alice*, the Court first determined whether the claims at issue were drawn to the "abstract idea of intermediated settlement."¹²⁴ Although the Court did not provide a substantive definition of what an abstract idea is, the Court provided clues regarding what it considers as falling within the category of an "abstract idea."¹²⁵ First, the Court mentioned that "the 'abstract ideas' category embodies 'the longstanding rule that 'an idea of itself is not patentable."¹²⁶ The Court cited *Le Roy v. Tatham*: "A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right."¹²⁷ Drawing from its *Benson* decision, the Court suggested that an algorithm per se would fall within the realm of "abstract ideas."¹²⁸ Further drawing from its *Flook* decision, the Court suggested that "a nathematical formula for computing 'alarm limits' in a catalytic conversion process was also a patent-ineligible abstract idea."¹²⁹

Based on the previous discussion of *Flook* and its distinction from *Diehr*,¹³⁰ because the Court upheld the patent claims in *Diehr* and did not engage in the two-pronged test set forth in *Mayo* and *Alice*, one could reasonably conclude that the Court does think the industrial process for curing rubber as claimed in *Diehr* is an abstract idea.¹³¹ However, the Court may not have engaged in the

the said permitted transactions, the credits and debits being irrevocable, time invariant obligations placed on the exchange institutions.

¹²¹ Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289 (2012).

¹²² *Id.* at 6-7.

¹²³ *Id.* at 7.

¹²⁴ Id.

¹²⁵ *Id.* at 10.

¹²⁶ Id. at 7. (citing Gottschalk v. Benson, 409 U.S. 63, 67 (1972)).

¹²⁷ Id. at 7-8 (citing Le Roy v. Tatham, 55 U.S. 156, 174–75 (1852)).

¹²⁸ *Id.* (citing Gottschalk v. Benson, 409 U.S. 63, 67 (1972)).

¹²⁹ *Id.* at 8 (quoting Parker v. Flook, 437 U.S. 584, 594-95 (1978)).

¹³⁰ See discussion supra Section III.C.

¹³¹ Diamond v. Diehr, 450 U.S. 175, 184 (1981).

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two-pronged test set forth in *Mayo* because it had not yet formulated the test.¹³² Had the Court applied the tests in *Mayo* and *Alice* to the facts of *Diehr*, the Court likely would have found that the mathematical formula in *Diehr* fell within the category of an "abstract idea" because the formula is a fundamental mathematical truth.¹³³ This is not to say that the Court would have held the claims in *Diehr* unpatentable; before determining patentability, the Court would have proceeded to the second prong of *Alice*'s two-pronged test.¹³⁴

Drawing from its decision in *Bilski*, the Court stated that "the described method for hedging against the financial risk of price fluctuations" claimed an "abstract idea" because "[h]edging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class."¹³⁵ The Court analogized *Bilski* and *Alice*, finding that, like the risk-hedging in *Bilski*, the claims in *Alice* were drawn to abstract ideas because the claims in *Alice* were drawn to the concept of intermediated settlement risk, which is "a fundamental economic practice long prevalent in our system of commerce."¹³⁶

The Court's analysis leaves many questions unanswered regarding the test for "abstract ideas." One could construe the definition of "abstract ideas" broadly, such that if any part of a patent claim is directed to a fundamental practice, be it economic or scientific, then the claim is directed to an abstract idea under the first prong of *Alice*'s two-pronged test.¹³⁷ Under such a broad definition of an "abstract idea," however, § 101 would swallow the majority of, if not all patent filings and currently existing patents. In other words, most patent applications are drawn to fundamental scientific principles at their core. All biotechnology applications draw from biological and chemical principles and practices at their core. Most, if not all business methods applications draw from mathematical and economic practices. However, the Court likely did not intend to include most patent applications under the "abstract idea" umbrella.

The Court likely intended the term to be a sliding-scale. In other words, the Court likely meant that a claim that is *substantially* drawn to an abstract idea meets the first prong of the *Alice* test, thus requiring the analysis to proceed to the second prong.¹³⁸ On the other hand, a claim that is not *substantially* drawn to an abstract idea does not meet the first prong in *Alice*, and thus, the claim

¹³² The Court ruled on *Mayo* in 2012 and on *Diehr* in 1981.

¹³³ Alice Corp. Pty. v. CLS Bank Int'l, 573 U.S. ____, 8 (2014) (quoting Le Roy v. Tatham, 14 How. 156, 175 (1853)).

¹³⁴ *Id.* at 10-11.

¹³⁵ *Id.* at 8 (quoting Bilski v. Kappos, 561 U.S. 593, 609 (2010)).

¹³⁶ Id. at 9 (quoting Bilski v. Kappos, 561 U.S. 593, 611 (2010)).

¹³⁷ See id. at 10.

¹³⁸ Alice, 573 U.S. at 9 (noting that "[1]ike risk hedging in *Bilski*, the concept of intermediated settlement, is 'a fundamental economic practice long prevalent in our system of commerce").

meets the § 101 requirement for patentability.139

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Still, the question remains as to what exactly is considered an "abstract idea." Patent practitioners only have the Court's examples and the dictionary definition of "abstract" to shed some light on this question. Black's Law Dictionary defines an "abstract idea" as "[a] concept or thought, removed from any tangible embodiment."¹⁴⁰ A more relevant definition of "abstract" provided by the Merriam Webster dictionary is "relating to or involving general ideas or qualities rather than specific people, objects, or action."¹⁴¹ In summary, these definitions, the Court's examples of abstract ideas, and the conclusion that the Court likely intends to apply a sliding scale in determining whether a claim is drawn to an "abstract idea," likely control whether a claim will meet the first prong of the *Alice* test.

B. Alice test Step 2 – whether the inventive concept transforms the abstract idea into a patent-eligible claim

The second step of the *Alice* two-pronged test requires that a court consider the rest of the claim language.¹⁴² The question in this step is whether the claim "contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application."¹⁴³

If the first step of the *Alice* test was not vague enough, the Court perfected the obscurity of the test by failing to specify what comprises a sufficiently transformative inventive concept.¹⁴⁴ Thankfully, the *Alice* opinion provides a few examples regarding what factors may or may not nudge an abstract claim from ineligibility into eligibility. For example, the Court states that "the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention."¹⁴⁵ Thus, a patent applicant would be ill-advised to recite a computer in a claim directed to an abstract idea without further describing the computer as doing something significant other than acting as the medium through which the abstract idea is implemented. The Court states that "[t]he fact

¹⁴⁵ *Id.* at 13.

¹³⁹ See id. at 7.

¹⁴⁰ Abstract idea, BLACK'S LAW DICTIONARY (10th ed. 2014).

¹⁴¹ *Abstract*, MERRIAM–WEBSTER LEARNER'S DICTIONARY (Sept. 24, 2016, 3:13 PM), http://www.merriam-webster.com/dictionary/abstract [https://perma.cc/WHF6-VW5Q].

¹⁴² See Alice, 573 U.S. at 14.

¹⁴³ *Id.* at 11 (quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. __, 3 (2012)).

¹⁴⁴ *Id.* at 7 (rather that Court defines the term "inventive concept" broadly as "an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."(quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. __, 3 (2012)).

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that a computer 'necessarily exist[s] in the physical, rather than purely conceptual realm . . . , is beside the point."¹⁴⁶

Regarding the second prong, the Court stated that Flook stands for "the proposition that the prohibition against patenting abstract ideas cannot be circumvented by attempting to limit the use of [the idea] to a particular technological environment."147 However, the Court's characterization of Flook seems at odds with its Diehr decision.¹⁴⁸ In Diehr, an abstract idea, *i.e.* the Arrhenius equation, was employed in a particular technological environment and the Court upheld the claims.¹⁴⁹ Even though the Court seems to contradict itself, patent practitioners are likely seeing another instance of a sliding scale approach. The Court's language in Benson further supports this proposition, stating that the claims were not patentable in part because they "were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use."¹⁵⁰ This suggests that limiting the claims to a particular art or technology would have helped the patent applicant. Thus, to put it in the terms that the Court uses in *Alice*, limiting an abstract idea to a particular technological environment would help a patent applicant as long as the limitation adds enough to "transform" the claim into a patent-eligible claim, like in the facts in Diehr.¹⁵¹ In contrast, the limitations added to the claims in Flook were not enough.¹⁵² Therefore, the threshold is somewhere between Diehr's and Flook's limiting language. In drafting patent claims that contain "abstract ideas," practitioners should try to use claim language that limits the claimed subject matter to a similar degree and to a similarly narrow technological environment as the claims at issue in *Diehr*.¹⁵³ Beyond providing enough language to reasonably reach this narrow recommendation, the Alice opinion fell short of defining what language would sufficiently transform a claim directed to an abstract idea into a patent-eligible claim.

¹⁴⁶ *Id.* (citation omitted).

¹⁴⁷ Alice Corp. Pty. v. CLS Bank Int'l, 573 U.S. ____, 11 (2014) (quoting Bilski v. Kappos, 561 U.S. 593, 610-11 (2010)).

¹⁴⁸ See discussion supra Section III.C.

¹⁴⁹ Diamond v. Diehr, 450 U.S. 175, 192 (1981).

¹⁵⁰ Gottschalk v. Benson, 409 U.S. 63, 64 (1972).

¹⁵¹ Alice, 573 U.S. at 3.

¹⁵² Parker v. Flook, 437 U.S. 584, 590 (1978).

¹⁵³ Compare Flook, 437 U.S. at 596-598 (disclosing the claim language at issue—which the Court ultimately found to be unpatentable—which seemed ancillary to and only slightly limited, if at all, by a catalytic conversion process) with Diehr, 450 U.S. at 179-180 n. 5 (disclosing the claim language at issue—which the Court ultimately found to be patentable which was closely related to and limited by a rubber-molding process).

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V. COST-BENEFIT ANALYSIS OF SUBJECT-MATTER ELIGIBILITY – DETERMINING WHICH SOFTWARE CLAIMS SHOULD BE PATENT ELIGIBLE

A. The framework

Intuitively we would think that rule-makers—be it the courts or the legislature—usually consider a cost-benefit analysis to gauge the consequences of the rules that they create. In their book, *Laws of Creation*, Professors Ronald A. Cass and Keith N. Hylton ("Cass and Hylton") set forth a framework for performing a cost-benefit analysis of legal rules within intellectual property.¹⁵⁴ The framework considers the static effects (costs and benefits) and the dynamic effects of intellectual property rights.¹⁵⁵ Cass and Hylton propose that a cost-benefit analysis "provides a coherent analytical framework and a basis for assessing empirical claims respecting specific property rights."¹⁵⁶ Although the comparison of values to perform a cost-benefit analysis is not always simple, it is likely as rigorous an analysis as lawyers and economists can obtain without actually performing empirical studies. If done correctly, a cost-benefit analysis can provide a rough prediction of the consequences of different proposed laws without having to set up legal or social experiments.¹⁵⁷

In performing a cost-benefit analysis, the main task involves comparing the static costs with the dynamic benefits.¹⁵⁸ In looking at any possible property law, if its structure suggests that the law is likely to reduce the costs while at the same time increasing the benefits, that likely means that the law is serving a desirable purpose.¹⁵⁹ The static costs are those that can be observed at any given instant, without the need for time to transpire.¹⁶⁰ Whereas the dynamic benefits are those that can be observed only if time is allowed to transpire and not when time is

¹⁵⁴ RONALD A. CASS & KEITH N. HYLTON, LAWS OF CREATION (2013). Professor Hylton currently teaches at Boston University School of Law in the areas of Antitrust Law, Tort Law, and the Economics of Intellectual Property. His classes on the latter topic cover patent doctrines and their costs and benefits to society.

¹⁵⁵ See id. at 38.

¹⁵⁶ *Id.* at 31.

¹⁵⁷ Id.

¹⁵⁸ *Id.* at 44.

¹⁵⁹ See id. at 45.

¹⁶⁰ *Id.* at 38.

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fixed.¹⁶¹ When considering patent rights, the analysis considers the effects (costs and benefits) associated with the right to exclude others from using, manufacturing, importing, or selling a patented invention.¹⁶²

Because patent rights are temporary monopolies to an invention lasting twenty years, the dynamic benefit includes investment incentives in technology, which result in increased technological developments and discoveries, all of which benefit society.¹⁶³ The incentives are a result of the guaranteed financial rewards that a patent confers to a patent owner: because a patent owner can exclude others from selling, manufacturing, and importing the invention, the patent owner gets a financial benefit from inventing patentable subject matter.¹⁶⁴

The static costs of increased patent rights include the exclusion of potential users of the invention who would pay more than the marginal cost of providing the invention but less than the price a patent owner would charge under a temporary monopoly. ¹⁶⁵ In other words, the latter is a cost to society because those people who would pay more than a margin additional cost but would not pay the owner's price cannot reap the benefit of the invention.¹⁶⁶ Regarding static costs, it is readily discernible that the more potential users that a law excludes, the greater the cost to society.¹⁶⁷ Also, the lower the marginal cost and the higher the price of the invention as set by the patent owner, the higher the cost to society.¹⁶⁸ These two costs to society are the main effects, but other static and dynamic effects can result depending on the property at issue.¹⁶⁹ For example, the incentive to preserve and to enhance the value of the property and the administrative costs associated with enforcing certain type of property rights.¹⁷⁰

B. Applying the framework to the current law.

The current analysis under § 101 for software claims requires application of the two-prong test set forth in *Alice*.¹⁷¹ In June 2014, the United States Patent and Trademark Office ("USPTO")'s interim guidance regarding patent subject

¹⁶¹ *Id.* For a full discussion of how the static and dynamic costs are derived in both property law and intellectual property law, *see id.* at 28-31, 38-44.

¹⁶² 35 U.S.C.A. 271 (2010).

¹⁶³ RONALD A. CASS & KEITH N. HYLTON, LAWS OF CREATION 42 (2013).

¹⁶⁴ See id. at 50.

¹⁶⁵ *Id.* at 48.

¹⁶⁶ Id.

¹⁶⁷ See Id.

¹⁶⁸ See id. at 39.

¹⁶⁹ See id. at 44, 51.

¹⁷⁰ *Id.* at 44, 53.

¹⁷¹ U.S. Patent and Trademark Office, 2014 Interim Eligibility Guidance Quick Reference Sheet, https://www.uspto.gov/patents/law/exam/2014_eligibility_qrs.pdf.

matter eligibility shows how the two-pronged test applies to software patents.¹⁷² Again, the two-pronged test provided by *Alice* consists of (1) determining whether the patent claims are directed to a patent-ineligible concept, such as a law of nature, a natural phenomenon, or an abstract idea, and (2) if so, determining whether the elements of each claim individually or in combination transform the claim into a patent-eligible application.¹⁷³

The Court has indicated that the following technologies are not eligible for patents because they are directed to abstract ideas: the abstract idea of mitigating settlement risk;¹⁷⁴ the abstract idea of hedging;¹⁷⁵ the abstract idea of creating a contractual relationship;¹⁷⁶ a formula for updating alarm limits;¹⁷⁷ and a mathematical algorithm for converting from one form of numerical representation to another.¹⁷⁸ Putting the analysis in *Alice* through a cost-benefit framework indicates that the Court has the correct intuition in barring abstract ideas from patentable subject matter. Given one of the definitions employed by the Court regarding abstract ideas, *i.e.*, that they are fundamental truths or practices, be it economic or scientific, it seems that providing patent protection for those fundamental truths or practices would be more costly than beneficial for society as a whole.¹⁷⁹

Regarding the dynamic benefits, one could imagine that providing patent protection for newly developed or discovered fundamental economic or scientific practices would generate an increased interest and investment in developing new fundamental scientific and economic practices. This is so because potential patent owners would recognize the potential benefits of discovering new abstract ideas, which have the potential for widespread application. This effect would be consistent with the Intellectual Property Clause of the Constitution, which requires that Congress promote technological innovations.¹⁸⁰

Regarding static costs, one must first note that fundamental truths and practices are ubiquitous. If the patent system were to allow patents on fundamental truths or principles in economics and science, a patentee would have the right exclude anyone from using, selling, manufacturing, or importing the patented

¹⁷² Memorandum from Andrew H. Hirshfield, Deputy Comm'r for Patent Examination Policy, to Patent Examining Corps, U.S. Patent and Trademark Office (June 25, 2014), http://www.uspto.gov/sites/default/files/patents/announce/alice_pec_25jun2014.pdf [https://perma.cc/6R2L-JRYF].

¹⁷³ See discussion supra Section IV.

¹⁷⁴ See Alice Corp. Pty. v. CLS Bank Int'1, 573 U.S. ____, 1 (2014).

¹⁷⁵ Bilski v. Kappos, 561 U.S. 593, 598 (2010).

¹⁷⁶ Buysafe, Inc. v. Google, Inc., 765 F.3d 1350 (Fed. Cir. 2014).

¹⁷⁷ Parker v. Flook, 437 U.S. 584, 585 (1978).

¹⁷⁸ Gottschalk v. Benson, 409 U.S. 63, 64 (1972).

¹⁷⁹ *Id.* at 67.

¹⁸⁰ U.S. CONST. art. I, § 8, cl. 8 ("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").

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fundamental practice in science or engineering.¹⁸¹ A patentee would thus be free to set monopoly prices for using those fundamental practices in economics and science.¹⁸² Effectively, this would result in excluding a large portion of society from using those fundamental practices. This is because the ubiquity of fundamental practices in science and engineering coupled with the fact that monopoly prices always exclude buyers who would have purchased the product or service at a competitive price but who cannot afford the same product or service at the monopoly price.¹⁸³ This result would be observed even if the difference between the marginal cost and the monopoly price for using the fundamental economic or scientific practice is small.¹⁸⁴ Such fundamental economic or scientific practices are so widespread that even basic activities such as education would be affected by monopoly pricing, *e.g.*, professors and students rely on performing experiments in classes to learn, and those experiments, in turn, apply fundamental economic or scientific principles.

The problem with determining the overall outcome of a cost-benefit analysis for abstract ideas is in trying to determine whether the dynamic benefits outweigh the static costs. The answer is likely not in the affirmative. Even though providing protection for abstract ideas would incentivize the discovery of new fundamental economic and scientific practices, one could argue that the increase in incentives would only be slight because the patent system already provides protection for the application of those fundamental economic or scientific principles. For example, consider the fundamental scientific practice of heating water to boiling temperature in order to obtain vapor. Even though the patent system would not allow a patent for the principle of boiling water, the patent system allows patents for particular designs for boiling water nuclear reactors.¹⁸⁵ These reactors employ a safety system that prevents nuclear meltdowns by decreasing the number of nuclear reactions as water starts to boil with a rising reactor temperature.¹⁸⁶ Thus, the specific application of a fundamental scientific practice is protectable. However, providing protection for the use of the fundamental scientific practice-in this case, the act of boiling water-would create a large cost to society. Boiling water is a ubiquitous practice in society as it is used to kill

¹⁸¹ See 35 U.S.C. § 154 (2012) (stating that a patent confers "the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States. . .").

¹⁸² RONALD A. CASS & KEITH N. HYLTON, LAWS OF CREATION 179 (2013).

¹⁸³ *Id.* at 39.

¹⁸⁴ See id.

¹⁸⁵ See U.S. Patent 3,061,533 (claiming "a nuclear reactor power system comprising a reactor having a mass of fissionable material for vaporizing liquid working fluid, cooling tubes in said mass, control rods adapted to be inserted in and Withdrawn from said mass, a means for delivering liquid working fluid to said tubes, heating means for heating said working fluid prior to its delivery to said tubes...").

¹⁸⁶ See id.

germs to produce drinking water, power cars, generate energy, and even for educational purposes. Because of the widespread need to boil water, conferring the right to set a monopoly price for boiling water to one individual would bar a large portion of society from practicing such a fundamental scientific practice. It would be far too detrimental.

Another example, which is more analogous to software as discussed in Section V. C. below, is the scientific principle of using screws to attach two plates. That two plates can be attached to each other via a screw is a fundamental scientific practice; using screws is no more than just one way of implementing an invention requiring two plates attached to each other. Applying the analysis offered above, conferring a patent for the process of attaching two or more plates via a screw would be a great cost to society while, comparatively, it would only slightly incentivize investments in similar discoveries. The incentive to patent particular applications of using screws to fasten plates already exists because the patent system confers patent rights to those who invent new and useful mechanical devices that feature two plates attached to each other via a screw.¹⁸⁷ On the other hand, the ubiquity of the use of screws in society would make a monopoly on the practice of using screws to attach two plates highly costly to society. Overall, it makes sense that a fundamental scientific practice is not patent eligible.

C. Patent law should treat mechanical building tools and software building tools similarly: neither element should be prima facie evidence for patent ineligibility.

Just like a screw is a tool used to implement mechanical devices that perform useful functions, software elements are also tools used to implement applications that perform useful functions.¹⁸⁸ In other words, just like a patent examiner would not categorize a claim describing two pieces of metal that are fastened by a screw as a claim directed to an abstract idea or a fundamental scientific practice only because the screws are mentioned in the claim language, a patent examiner should not categorize a claim describing software elements as a claim directed to an abstract idea simply because the claim language mentions software elements. Instead, for purposes of patentable-subject-matter analysis, a patent examiner should approach each of these two hypothetical claims by considering the claim language as a whole rather than in a piecemeal fashion. The Court has

¹⁸⁷ See, e.g., U.S. Patent No. 3,094,238 col. 3 l. 13 (filed June 18, 1963) (claiming a door comprising two plates connected via a screw-threaded member that projects from one plate to the other plate, where the screw-threaded member is disclosed in the specification as a screw-threaded bolt—*i.e.* a "screw").

¹⁸⁸ See supra text accompanying note 12.

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consistently reiterated this holistic principle in its precedent and should not depart from this principle in an ad-hoc basis.¹⁸⁹

However, the *Alice* decision seems inconsistent with the long-held holistic approach to claim language. As evinced by the June 2014 USPTO guidance, the *Alice* two-pronged test suggests that a claim is directed to an abstract idea simply because one or more of the elements in the claim language recite abstract ideas (such as software elements or mathematical formulas).¹⁹⁰ The USPTO guidance states that "[c]laims that include abstract ideas [...] should be examined under Part 2 [of the *Alice* two-pronged test] to determine whether the abstract idea has been applied in an eligible manner."¹⁹¹ To reinforce the idea, USPTO memorandum states that "if an abstract idea is present in the claim, proceed to Part 2 If not, proceed with examination of the claim for compliance with the other statutory requirements of patentability."¹⁹² Thus, *Alice* has resulted in a piecemeal approach to claims that recite software elements.

Drawing from the mechanical device example provided above, the Court likely would not characterize a claim reciting the use of a screw as a claim directed to an abstract idea or a scientific principle. Instead, the Court likely would approach the claim as a whole. The Court likely neither would bar the patentability of the claim simply because it includes the screw nor would it subject the claim to a higher scrutiny because of the screw element. Instead, the Court would engage in an analysis of § 103 and other statutory requirements to find whether the claim is worthy of a patent.¹⁹³

As this discussion illustrates, the Court, in essence, subjects claims reciting software elements to a higher scrutiny (i.e. *Alice* step two) than other claims simply because the claims recite those software elements.

One could argue, unpersuasively, that the difference in treatment is proper because a screw is a tangible thing, which is distinguishable from software elements (say, a software loop, or a reiterative method) because software elements are not tangible things. However, the argument fails because the fact remains that the use of screws to attach two plates is a fundamental scientific practice, which, consistent with the Court's opinions, falls within its definition of abstract

¹⁸⁹ See, e.g., Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 573 U.S. ____, 7 (2014); Diamond v. Diehr, 450 U.S. 175, 192 (1981); Parker v. Flook, 437 U.S. 584, 594 (1978).

¹⁹⁰ Memorandum from Andrew H. Hirshfield, Deputy Comm'r for Patent Examination Policy, to Patent Examining Corps, U.S. Patent and Trademark Office (June 25, 2014), http://www.uspto.gov/sites/default/files/ patents/announce/alice_pec_25jun2014.pdf [https://perma.cc/6R2L-JRYF].

¹⁹¹ Id.

¹⁹² Id.

¹⁹³ See, e.g., Diamond v. Diehr, 450 U.S. 175, 191 (1981).

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Note that this discussion does not suggest that a software element claimed by itself should be patent eligible. To continue the analogy between the hypothetical claims reciting screws and software elements, a claim reciting a screw and nothing more should not be patent eligible. Similarly, software elements by themselves should not be patent eligible either. Software loops, if-then statements and data storage units (all software elements) are indeed fundamental elements in software development that are ubiquitous in software applications just like screws are ubiquitous in mechanical applications. They are nothing more than tools used to implement innovative solutions to problems. This the crux of one of the arguments in this article: that the software elements, when combined to implement a solution, may give rise to something innovative that has not been done before, just like different mechanical elements—such as screws, plates, and bolts—can be combined to implement a new and useful device.

Further, this article does not suggest that claim language that implements a combination of software elements is necessarily patentable. In the software arts, just like in the mechanical arts, a claim with an unduly large scope should be unpatentable.¹⁹⁵

The proponents of the *Alice* two-step test may see the second prong in *Alice* as taking care of the requirement to view the claim language *as a whole* since the second prong in Alice tries to determine whether the claim language adds other significant factors to make the claim patent eligible.¹⁹⁶ For example, in *Diehr*, the Court decided that even when the claim language recites software elements, if the claim as a whole is directed to a process that traditionally is thought of as belonging to a patent-eligible class, then the claim may be patent eligible.¹⁹⁷

Nonetheless, the § 101 analysis makes it harder for claims reciting software elements to pass the subject-matter eligibility test than it is for claims reciting other building tools like screws to pass the subject-matter eligibility test. The *Alice* opinion effectively turned the presence of software elements within a claim into *prima facie* evidence of subject-matter ineligibility, subject to the second prong of *Alice*.¹⁹⁸ On the other hand, other fundamental scientific practices or truths—such as attaching plates via screws or boiling water with heat—are not

¹⁹⁴ See Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 573 U.S. ____, 7-10 (2014) (stating that fundamental economic principle was deemed to be an abstract idea; by extension, a fundamental scientific principle likely is also included in the Court's definition of abstract idea); Le Roy v. Tatham, 55 U.S. 156, 175 (1852).

¹⁹⁵ See, e.g., Consol. Elec. Light Co. v. McKeesport Light Co., 159 U.S. 465 (1895) (invalidating some claims of the patent for being overly broad because they preempted patent applications not enabled in the written description of the patent).

¹⁹⁶ See Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 573 U.S. ____, 7 (2014).

¹⁹⁷ Diehr, 450 U.S. at 192.

¹⁹⁸ See Alice, 573 U.S. at 13.

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treated a *prima facie* evidence of subject-matter ineligibility. The result is that more claims that recite software elements are suspect of being ineligible for patent protection than claims that recite other building blocks.

Other arguments in favor of the *Alice* treatment of software elements rest on the importance of software in the U.S. economy.¹⁹⁹ Since, the software industry is very important and has the potential for lucrative returns, the additional incentives of the patent system are unnecessary to spur innovation software. Another argument is that because of the large size of the software industry, having too many patents may result in a disincentive to innovate—as the number of patents in an industry increases, the chances of developing technology that is already patented by a third party increases, which could turn potential investors and innovators away from the industry. Finally, it may make sense to subject software patents to a higher scrutiny to ensure that the issued patents are quality patents.

Even though the arguments provided in favor of *Alice* may be compelling, a carve-out within patent law that subjects software claims to a higher scrutiny under § 101 than the scrutiny given to mechanical device claims reciting screws seems like an unfair, irregular, and cumbersome carve-out. The carve-out is especially troublesome because both, software elements and the use of screws to attach mechanical elements both fall within the realm of abstract idea as defined by the Court. Finally, the Court should be careful when creating ad-hoc carve outs in patent doctrine; it seems contrary to the principles of the American legal system to first give a property right to a party and then take away that right because the popularity of the property increased. *Alice* has essentially resulted in exactly such a taking; since *Alice*, thousands of patentees have lost their rights due to the two-pronged test.²⁰⁰

Justice Stevens's dissent in *Diehr* may provide the basis for a sensible solution to the problems created by *Alice* and § 101. Justice Stevens suggested that "proper [101] analysis . . . must start with an understanding of what the inventor claims to have discovered."²⁰¹ Such an analysis would foster a more holistic approach of the claims since no one knows the invention better than the inventor himself and he may be the best source for ascertaining what the actual innovative concept his patent application embraces. Further, the inventor, when describing his inventive concept, likely will not simply focus on the building tools when describing his inventive concept would steer the courts and patent examiners away from the piecemeal approach that the *Alice* decision and other precedent have suggested.²⁰² Thus, the first prong in the subject-matter eligibility inquiry

¹⁹⁹ See discussion supra Section II.

²⁰⁰ See Robert Sachs, A Survey of Patent Invalidations Since Alice, LAW360 (Jan. 13, 2015, 10:25AM), http://www.law360.com/articles/604235/a-survey-of-patent-invalidations-since-alice [https://perma.cc/8TCW-VPEH].

²⁰¹ Diehr, 450 U.S. at 212 (Stevens, J., dissenting).

²⁰² See Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 573 U.S. ____, 4 (2014).

should consist of considering whether what the inventor claims to have discovered falls within one of the patent-ineligible concepts (such as a law of nature, a natural phenomenon or an abstract idea). Alternatively, if conducting an inquiry with the inventor proves impractical or impossible, a person with ordinary skill in the art ay ascertain the inventive concept of a patent application determine whether such inventive concept is directed to patent ineligible subject matter. Scrutinizing the inventive concept, rather than the piecemeal approach to the claim language that *Alice* suggested, would be consistent with a holistic approach to patent claims.

D. Cost-benefit analysis of treating the software building blocks (or units) as building tools

Treating software building blocks, like if-then statements and data storage units, as building tools, like screws, may create the concern of implementing a costly benefit to society without a counterbalancing cost. Performing a cost-benefit analysis to such a policy reveals otherwise. The dynamic benefits are easy to see; allowing the patentability of claims containing language directed to software building blocks likely would result in increased investment in the software technologies. Due to the non-obviousness and novelty requirements, not all software technologies would be patentable; in fact, only those software technologies that have not been described before and that are not obvious over the prior art would be patentable. However, novelty and non-obviousness are different and both inquiries do not belong under § 101; instead the non-obviousness inquiry should fall under § 103 analysis and the novelty requirement should fall under § 101 analysis. It makes sense to follow the policy outlined above,²⁰³ to incentivize investment in software technology; *Alice* has resulted in the opposite result by creating extra obstacles to patenting software.

The static costs of implementing the policy suggested in this article should be similar to the static costs currently caused by patent-eligible processes. The policy suggested in this article requires that software elements act in combination in a particular fashion to solve a particular problem, as opposed to claims reciting generalized principles. Because of the limited scope, patenting a particular software application has about the same static costs as patenting a particular process or method. The owner of a patent claiming a particular software implementation targeted to solving a specific problem would not be entitled to control alternative, yet similar, software applications.²⁰⁴

Thus, just like a cost-benefit analysis favors patents for particular processes and methods, a cost-benefit analysis should also favor particular software applications patents as long as software elements within the patent claims are treated

²⁰³ See discussion supra Section V.C.

²⁰⁴ For further discussion on the static costs of patentable processes and methods, see CASS & HYLTON, *supra* note 10, at 58.

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as building blocks.

VI. ALICE CONFLATES § 101 (NOVELTY) AND § 103 (OBVIOUSNESS)

Aside from the potentially harmful economic effects created by *Alice's* twostep approach, the analysis of the Court in *Alice* is sloppy as it conflates § 101 and § 103. When the Court applied *Mayo* step two in *Alice*, it found that the claims at issue did not sufficiently transform the claimed abstract idea into a patent-eligible application.²⁰⁵ In its analysis, the Court relied on *Flook* and *Mayo*.

The Court cited *Flook* to reject the idea that a § 101 inquiry could be satisfied by simply drafting a computer-implemented process claim even though a computer is a tangible medium that qualifies as a "machine" under the statutory language of § 101.²⁰⁶ The Court stated that a contrary finding "would make the determination of patent eligibility 'depend simply on draftsman's art."²⁰⁷

This article already explored *Flook* extensively.²⁰⁸ This note has pointed out the flaws in the Court's finding that a patent application for a process implementing a principle in some specific fashion does not automatically fall within the patentable subject matter of § 101. The Court in *Flook* relied on its concern, now reiterated in *Alice*, that a competent draftsman could attach some form of post-solution activity to almost any abstract idea.²⁰⁹ The flaw in the Court's reasoning, in short, is that the Court's is more afraid than it should be of the "draftsman's art." A patent application must clear both hurdles imposed by § 101 analysis and a § 103 analysis before a patent is issued, and the § 103 inquiry would prevent the result that the Court fears.

Similarly, in *Alice*, the Court found that a computer-implemented claim does not end the § 101 inquiry, even though a computer is patent eligible subject matter per the explicit terms of the statutory language of § 101.²¹⁰ The Court grounded its finding on *Flook*'s articulation that a different result would cause patent eligibility to depend on draftsman's art. However, the arguments piercing the findings in *Flook* apply with equal force to the finding in *Alice*—§ 103 inquiry would prevent the result that the Court fears. If the process recited in a computer-implemented claim had been obvious to try on a computer, then the patent application would not issue under a § 103 analysis. If, on the other hand, the process recited in a computer-implemented claim had not been obvious to try on a computer, then it seems that the patent system should incentivize such innovative and particular implementations by granting them patent protection. It

²⁰⁵ Alice Corp. Pty., Ltd., 573 U.S. at 14.

²⁰⁶ *Id.* at 13-14.

²⁰⁷ *Id.* at 14.

²⁰⁸ See discussion supra Section III. B.

²⁰⁹ Alice, 573 U.S. at 14.

²¹⁰ *Id.* at 13-14.

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doesn't make sense to carve out an exception to the statutory language of § 101 simply because the Court fears a result that § 103 was designed to prevent.

The Court applying *Mayo's* two-prong test rejected the patentability of the claims under a § 101 analysis : "[t]aking the claim elements separately, the function performed by the computer at each step of the process is '[p]urely conventional."²¹¹ Further, the Court held that all of the claimed "computer functions are 'well-understood, routine, conventional activit[ies]' previously known in the industry."²¹²

By this point, the Court's conflation of § 103 analysis and § 101 analysis should be clear. In *Alice*, like in *Flook*, the Court determined patentability under § 101 by finding that elements in the claims "purely conventional" and well known in the art. Yet again, the Court's inquiry into these questions under a § 101 analysis is troublesome because the Court does not rely on the precedent and rigors required by a § 103 analysis. The § 103 inquiries regarding obviousness in light of prior art and the ordinary skill in the art have been extensively developed in cases grappling with § 103 issues.²¹³ Instead, the *Alice* Court applied a haphazard § 101 obviousness analysis that, with broad strokes and without delving into the *Graham* factors, gave a conclusory statement asserting that the claim elements at issue were well known in the art.²¹⁴

The Court stated in *Graham v. John Deere Co.* that a factual inquiry of obviousness under § 103 involves: (A) determining the "scope and content of the prior art"; (B) ascertaining the differences between the claimed invention and the prior art; and (C) resolving the level of ordinary skill in the pertinent art.²¹⁵ When, in *Alice*, the Court determined patentability under § 101 by finding that the elements in the claims were well known in the prior art, the Court necessarily stepped out of a § 101 analysis and into a § 103 inquiry of the *Graham* factors.²¹⁶ In other words, to find that the elements in the claim were well known in the art, the Court was supposed to (A) determine the "scope and content of the prior art" that applied to the claims in *Alice*, (B) ascertain the differences between claims in *Alice* and the prior art, and (C) resolve whether an ordinarily skilled artisan would have been able to produce from the prior art the same combination of elements that were claimed in *Alice*. The inquiry under each of these steps has

²¹¹ Id. at 15 (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. __, 10 (2012)).

 ²¹² Id. (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. __, 4 (2012)).
²¹³ See supra Section III.B.

²¹⁴ *Alice*, 573 U.S. at 15 (finding that "taking the claim elements separately, the function performed by the computer at each step of the process is '[p]urely conventional,'" and that the computer functions were "well-understood, routine, conventional activit[ies]' previously known to the industry.").

²¹⁵ Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966); MPEP § 2141(ii) (9th ed. Rev. Nov. 2015).

²¹⁶ Alice, 573 U.S. at 11.

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been further developed under the case law grappling with § 103.²¹⁷

By applying a haphazard § 101 analysis to determine what is well known in the art, the Court effectuated in *Alice* a drawback for patent doctrine. The inquiry under § 101 regarding what is well known in the art is comparatively crude and unsophisticated in relation to a § 103 analysis.²¹⁸ In fact, the analysis not only ignores the robust doctrine developed under § 103, but in failing to consider the *Graham* factors, the Court in *Alice* did what it has frowned upon others for doing: basing decisions on knowledge that lacks substantial evidentiary support.²¹⁹ The Court in *Alice* essentially took judicial notice of the state of the art relevant to the claims at issue and did not set forth evidence to support its conclusions regarding the state of the art.²²⁰ As the Federal Circuit stated in *In Re Zurko*, core

²¹⁸ Compare Alice, 573 U.S. at 14-16 (finding, conclusorily, that the claim elements at issue were well known in the industry even though the Court provided no treatment of the prior art or other evidence showing what was conventional or known in the relevant art) *with* Sakraida v. Ag Pro, Inc., 425 U.S. 273 (1976) (applying the *Graham* factors and discussing the sources it used to determine what was known in the art—prior patents, publications, affidavits of experts, and testimony of a person having first-hand exposure to the technology at issue) *and* In re Zurko, 258 F.3d 1379, 1385 (Fed. Cir. 2001) (citing Baltimore & Ohio R.R. Co. v. Aderdeen & Rockfish R.R. Co., 393 U.S. 87, 91–92, (1968)) (finding that a PTO's conclusion of obviousness lacked substantial evidentiary support because "the Board cannot simply reach conclusions based on its own understanding or experience—or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings.").

²¹⁹ Baltimore & Ohio R. R. Co. v. Aderdeen & Rockfish R. R. Co. 393 U.S. 87 (1968) (rejecting a determination of the Interstate Commerce Commission with no support in the record, noting that if the Court were to conclude otherwise, "[t]he requirement for administrative decisions based on substantial evidence and reasoned findings—which alone make effective judicial review possible—would become lost in the haze of so-called expertise.").

²²⁰ Alice, 573 U.S. at 14-16 (finding, conclusorily, that the claim elements at issue were well known in the industry even though the Court provided no treatment of the prior art or other evidence showing what was conventional or known in the art).

²¹⁷ See, e.g., MPEP § 2141 (9th ed. Rev. Nov. 2015) (stating that the framework for the objective analysis for determining obviousness under 35 U.S.C. § 103 is the Graham inquiry and supporting the further discussion of each of the Graham factors with caselaw that grapples with 35 U.S.C. § 103); Sakraida v. Ag Pro, Inc., 425 U.S. 273, 280 (1976) (finding, under § 103, that the scope of the prior art for the Gribble patent was sufficiently shown by prior patents, prior art publications, affidavits of people having knowledge of prior flush systems analogous to respondent's, and the testimony of a dairy operator with 22 years of experience who described flush systems he had seen on visits to dairy farms throughout the country); In re Bigio, 381 F.3d 1320, 1325 (Fed. Cir. 2004) (discussing, in an opinion affirming the rejection of a patent under § 103, the test that defines the scope of analogous art—references gualifying as prior art against a patent application); In re GPAC Inc., 57 F.3d 1573, 1579 (Fed. Cir. 1995) (discussing, in an opinion affirming the rejection of a patent under § 103, that courts may consider the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field" to determine the level of ordinary skill in the art).

findings of basic knowledge or common sense in a determination of patentability must point to concrete evidence in the record.²²¹

VII. CONCLUSION

The law regarding the subject-matter eligibility of patent claims containing software elements is still developing. The Court missed an opportunity to clarify the law in the *Alice* opinion. Instead, the Court provided a rough idea regarding what is and what is not patentable but left undefined many critical terms such as what constitutes an (1) "abstract idea"²²² and (2) inventive concept that sufficiently "transforms" a claim directed to an abstract idea.²²³ However, such vagueness may have been intentional. The Court may still be unsure regarding what comprises a patentable claim within the software and business method technologies, the Court is thus well served by rules that are subject to further definition. Rules that are malleable, such as the two-pronged test provided in *Alice*, give the Court the ability to adapt the law on a case-by-case basis.

The Court's approach makes sense since software is ubiquitous in our society and substantially contributes to our economy.²²⁴ Providing a bright-line rule regarding what is patentable and what is not patentable within the software industry may cause more harm than good to the economy. The harm caused by the rigidness of bright-line rules could be compounded by the constant change the software industry is experiencing. It was not too long ago that social media exploded and that smartphone applications became a sensation. Setting bright-line rules in such a dynamic industry may have negative unintended consequences; rigid rules would eliminate any wiggle room for adapting the law to unforeseen scenarios.

On the other hand, the patent system needs clarity to operate efficiently. The policies described here not only take the position that the recitation of software elements should not be used as an excuse to more harshly scrutinize patent claims like *Alice* did. Such practices simply make it harder to patent software with no true justification besides the "abstractness" of the building blocks of software. This note argued that even the more tangible technologies have "abstract" building blocks and, yet, we do not subject claims reciting those "abstract" building blocks to a harsher scrutiny. Such consequences may not be desirable given the importance of software technology in our society. In place of the *Alice* two-prong test, this note suggested that the analysis should begin with a consideration of what an inventor considers as his inventive concept. Only if

²²¹ In re Zurko, 258 F.3d 1379, 1385-6 (Fed. Cir. 2001) (citing Baltimore & Ohio R.R. Co. v. Aderdeen & Rockfish R.R. Co., 393 U.S. 87, 91–92, (1968)).

²²² Alice, 573 U.S. at 10.

²²³ *Id.* at 6-7.

²²⁴ See discussion supra Section II.

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that inventive concept, and not its building blocks, is directed to ineligible subject matter, should a § 101 analysis bar the patentability of the claims. This type of analysis would be more uniform and would still attain a positive cost-benefit balance.

Finally, this note argued that the Court has conflated the § 101 and § 103 analyses. In the interest of keeping patent doctrine clean and free of inefficiencies when applying the statutes to new facts, the Court should separate the § 101 and § 103 inquiries lest it establish an unpredictable patent system.