No. 13-298

In The
Supreme Court of the United States

ALICE CORPORATION PTY. LTD.,

Petitioner,

v.

CLS BANK INTERNATIONAL, et al.,

Respondents.

On Writ Of Certiorari To The United States Court Of Appeals For The Federal Circuit

BRIEF OF AMICI CURIAE PROFESSOR ROBIN FELDMAN AND THE U.C. HASTINGS INSTITUTE FOR INNOVATION LAW ON BEHALF OF NEITHER PARTY

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INTEREST OF THE *AMICI CURIAE*[1]

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[1] Counsel for all parties has consented to the filing of this brief, as indicated by consents lodged with the Clerk of this Court. No counsel for any party had any role in authoring this brief, and no person other than the named *amici* and their counsel has made any monetary contribution to the preparation of this brief. *See* Rule 37.6.

was cited in the 2013 White House Report on Patent Assertion.[2]

Amici curiae Professor Feldman and the Institute for Innovation Law at the University of California, Hastings College of the Law have a strong interest in the development of a coherent test for patentable subject matter under 35 U.S.C. § 101. *Amici* submit this brief to offer for the Court's consideration a framework under 35 U.S.C. § 101 for analyzing the software patentability issues raised in this case, which can also be applied rationally across innovation, including in other emerging areas such as biology and business methods.

SUMMARY OF ARGUMENT

Computers, unfortunately, do not speak English. Thus, software uses languages that are a translation of English, and other human languages, into a numerical code computers can understand. Like words in any language, software can express the sublime or the mundane. And, like words in any language, software can be a translation of a law of nature or a translation of an innovative idea.

Software's subject matter patentability is determined not by the words or characters used, but by

[2] Exec. Office of the President, *Patent Assertion and U.S. Innovation* (June 2013).

the content of what is being expressed and the preemptive effect that might result from patenting that type of content. Despite the Court's precedents to that effect, the lower courts have been unable to reach a consensus on this point, much less a workable doctrine.

This Court's first forays into computer-related inventions concerned computer code that was normally integrated into hardware inventions. *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Parker v. Flook*, 437 U.S. 584, 594 (1978); *Diamond v. Diehr*, 450 U.S. 175, 192-93 (1981). Later, when technological advancements raised the question of whether pure software inventions could be patentable, the Federal Circuit, quite simply, got it wrong. The Circuit misinterpreted this Court's early cases to suggest that a proper software patent is an abstract document, one that covers vast swaths of territory. *In re Alappat*, 33 F.3d 1526, 1542-43 (Fed. Cir. 1994). This misinterpretation has spawned two decades of software patents that constitute no more than abstract ideas and threaten to preempt laws of nature. In fact, the type of patents that are commonly accepted for software today would be summarily rejected if they were offered for other types of inventions.

With the Court's decision to address the patentability of software in this case, *amici* hope that correcting the Circuit's misinterpretation will be the first order of business, refocusing the analysis on whether the subject matter of a particular patent threatens preemption. Indeed, such clarification will greatly

assist the lower courts, the Patent and Trademark Office, and patent applicants themselves in understanding that software patents are no different than other types of patents, and should be tested in the same rigorous manner required throughout the patent system.

Importantly, in clarifying the test for software patentability, there is a unique opportunity to create logical coherence throughout patentable subject matter doctrines – regardless of whether those doctrines relate to product patents or process patents, business methods or biotechnology. The key to creating coherence throughout patentable subject matter lies, as the Court's early cases make clear, in ensuring that an invention has *specific commercial application*. This distinction provides the foundation for the Court's decisions to find patentable subject matter in certain cases, while declining to find patentability in others.[3] Indeed, as set forth more fully below, specific commercial application is the unifying concept in the Court's prior decisions, and applies logically to all

[3] *Compare Benson*, 409 U.S. at 69, 72 (rejecting patentability because algorithm to convert binary coded decimal numerals into pure binary code is not a "process" under § 101) and *Flook*, 437 U.S. at 594 (rejecting patentability of a procedure to monitor multiple conditions during the catalytic conversion process because the claim was "directed essentially to a method of calculating, using a mathematical formula, ...") (quotation omitted) *with Diamond*, 450 U.S. at 192-93 (upholding patent on process for curing synthetic rubber because it did not attempt to "[p]atent a mathematical formula, but rather . . . an industrial process").

software cases, including the one at bar, and to all areas of subject matter patentability.

Testing for specific commercial application ensures that a patent covers an application of a law of nature – rather than the law itself – and that the patent meets the constitutionally mandated standard of promoting the progress of the "useful arts." *Mayo Collaborative Services, et al. v. Prometheus Laboratories, Inc.,* 132 S. Ct. 1289, 1294 (2012) ("As the Court has also made clear, to transform an unpatentable law of nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words 'apply it.'") (emphasis in original).

Predicated on the Court's teachings, set forth herein is a proposed framework for determining patentable subject matter under 35 U.S.C. § 101, one that can be used in connection with the software-related issues presented in this case and across innovation generally, focusing on both preemption and the tests for patentability as a whole.

ARGUMENT

I. COMPUTERS DO NOT SPEAK ENGLISH; SOFTWARE IS A LANGUAGE TRANSLATION THE PATENTABILITY OF WHICH SHOULD DEPEND ON THE SUBSTANCE OF WHAT IS TRANSLATED: AN APPLIED INVENTION OR A LAW OF NATURE

The current crisis in patentable subject matter (highlighted by the conflicting opinions and fractured panel below) can be traced to the emergence of computer technology in the American industrial landscape. Computer programs brushed up against a number of prohibitions in subject matter patentability. At first blush, a computer program looks a great deal like a formula, or pure math, categories this court has long excluded from patentability. *Prometheus,* 132 S. Ct. at 1293. If mathematical formulas are unpatentable, how can a computer program be patentable?

Part of the difficulty can be traced to confusion between the content of something that is being expressed and the language in which it is expressed. We know, for example, that laws of nature are not patentable. Some of these laws are familiar to us in the formulaic language in which we normally see them expressed. Most people would recognize one of Einstein's laws of physics expressed as $E=mc^2$. One could express that same law in prose, however, rather than formulaic language, by explaining the way in which matter and energy are interchangeable. The choice of language is irrelevant. We disallow

patenting of $E=mc^2$ not because it is expressed in mathematical form but because it represents one of the building blocks of scientific exploration and endeavor. *Id.* Patenting that law would preempt scientific exploration by occupying a basic concept. In addition to laws of physics, other things can be expressed in formulaic language. Expressing something in formulaic language does not, however, mean that what is being expressed is a law of nature. Thus, the fact that computer programs are expressed in formulaic language which looks somewhat like math does not mean the concepts underlying a particular program are analogous to a law of nature.[4]

This confusion is likely the cause of the lower court's analytical errors, which run contrary to the Court's precedent that focuses on the importance of preemption and the necessity of cabining inventions within "definite bounds." *Benson,* 409 U.S. at 69. The Court's early case law on computer-related inventions arose in a series of three cases concerning a generation of inventions that were typically hard-wired into the machines themselves. In the 1972 case of *Gottschalk v. Benson*, the Court denied patentability to a process for programming a computer to convert

[4] Some would argue that all math is invented, and that it is a human-made method of imposing order and structure on the natural world. For an interesting and accessible discussion of Wittgenstein's view that all mathematics is a human invention and various responses to that argument, *see* Ludwig Wittgenstein, *Wittgenstein's Philosophy of Mathematics* § 3.1, http://plato.stanford.edu/entries/wittgenstein-mathematics.

numbers from the binary-coded decimal system into pure binary form. *Id.* at 72. Similarly, in the 1978 case of *Parker v. Flook,* 437 U.S. 584 (1978), the Court denied patentability to a process that involved programming an alarm to signal when a catalytic conversion process reached a danger point. Finally, in the 1981 case of *Diamond v. Diehr,* 450 U.S. 175 (1981), the Court upheld patentability of an invention related to "a process for curing rubber which includes in several of its steps the use of a mathematical formula and a programmed digital computer." *Id.* at 177.[5]

Throughout these cases, the Court emphasized three points, as it recently reiterated. First, patent eligibility must *not* depend on clever draftsmanship. *Prometheus*, 132 S. Ct. at 1294 (precedents "warn us against interpreting patent statutes in ways that make patent eligibility 'depend simply on the draftsman's art' without reference to the 'principles underlying the prohibition against patents for [natural laws].'"), quoting *Flook,* 437 U.S. at 593. Second, care must be taken to ensure patents do not preempt laws of nature or entire areas of natural phenomena. *Id.* (precedents "warn us against upholding patents that claim processes that too broadly preempt the use of a natural law"), citing *O'Reilly v. Morse*, 56 U.S. (15 How.) 62 (1853); *Benson*, 409 U.S. at 71-72. Third, patents drawn without any limitations, such as those

[5] For a description of the inventions at issue in these cases and a more detailed discussion of the Court's holdings, *see* Robin Feldman, *Rethinking Patent Law* (Harvard 2012) at 105-07.

related to a particular art, technology, or end, are problematic. *Id.*, citing *Flook*, 437 U.S. at 5894, *Bilski v. Kappos*, 130 S. Ct. 3218, 3220 (2010), and *Diehr*, 450 U.S. at 191-92; *see also Benson*, 409 U.S. at 64 (rejecting patentability where "the claims were not limited to any particular art or technology, to any particular apparatus or machinery, or any particular end use.").

In the period following *Benson*, *Flook*, and *Diehr*, computer technology advanced rapidly. Among other changes, a new generation of computer-related inventions came about that were not hard-wired into machines but, rather, were embodied as pure software. Concerned about avoiding the appearance of a mathematical formula, patent drafters began to file patents that merely described the process of what was happening in simple English prose. These patents focused on the *result* of the invention, rather than the steps taken to get there, an approach unheard of for other types of inventions. Nevertheless, connecting the invention to an industrial endeavor focused attention on the industrial art involved in the invention as a whole and not the appearance of math or abstractions. The advantages were obvious: Given that broad, abstract language had the potential to cover many different ways of accomplishing the same result, inventors were allowed to tie up large areas of innovation. The Federal Circuit, when called upon to adjudicate the propriety of this approach, unfortunately acquiesced.

A. IN DECIDING WHETHER SOFTWARE IS PATENTABLE UNDER SECTION 101, THE FEDERAL CIRCUIT MISINTERPRETED THIS COURT'S PRECEDENTS IN HARDWARE CASES TO ALLOW ABSTRACT PATENTS COVERING VAST SWATHS OF TERRITORY – AN APPROACH UNHEARD OF FOR OTHER TYPES OF INVENTIONS

In the 1994 case of *In re Alappat,* 33 F.3d 1545 (Fed. Cir. 1994), the Federal Circuit faced the question of whether pure software inventions are patentable. *Alappat* concerned a software program for making lines on a computer appear smooth to the human eye. *Id.* at 1557-58. The Federal Circuit focused simply on the question of whether the invention could be tied to a specific type of machine, similar to the rubber-curing machine in *Diehr.* In so doing, however, the Circuit lost sight of *Diehr*'s animating logic. The Circuit misinterpreted the Court's instructions about focusing on inventions applied to particular industrial processes and avoiding mathematical formulas. These admonitions were read to suggest that a proper computer-related patent is one expressed in just the type of broad prose terms described above – ones that need only describe the result of the invention and explain how the invention relates to an industrial process or a specific kind of machine. In fact, however, the question is not (and was never) whether a machine is in the picture. Rather, under the logic of *Diehr*, the question is

whether the invention threatens to preempt laws of nature, as opposed to constituting the application of those laws in a specific manner to a specific industrial art.

Focusing on the presence or absence of a specific machine led the Federal Circuit to engage in remarkably strained logic. The *Alappat* court upheld the invention on the grounds that it related to a specific machine because the software allowed the computer to, in effect, become a machine with the specific purpose of being a machine that produced smooth lines on the display. 33 F.3d at 1544. This may sound circular and confused, and it is. Under *Alappat's* logic, *any* invention related to a computer automatically makes the computer a specific machine. *See, e.g., Rethinking Patent Law* at 119-20. Worse yet, the Circuit's decision implicitly endorsed the approach of patenting software by focusing on broad, vague notions of the result.

In the two decades that have followed, the consequence has been ever-broader result-oriented software patents granting huge swaths of territory to inventors with the potential to reach well beyond what the inventor actually accomplished up to that point. Consider, for example, a recent patent on a user interface. U.S. Patent No. 7,620,565 (filed Nov. 17, 2009). The patent claims a monitor, a memory, and a transmitter and a processor configured to: Monitor a product for a predefined "trigger event," increment a counter, cause the display of a user interface, and, if the counter exceeds a threshold,

cause the memory to store an input received from the interface and cause the transmitter to transmit the input to a server. *Id.* at Sheet 23. The language in this patent is incredibly broad. It does not indicate how the patent holder actually accomplished all those steps, nor would it be limited to the path the patent holder has taken. Far from extreme, however, this language is standard in software patenting. Its broad, nonspecific wording can provide extraordinary reach without much of a knowledge contribution. That problem is precisely what this Court warned against in the *Prometheus* case on patentable subject matter when it expressed concern about "conventional steps specified at a high level of generality." 132 S. Ct. at 1289. With software patents, the entire explanation of the patent may be little more than just that: Generality at the highest level.

Allowing simple prose to describe what a computer is accomplishing, rather than requiring identification with specificity of the programming innovations which create that result, contravenes one of this Court's first principles and is, plainly, nonsensical. *Prometheus*, 132 S. Ct. at 1294 (patent eligibility must not "depend simply on the draftsman's art"). This approach would never be permitted in areas outside software and its cousin business method patents. It is the legacy of our societal aversion to math and the Federal Circuit's misinterpretation of this Court's precedents.

B. REFOCUSING SECTION 101'S ANALYSIS ON PREEMPTION IS CRUCIAL IN LIGHT OF MODERN STRATEGIC BEHAVIOR IN PATENTING

In the modern world of patent monetization and patent wars, the notion of preemption takes on particular importance. Entire industries have exploded onto the scene in which entities buy up patents to assert them against any product that might conceivably have a relation to the patent – no matter how tangential. This practice has opened a Pandora's box of strategic behavior, in which companies spend an increasing amount of their time and resources defending, asserting, and strategizing about patents.[6]

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[6] *See, e.g.,* Robin Feldman, et al., *The America Invents Act 500 Expanded: Effects of Patent Monetization Entities* (forthcoming UCLA J. L. & Tech. 2014) (cited in the White House report on patent assertion) (reporting the result of an empirical study of all patent litigation over 4 years examining 13,000 patent lawsuits involving 30,000 patent assertions; the study documents the rise in monetization lawsuits and demonstrates, in particular, that as of 2012, a majority of patent lawsuits are now filed by monetizers), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2247195; Robin Feldman, *Patent Demands & Startup Companies: The View from the Venture Capital Community*, U.C. Hastings Research Paper No. 75 (Oct. 28, 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2346338 (cited in House and Senate hearings on patent assertion in fall 2013 and concluding, among other things, that the majority of venture capitalists do not consider the potential for selling patents to NPEs when they decide whether to invest in a company, and that venture capitalists and startups do not see this activity in general as positive for the startup community); *see also* Colleen V. Chien, White Paper for Open Technology

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In an intense bargaining environment, courts must set rules that limit the possible roaming space for a patent holder. With certain types of patents, so few things are likely to survive close scrutiny, and the bargaining power that can be wielded with them is so great, that it may be better to forbid patenting them altogether. This is particularly true in light of the fact that much of the patent bargaining takes place privately, beyond the reach of the courts. Figures from the White House report on Patent Assertion suggest that the vast majority of patent demands never proceed to a lawsuit.[7] The potential for overreaching with certain types of patents suggests that those areas should remain outside the patent system. One can think of this as roughly analogous to *per se* rules in antitrust law. Given that so few examples are likely to be legitimate and the potential damage is likely to be so great, we choose to eliminate the category entirely.

The need for limitations may be particularly acute in the realm of process patents, of which software patents are a key segment. Patents are generally divided into two types: product and process patents.

Institute, *Patent Assertion and Startup Innovation*, New America Foundation (2013) at 20, *available at* http://ssrn.com/abstract=2321340 and Colleen Chien, *Startups and Patent Trolls* (forthcoming Stanford Tech. L. Rev.), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2146251; James E. Bessen & Michael J. Meurer, *The Direct Costs from NPE Disputes*, 99 Cornell L.Rev. (forthcoming 2014).

[7] Exec. Office of the President, *Patent Assertion and U.S. Innovation* (June 2013) at 6.

In very general terms, product patents are granted on a particular device or machine, while process patents are granted on a method of doing something. When patent language identifies the boundaries of an invention that constitutes a device or a substance, that language is an abstraction of something concrete. When patent language identifies the boundaries of an invention that constitutes a way of doing something, that language may be an abstraction of an abstraction. The need for warning signals is particularly great when the discussion is quite far removed from anything we can contemplate in concrete terms. To cabin the bargaining, it is important to choose default rules to push back the possible roaming space and prevent patent holders from preempting areas that should be available to all.

II. THIS CASE PRESENTS A UNIQUE OPPORTUNITY TO CREATE COHESION ON THE ISSUE OF SUBJECT MATTER PATENTABILITY ACROSS ALL FIELDS OF INNOVATION

In a series of patent cases over the last few years – first business method patents, then medical diagnostics, then gene patents, now software patents – the Court has been considering the categories of invention that properly fall within the subject matter of a patent. *Bilski v. Kappos*, 130 S. Ct. 3218 (2010); *Prometheus*, 132 S. Ct. 1289 (2012); *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (June 13, 2013). As this series suggests,

these are related categories that have become intertwined in illogical ways. The morass across recent years in patentable subject matter lies at the tangled intersection of computer technology, life sciences, financial services, and the Internet. In the decades since *Alappat*, the lower courts have struggled to develop a test that will allow patenting of computer-related innovations in a logical manner, one that can also be applied rationally in other emerging areas. One after another, the lower court tests have failed, because the courts were increasingly trying to justify – and create doctrine for – inventions that were outside patentable subject matter. The case at hand presents a unique opportunity to harmonize the law across all of these areas which, at the moment, remains logically incoherent.

The Gordian knot centers on patents related to methods of doing things. Following on the heels of the Federal Circuit's approval of software patents in *Alappat*, the Circuit turned four years later to the question of business method patents. These lower court cases arose decades after the Court's decisions in *Flook* and *Diehr*, during which time the lower courts had strayed far from the underlying logic of these cases.

In particular, for much of the 20th century, courts had excluded methods of doing business from the list of patentable subject matter. In 1998, however, the Federal Circuit upheld business methods as a legitimate subject for patents in the *State Street Bank*

case, finding that prior cases had rested on concerns unrelated to patentable subject matter. *State Street Bank & Trust Co. v. Signature Fin. Group Inc.,* 149 F.3d 1368 (Fed. Cir. 1998). Extending its misinterpretation of this Court's precedents, the Federal Circuit upheld the same approach for business method patents that it had for software, allowing patenting of business methods described only in abstract terms of the result accomplished, and at a high level of generality.

The patent the Federal Circuit upheld in *State Street* concerned a computerized hub and spoke accounting system for structuring mutual fund investments, but many business method patents granted in the subsequent years covered far less sophisticated inventions. These included a method of teaching janitors how to vacuum, and a method of making toilet reservations for airplane travelers. *See* U.S. Patent No. 5,851,117 (filed Apr. 23, 1997), and U.S. Patent No. 6,329,919 (filed Aug. 14, 1999), respectively. As one dissenting judge noted, "[p]atents granted in the wake of *State Street* have ranged from the somewhat ridiculous to the truly absurd . . . producing a thunderous chorus of criticism." *In re Bilski*, 545 F.3d 959, 1004 (Fed. Cir. 2008) (Mayer, J., dissenting).

The questions of whether and how to limit business method patents, however, implicate numerous other areas of invention. Business methods are essentially ways of going about doing something. Language that might limit business method patents, therefore, might also be applied to patents on computer

software, which may be expressed in terms of ways of going about getting a machine to do something. Limitations on business methods might also implicate diagnostic and therapeutic patents in the biotechnology space, which may be expressed as methods of diagnosis and treatment by doing something. Such limitations could also implicate patents on things like genes and antibodies, which are a strange combination of a product and a method of going about doing something. Human genes are literally a sequence of nucleotides that operate as a set of instructions for carrying out some function in the human body. Normally, a set of instructions is considered a process, rather than a product but, once again, genes are as tangible as any product one might create.

It takes a certain amount of mental gymnastics to contemplate a thing whose nature combines both product and process. If one could create an instruction manual that operated on its own, for example, would it be a process or a product? One could argue that software, to some extent, is an example of another hybrid of this kind. Software itself could be thought of as a set of instructions. It is a set of instructions, however, that is designed to operate itself, to produce a set of results. The overlap between product and process patents for inventions such as software highlight the importance of creating coherence in this area, to avoid the type of clever draftsmanship the Court has warned about.

In cases following *State Street*, the lower courts struggled to establish a test for patentable subject

matter that could successfully navigate all of these areas.[8] The Federal Circuit considered a "physical transformation" test, then tried out a "useful, concrete, and tangible" test and, finally, moved on to the "machine or transformation test" as the sole method for determining patentable subject matter, with none of these capable of addressing the issues in a consistent and comprehensive manner.[9]

Problems with the Federal Circuit's application of the "machine or transformation test" in the context of software cases are illustrative. Finding a machine or transformation is not the goal of patentable subject matter. As this Court has noted, nothing in the ordinary meaning of Section 101's terms "would require them either to be tied to a machine or to transform an article." *Bilski*, 130 U.S. at 3234. Rather, the test is a possible proxy for ensuring that the subject matter of the patent at hand does not pose preemption problems. It is not that everything embodied in the proxy is wrong; the danger with "the machine or transformation test" is that one can forget what the proxies are testing for and allow the proxies to take on a life

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[8] For a detailed discussion of examples within the Federal Circuit's jurisprudence, *see Rethinking Patent Law* at 89.

[9] The lower courts' approach can best be characterized as "death by tinkering," changing a little piece here and a little piece there until the entire doctrinal area threatens to collapse of its own weight. The cases make distinctions to reach a particular result, but the rules (and the distinctions within those rules) lack general applicability and defensible logic. The approach is both intellectually and operationally unsatisfying.

of their own. That is precisely what has happened with software. The Circuit has applied the test in a literalist manner that loses sight of the underlying logic. As described above with the patent related to causing a computer display to show a smooth line, the Circuit's *Alappat* decision created a test in which any software patent would survive when a machine is involved.

The Circuit's vision of the transformation prong of the "machine or transformation test" has suffered from similar problems. For example, in dicta in the *Bilski* business methods case, which this Court subsequently overturned, the Federal Circuit explained that CAT Scan data would satisfy the transformation test because data representing bones, organs, and other body tissues were transformed. *In re Bilski*, 545 F.3d at 969. This example is difficult to comprehend. The act of displaying CAT Scan data on a screen bears little resemblance to a chemical process or a process that physically transforms raw materials.

Alternatively, one might think, from the CAT Scan example, that the Circuit is really asking whether input data represent something physical. In other words, it is not about whether something physical is changed in a physical sense. Rather, it is simply about whether input data that started out representing something physical are "transformed" into a different state. From that perspective, the Federal Circuit might have intended to limit computer-related technology only to those programs that create data representations of physical items. This approach

seems to be the best way to make sense of the idea that CAT Scan data satisfy the transformation test. Such a distinction, however, would not be very helpful as a demarcation line. One can argue that almost any data represent something physical in some way. For example, one would think that interest rates and carbon credits are abstractions rather than physical items. Interest rates, however, represent cash payments of dollar bills, and carbon credits represent volumes of carbon that are not emitted into the atmosphere. Just about anything could arguably satisfy a test this broad. *See* Bruce Alberts et al., *Molecular Biology of the Cell* (4d ed. 2002) at 1358.

Undoubtedly, computer programs are similar to things that are intangible and abstract. Performing a series of steps on data is certainly abstract. Attempting to circumvent the ethereal nature of computer programs by looking for evidence of something concrete in any corner of the activity, however, simply invites clever drafting and creative framing of the invention. These types of comparisons have led some courts to fixate on the presence of a machine in the invention. A machine for a specific purpose would seem to mollify those who would object that the invention is merely an abstraction or that it constitutes no more than human thought. Nonetheless, the presence of a machine may be totally irrelevant. If an invention is unpatentable because it is essentially human thought, one cannot save the invention by having a computer perform the task that a human ordinarily would. Thus, arguing over the presence or

absence of a machine and the centrality of the machine to the invention is not helpful. What is helpful, however, is to return to the touchstone reason for removing certain categories from patentable subject matter in the first place: Preemption. The focus must be on the content of what is new in the invention, in other words, the inventive concept. *Prometheus*, 132 S. Ct. at 1289 (the Court's "precedents . . . insist that a process that focuses upon the use of a natural law also contain other elements or a combination of elements, sometimes referred to as an "inventive concept," sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself.").

III. FOR SOFTWARE AND BEYOND, THE UNIFYING, COHESIVE TEST FOR PATENTABLE SUBJECT MATTER LOOKS TO PREEMPTION AND TO SPECIFIC COMMERCIAL APPLICATION

A proper test for determining patentable subject matter, one that can be used across innovation generally, should focus both on preemption and on the tests for patentability as a whole. It can be expressed as follows: Considering the limitations of the patent system as a whole, is the subject matter of this patent likely to create preemption problems? The answer requires an analysis of preemption and specific commercial application. This latter element is required because, "as the Court has also made clear, to transform an unpatentable law of nature into a

patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words 'apply it.'" *Prometheus*, 132 S. Ct. at 1294 (emphasis in original).

There is no question that, for patents other than software, we require inventors to tell us not just the result, but how they actually got to that result. We then limit the territory granted by the patent to the specific path they invented. Only in software and business method patents do we allow inventors to aggregate to themselves a broad, abstract result. This disparate and inexplicable situation must be rectified to correct the lower court's misinterpretation of case law that has lead to the proliferation of patents in this form.[10]

[10] The lower court's confusion on this point undoubtedly has been fueled by the similarity of facts in *Flook* and *Diehr*, notwithstanding that the expressions of the claims and the preemption risks diverged. Indeed, over time, scholars have noted that the facts in those two cases are uncomfortably similar. For example, the invention in *Flook* could be described as a process for updating the moment a catalytic conversion should end, using a computerized formula and a set of steps to constantly recalculate the relevant moment, based on a series of changing factors. Similarly, the invention in *Diehr* could be described as a process for updating the moment that rubber-curing should end, using a computerized formula and a set of steps to constantly recalculate the relevant moment, based on a series of changing factors. The lower court's difficulties in applying these cases to new inventions decades later might benefit from an acknowledgement that, to the extent these cases have been interpreted to suggest that a proper software patent is an abstract document

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Notably, part of the lower court's challenge in developing appropriate tests in this context may well have centered on confusion about the application of the term "algorithm" to software. The term first appeared in the Court's jurisprudence as early as 1972 (*Benson,* 409 U.S. at 65), but it has come to have specific meaning in the software field, and one that has created major difficulties. In the context of computer software, defining what constitutes an algorithm is hardly clear. An algorithm at its broadest sense is any sequence of steps taken to produce a result. That definition would, however, cover just about everything that receives a process patent. In the field of computer science, the term "algorithm," again in its broadest sense, refers to a series of steps that a computer performs on input data. In a narrow sense, the study of algorithms in computer science often describes a theoretical area of the field in which sets of operations are formalized in mathematical notations.

If the exclusions from patentable subject matter include anything that can be understood as a set of steps formalized in mathematical notation, huge swaths of modern innovation would be eliminated from the patent system. These concerns may have encouraged patent holders and the lower courts to develop the current approach for software patents

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expressed at a high level of generality, the Court had no such intent.

of focusing on the result of the invention, rather than the steps taken to get there.

We now know that, while digital languages are typically represented by mathematical characters, they are quite different from an algorithm or mathematical formula that expresses a law of nature. Indeed, there are many different digital languages (*e.g.*, C++, VB.NET, HTML, Python, Assembly), and software programming has advanced to its fourth generation. Unlike the patent in *Benson*, modern software programs are no longer comprised of pure machine code, that is just ones and zeros, but use mnemonic codes such as LDA for load and STA for store making the code easier to read and write.[11] Today, software is commonly understood to be a means of expression or communication, and one would be hard-pressed to say that all software is, categorically, nonstatutory. The focus should remain on the content of what is being expressed and the preemptive effect that might result from patenting that type of content.

Thus, an "algorithm" in computer science – a series of steps performed on input data by a computer – may or may not raise preemption concerns. Some computer "algorithms" are based on properties

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[11] *Fundamentals of Computer Systems: Generations of programming language,* WikiBooks: Open Books for an Open World (updated Sept. 23, 2013), available at http://en.wikibooks.org/wiki/Alevel_Computing/AQA/Computer_Components_The_Stored_Program_Concept_and_the_Internet/Fundamentals_of_Computer_Systems/Generations_of_programming_language.

inherent in types of input and output data. Such broad, generic algorithms, which can be used on a variety of types of input data, may raise threats of preemption. In other words, in light of the bargaining potential that would come with such a grant, the patent would risk tying up entire types of data rather than constituting something applied. This does not mean, however, that all software is unpatentable. Claims to programs that are applied to a *specific* type of data in the pursuit of *particular* types of outputs do not present the same level of preemption threat.[12]

Consider the following hypothetical example of a software invention that would meet the test of commercial application specificity. Suppose a software program is invented to assess how risky someone is for car insurance underwriting. The inventive concept relates to ways to assess risk related to information on how much a person texts while driving. The idea that someone who sends a lot of text messages while driving is likely a distracted and risky driver is somewhat akin to a law of nature, if not an abstract concept. This specific method combines the frequency an individual sends text messages while driving with other indicators of that person's risk, such as credit

[12] At its core, this is the distinction the Court identified in reaching opposite conclusions in *Flook* and *Diehr*. The Court's decisions in these two cases can be characterized as focusing on whether the inventor was trying to claim a type of computer program in general, rather than a specific application and a specific way to apply the type of program.

history, hobbies, and driving history. These values are assigned different weights and multipliers to produce a risk score. As an additional twist on this approach, if the frequency of text messaging is above a certain level, the score indicates the person should be denied insurance. Otherwise, the frequency of text messaging while driving is weighted in the software program against other factors to produce a composite risk score, which is used in underwriting.

In contrast to current software patenting, in which this program would simply describe the invention in these abstract terms, a proper software patent would begin by including the precise combination used to produce the risk score and the software language to accomplish it. The scope of the patent would be limited to the inputs used, the path chosen, and the method of combining the inputs to reach the result for determining this type of underwriting risk. The patent would not, for example, be able to claim broadly all software and all risk assessment methods that use one factor as a floor before other factors might be weighed in. Nor would the patent be able to control other combinations of inputs for assessing driving risk.

Requiring such specificity helps to ensure that the patent does not preempt the natural phenomenon that one who texts and drives is risky, nor blocks all routes for assessing that characteristic. Rather, the patent holder receives territory commensurate with the inventive concept contributed – assuming, of course, that the core of the inventive concept meets

the other elements of patentability, such as the requirements that the approach is new and would not be obvious to those skilled in the art.

This notion of specific commercial application is not akin to field of use limitations, which the Court has rejected in the past. As the Court has noted, all patents involve laws of nature to some degree, and one cannot solve preemption problems simply by claiming, for example, the law of gravity limited to the field of building bridges.[13] Identifying the field does not help the preemption problem. In contrast, testing for specific commercial application ensures that a patent covers an application of a law of nature – rather than the law itself – and that the patent meets the constitutionally mandated standard of promoting the progress of the "useful arts."

In sum, the framework set forth herein for determining patentable subject matter under 35 U.S.C. § 101 is one that can be used in connection with the software-related issues presented in this case and across innovation generally, focusing on both preemption and the tests for patentability as a whole. It is

[13] *See, e.g., Prometheus,* 132 S. Ct. at 1293 ("[A]ll inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas."); *Bilski*, 130 S. Ct. at 3221 ("[T]he prohibition against patenting abstract ideas 'cannot be circumvented by attempting to limit the use of the formula to a particular technological environment' or adding 'insignificant postsolution activity' ") (quotation omitted).

predicated on this Court's precedent and the language and legislative history of the Patent Act.

IV. THE TEST OF PREEMPTION AND SPECIFIC COMMERCIAL APPLICATION FOLLOWS LOGICALLY FROM THE COURT'S EARLIEST TEACHINGS ON SUBJECT MATTER PATENTABILITY AND FINDS SUPPORT IN THE PATENT ACT ITSELF

In ascribing a broad scope to things that may be patented, courts and commentators often quote language from the 1952 Patent Act's legislative history stating that patents "may include anything under the sun that is made by man." *Diamond v. Chakrabarty*, 447 U.S. 309 (1980) (citing legislative language).[14] In fact, in context, the complete language suggests just the opposite. It reads: "A person may have 'invented' a machine or a manufacture, which may include anything under the sun that is made by

[14] For example, numerous cases, relying on the quote set forth in text above, have suggested that patentable subject matter is quite broad and that everything under the sun made by human beings is eligible for patent protection. *See, e.g., State Street Bank & Trust Co. v. Signature Fin. Group*, 149 F.3d 1373 (Fed. Cir. 1998), abrogated by *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc), aff'd sub nom. *Bilski v. Kappos*, 130 S. Ct. 3218 (2010); *AT&T Corp. v. Excel Communs.*, 172 F.3d 1355 (Fed. Cir. 1999), abrogated by *In re Bilski*, 545 F.3d 943; *Ex parte Allen*, 2 U.S.P.Q.2d 1427 (B.P.A.I. 1987); *Ex parte Hibberd*, 227 U.S.P.Q. 444 (B.P.A.I. 1985).

man, but it is *not necessarily* patentable under section 101 unless the conditions of the title are fulfilled."[15] Thus, the full quote indicates not an expansive notion of patentable subject matter but, rather, a limitation on its reach. *In re Bilski*, 545 F.3d at 1000 (Mayer, J., dissenting) (noting that, although the quote is used to suggest that Congress intended anything under the sun to be patentable, the legislative history says no such thing).

United States patent law has traditionally excluded inventions that constitute laws of nature, abstract ideas, mental steps, and mathematical formulas from the list of things that are patent eligible, no matter how useful, insightful, ingenious, and revolutionary. This list of exclusions has developed as a matter of common law rather than statutory law.[16] The logic for these exclusions to patentable subject matter, however, can be understood from constitutional, historic, theoretic, and practical perspectives.

The constitutional language giving Congress the power to establish copyrights and patents authorizes

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[15] *See* S. Rep. No. 82-1979 (1952), p. 5, reprinted in 1952 U.S.C.C.A.N. 2399; H.R. Rep. No. 82-1923 (1952), p. 6, reprinted in 1952 U.S.C.C.A.N. 2399.

[16] Categories of proper subject matter are described in the Patent Act as including machines, compositions of matter, manufactures, and processes. 35 U.S.C. § 101. Categories excluded from proper subject matter are described in the courts as laws of nature, natural phenomena, mathematical formulas, mental steps, and abstract ideas. *Benson*, 409 U.S. at 67-68.

Congress "to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors an exclusive Right to their respective Writings and Discoveries." U.S. Const. art. 1, § 8, cl. 8. Given the language of the time and parallel construction within the sentence, science, authors, and writings are interpreted as applying to copyright, while useful arts, inventors, and discoveries are interpreted as applying to patents.

As this Court has noted, the constitutional clause serves both as a grant of power and a limitation on it. *See Graham v. John Deere Co. of Kansas City,* 383 U.S. 5 (1966) (discussing the constitutional language and noting that the clause is both a grant of power and a limitation). Congress's power is limited to those acts that will promote progress, reflecting the distinctly utilitarian approach in this country. Patents are limited to the useful arts, and the grant must be for limited times. Finally, the notion of granting rights to inventors for "their respective . . . Discoveries," can (and perhaps should) be read as a limitation granting rights only to those things inventors can show truly should be deemed *theirs*. *E.g.*, *Feist Publ'n Inc. v. Rural Tel. Serv. Co. Inc*., 499 U.S. 347 (1991) (ruling that telephone numbers do not meet the constitutional requirements for copyright protection).[17]

[17] A number of authors argue in favor of the general proposition that the constitutional clause on the whole or other parts

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These constitutional limitations provide the backdrop for the historic, theoretic, and practical considerations that have led to the common law exception to patentable subject matter. The notion that proper subject matter for patents excludes laws of nature and abstract principles has deep roots in the United States common law system. For more than 150 years, this Court has held that abstract ideas and laws of nature cannot be patented, reflecting a separation between the notion of *applied* science and *basic* science. General ideas, or basic science and research, are not the subject of patent protection. Only applied ideas are eligible to receive the patent bounty. As the Court explained in one of the earliest cases to address the issue:

> A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as none can claim on either of them an exclusive right. . . . The same may be said of electricity, and any other power in nature, which is alike open to all, and may be applied to useful purposes by the use of machinery. . . . The elements of the power

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can be read as a limitation. *See, e.g.*, Dotan Oliar, "Making Sense of the Intellectual Property Clause: Promotion of Progress as a Limitation on Congress's Intellectual Property Power," 94 *Georgetown Law Journal* 1771 (2006); Alan L. Durham, " 'Useful Arts' in the Information Age," 1999 *Brigham Young University Law Review* 1424-30 (1999); Cynthia M. Ho, "Who Deserves the Patent Pot of Gold?: An Inquiry into the Proper Inventorship of Patient-Based Discoveries," 7 *DePaul Journal of Health Care Law* 240-42.

> exist; the invention is not in discovering them, but in applying them to useful objects.

Le Roy v. Tatham, 55 U.S. (14 How.) 174-75 (1852) (dicta in case concerning lead pipe); *see also O'Reilly v. Morse*, 56 U.S. (15 How.) 62 (1853) (finding "the discovery of a principle in natural philosophy or physical science is not patentable.").

This perspective finds constitutional support in two ways. First, the Constitution gives Congress the power to promote the progress of the useful arts, suggesting that the universe of patents should include those inventions that are of *practical use* to society rather than fundamental laws and abstractions.[18] Second, the constitutional grant of rights to "their" (i.e., the inventors') innovations *excludes* abstractions, mathematical formulas, and the like because they are an invention of nature, not of humans.[19]

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[18] As one jurist has noted, "There is little evidence in the historical record about what is meant by the 'useful arts,' but it appears intended to refer to 'arts' used in industry and the production of goods." *Ex parte Bilski and Warsaw*, No. 2002-2257, 2006 Pat. App. LEXIS 51, *12-13 (B.P.A.I. Sept. 26, 2006).

[19] This difference echoes another historic distinction in U.S. patent law. At one time, British patent law rewarded not just the act of creation but also the act of rendering information accessible to British society. Importers and inventors, for example, were once treated the same under English patent law on the theory that information first brought to British society was as valuable as new inventions. *See* William C. Robinson, *The Law of Patents for Useful Inventions* (Little, Brown 1890) at 105 & n.2; 104 n.1 (describing the English case, *Edgebury v. Stephens*, 2 Salk. 447 (1691), for the proposition that "whether learned by

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The distinction between the discovery of basic laws of nature, which are outside the subject matter of patent law, and the application of laws of nature, which are within patentable subject matter, has echoed consistently and strongly in this Court's teachings. In 1853, for example, the Court rejected a claim from the inventor of the telegraph that would have covered all uses of "electromagnetism, however developed, for marking or printing intelligible characters, signs, or letters, at any distances." *O'Reilly*, 56 U.S. (15 How.) at 113. In denying patentability, the Court noted presciently:

> For aught that we now know some future inventor, in the onward march of science, may discover a mode of writing or printing at a distance by means of the electric or galvanic current, without using any part of the process or combination set forth in the plaintiff's specification. . . . [T]he inventor could not use it, nor the public have the benefit of it, without the permission of this patentee. . . . Nor is this all, while he shuts the door against inventions of other persons, the patentee would be able to avail himself of new discoveries in the properties and powers

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travel or by study it is the same thing"). The United States, however, has always focused on the notion of original creation rather than the notion of rendering information accessible. The distinction between introducing information and original creation has played out in the development of categories excluded from patentable invention under United States law.

> of electro-magnetism which scientific men [and women] might bring to light.

Id.

Some 100 years later, the Court reiterated these points in the *Funk Bros. Seed* case in 1948:

> 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 an invention from such a discovery, *it must come from the application of the law of nature to a new and useful end*.

Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948) (emphasis added).[20]

The Court explained that "patents cannot issue for the discovery of phenomena of nature" because such phenomena "are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none." *Kalo*, 333 U.S. at 130 (citation omitted) (quoted in *Diamond v. Chakrabarty*, 44 U.S. at 309).

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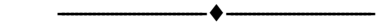
[20] *See also Diamond*, 450 U.S. at 187-88 (noting that the invention is patentable because it applies laws of nature to a specific application); *Mackay Radio & Tel. Co. v. Radio Corp. of America*, 306 U.S. 94 (1939) ("While a scientific truth, or the mathematical expression of it, is not [a] patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be."); *In re Alappat*, 33 F.3d at 1542-43 (arguing that when an abstract concept has no claimed practical application, it is not patentable); Robinson, *Law of Patents,* at 116 (noting that an unapplied idea is not an invention).

Allowing one inventor to capture these elements would hamper innovation and block further developments in a number of fields. Thus, as this Court has made clear, the patent system sequesters the raw materials of invention, thereby ensuring access for all current and future inventors.

As demonstrated herein, the touchstone for faithfulness to these concepts is preemption. Patentability should not be permitted for patents whose subject matter threatens to block out natural laws or natural phenomena. In misinterpreting this Court's precedents, the lower courts have opened the door to decades of patents whose very form raises preemption concerns. Such patents focus on the result of the invention, rather than the steps taken to get there, an approach unheard of for other types of patenting. Moreover, such abstract patenting fails to ensure that the invention, and its core inventive concept specifically, constitute a commercial application of the laws of nature. Refocusing the inquiry on the core concepts of preemption and specific commercial application can bring logical coherence to patentable subject matter, holding software patents to the same rigorous standards required for patenting of all kinds.



CONCLUSION

Amici respectfully ask the Court to consider the framework for analyzing patentability set forth herein as a cohesive means of addressing both

software and the broader issue of patentable subject matter in general under 35 U.S.C. § 101.

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