No. 16-

IN THE

Supreme Court of the United States

SYNOPSYS, INC.,

Petitioner,

v.

MENTOR GRAPHICS CORPORATION,

Respondent.

On Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit

PETITION FOR A WRIT OF CERTIORARI

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QUESTIONS PRESENTED

In *Alice Corp. Pty. Ltd.* v. *CLS Bank International*, 134 S. Ct. 2347 (2014), the Court reaffirmed the two-part test for determining whether an invention is patent-eligible under 35 U.S.C. § 101: (1) whether the patent claims are directed to a patent ineligible concept, such as laws of nature, natural phenomena, or abstract ideas, and (2), if so, whether the elements of the claim contain an "inventive concept" that transforms the ineligible concept into an invention that is patent-eligible. Here, a panel of the Federal Circuit held that in determining whether a patent is directed to an abstract idea, a court must ignore the specification and evaluate only the express limitations in the claims. The panel further held that the accused patents failed the second step of *Alice* because the claims do not explicitly call for involvement of a computer and therefore could not be characterized as an improvement to computers.

The questions presented are:

1. Whether the § 101 inquiry requires courts to ignore the specification, as the Federal Circuit held, or whether courts should ascertain the true scope of the claims in light of the specification and intrinsic record in determining whether they are drawn to a patent-ineligible concept.

2. Whether an otherwise revolutionary technological breakthrough is not an "inventive concept" under the second step of *Alice* merely because the court believed the breakthrough could theoretically be implemented without a computer.

PARTIES TO THE PROCEEDING

Petitioner (plaintiff-appellant below) is Synopsys, Inc. Respondent (defendant-appellee below) is Mentor Graphics Corporation.

RULE 29.6 STATEMENT

Petitioner Synopsys, Inc. has no parent corporation, and no publicly held corporation owns 10% or more of its stock.

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PETITION FOR A WRIT OF CERTIORARI

Synopsys, Inc. respectfully petitions for a writ of certiorari to review the judgment of the United States Court of Appeals for the Federal Circuit.

OPINIONS BELOW

The Federal Circuit's opinion is reported at 839 F.3d 1138 and reproduced at Pet. App. 1a–27a. The district court's opinion granting summary judgment for respondent is reported at 78 F. Supp. 3d 958 and reproduced at Pet. App. 28a–42a.

JURISDICTION

The court of appeals entered judgment on October 17, 2016. Pet. App. 1a. On December 28, 2016, the court of appeals denied Synopsys's petition for panel rehearing and rehearing en banc. *Id.* at 44a. On March 15, 2017 the Chief Justice granted Synopsys's application for an extension of time to file this petition until April 27, 2017. This Court has jurisdiction under 28 U.S.C. § 1254(1).

STATUTE INVOLVED

Section 101 of the Patent Act provides: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." 35 U.S.C. § 101.

INTRODUCTION

In this case, the Federal Circuit invalidated, as unpatentable, patents that revolutionized the microchip design industry by allowing computers to

undertake the most complex aspects of microchip design for the first time. The Federal Circuit did not dispute that the patents substantially improved computer functionality, enabling them to design microchips as they had never done before. Nevertheless, the Federal Circuit invalidated the patents because it found that the claims could theoretically also cover carrying out the patented operations by pencil and paper.

En route to its holding, the Federal Circuit ignored language in the patents' specification—a part of the patent in which Congress has required "a written description of the invention," 35 U.S.C. § 112(a)—that expressly limited the patents to implementation on a computer. The Federal Circuit refused to consult the specification, notwithstanding over a century of this Court's contrary precedent, which instructs that the § 101 inquiry must focus on whether the patent "application, *considered as a whole*, contains no patentable invention." *Parker* v. *Flook*, 437 U.S. 584, 594 (1978) (emphasis added). The conflict created by the decision in this case will sow confusion in the already chaotic § 101 jurisprudence and warrants this Court's immediate intervention.

Even as so interpreted, the Federal Circuit did not dispute that the patents "add[ed] … to the abstract idea" that the court believed was at issue in this case, Pet. App. 26a—the hallmark of patentable subject matter under *Alice Corp. Pty. Ltd.* v. *CLS Bank International*, 134 S. Ct. 2347 (2014). Nevertheless, the court of appeals held the patents to be unpatentable because, in the court's view, they could cover performance of the process using pencil and paper, rather than only on a computer. The Federal Circuit did not explain how that *per se* rule was consistent with this Court's decision in *Alice* or *Bilski*

v. *Kappos*, 130 S. Ct. 3218 (2010), which rejected the argument that processes are patentable only if implemented on a machine.

If allowed to stand, the Federal Circuit's decision will gut this Court's longstanding precedent requiring that a patent be interpreted as a whole. Instead, validity will depend on whether a clever draftsman placed all relevant descriptions in the claims themselves rather than the specification. Such a result is especially unfair to the owners of the millions of patents drafted without the benefit of the rule announced in the decision below. Under the Federal Circuit's rule, parties can avoid this atextual approach to patent interpretation only by seeking explicit construction of every aspect of the patent—even aspects that have no underlying factual dispute and are entirely clear from the specification—during a formal *Markman* proceeding. That simply erects a trap for the unwary.

The Federal Circuit's attempted replacement of *Alice*'s framework for assessing validity with the machine-or-transformation test rejected in *Bilski* will likewise distort patent law by bringing about precisely the effects that prompted the Court's intervention in *Alice* and *Bilski*. The machine-or-transformation test is particularly ill-suited to analyzing computer programs, as demonstrated by this case's rejection of patents claiming an undeniably useful invention that vastly improved how computers operate.

This Court's review is needed now to correct the standard under which thousands of patents are evaluated, and thousands of patent cases are litigated, across the nation every year.

STATEMENT OF THE CASE

I. STATUTORY BACKGROUND

Congress has carefully specified the various elements that patents must contain. Each patent must contain one or more claims, which must "particularly point[] out and distinctly claim[] the subject matter which the inventor … regards as the invention." 35 U.S.C. § 112(b). The claims define the scope of the patent grant. *Graver Tank & Mfg. Co.* v. *Linde Air Prods. Co.*, 336 U.S. 271, 277 (1949).

Congress has also required that each patent include a specification, which must "contain a written description of the invention … in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains … to make and use the same." 35 U.S.C. § 112(a). The specification provides critical context for the claims, and the "claims are to be construed in the light of the specification[]." *United States* v. *Adams*, 383 U.S. 39, 49 (1966). As the Federal Circuit has explained, "the specification is always highly relevant" to the claims' meaning; "[u]sually it is dispositive." *Philips* v. *AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc).

In addition to these two core elements of the patent itself, an inventor may also submit a drawing "where necessary for the understanding of the subject matter sought to be patented." 35 U.S.C. § 113. And the Director of the Patent and Trademark Office has authority to require an inventor to furnish a model of his or her invention where needed for analysis, as well as "specimens or ingredients for the purpose of inspection or experiment" in certain cases. *Id.* § 114.

The substantive requirements for a patent are set forth in 35 U.S.C. §§ 101–103. Sections 102 and 103 impose rigorous demands of novelty and non-

obviousness that require detailed assessments of a patent's contribution to the state of knowledge in the relevant scientific field. See 35 U.S.C. §§ 102, 103.

By contrast, Section 101 imposes a "threshold test" for patent eligibility. *Bilski*, 130 S. Ct. at 3225. Section 101 allows a patent for "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35 U.S.C. § 101.[1] The "expansive terms" of Section 101 were intended to give "the patent laws … wide scope." *Diamond* v. *Chakrabarty*, 447 U.S. 303, 308 (1980). However, this Court has crafted "an important implicit exception" to § 101's broad conferral of patentability: "Laws of nature, natural phenomena, and abstract ideas are not patentable." *Alice*, 134 S. Ct. at 2354. These concepts are "the basic tools of scientific and technological work"; because "monopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it," the Court has held that they are "free to all men and reserved exclusively to none." *Mayo Collab. Servs.* v. *Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012). As this Court recently warned in *Alice*, courts must "tread carefully in construing this exclusionary principle lest it swallow all of patent law." 134 S. Ct. at 2354.

In *Alice*, the Court confirmed the two-part inquiry for determining whether a patent inappropriately claims a building block of human ingenuity or instead integrates one of those building blocks into a patent-eligible invention. *Id.* at 2355. Courts must first determine whether a patent is drawn to a patent-

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[1] The term "process" is defined as a "process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material." 35 U.S.C § 100(b).

ineligible concept, such as a law of nature, natural phenomena, or abstract idea. *Id.* And if so, the invention is not patent-eligible unless "it contains an "'inventive concept'" sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Id.* at 2357.

II. PROCEEDINGS BELOW

A. The Invention

Microchips, or integrated circuits, are found in practically every modern electronic device. Microchips contain millions or even billions of hardware components, which are interconnected to form logic circuits that carry out the chip's functions. In the early days of the logic circuit design industry, designers would draw the circuit design by hand for each chip. Pet. App. 2a–3a. But designing circuitry by hand became less feasible as microchips became more complex, *id.* at 3a; indeed, a modern microchip would take years to design by hand. The need for a way to design chips by computer thus became evident.

Logic synthesis tools, or "logic synthesizers," met that need. A logic synthesizer is a computer program that allows an engineer to describe a logic circuit at a functional level using computer languages (known as hardware description languages or HDLs); the synthesizer then designs, or "synthesizes," the circuitry that would achieve the requested functionality. Pet. App. 3a–4a. Early logic synthesizers were severely limited: While they could design simple logic circuits, more complex logic circuit elements—in particular, high impedance drivers, level sensitive latches, and edge sensitive flip-flops—exceeded their abilities. *Id.* Because of this limitation, as the district court found, microchips containing these common but complex elements still had to be designed partly by

hand. *Id.* at 29a–30a. Thus, designing microchips continued to require "a detailed knowledge of the characteristics and operations of complex logic elements." JA60 (col. 9, ll. 32–33).

The invention claimed in the asserted patents (the "Gregory patents") changed that. The Gregory patents claim a process for converting functional descriptions (in HDL) into circuit designs using assignment conditions—an innovation that allowed the computerized synthesis of high impedance drivers, level sensitive latches, and edge sensitive flip-flops from functional descriptions of those elements. Pet. App. 4a. The Gregory patents thus enabled computers for the first time to be used to design the entirety of complex microchips. By doing so, the patents allowed the design of microchips with "only a knowledge of the desired operation of the resulting logic network" on the part of the engineer, JA60 (col. 9, ll. 35–36), thus revolutionizing the microchip industry.

The Gregory patents issued in 1996. From the beginning, their text left no doubt that they were designed for implementation on a computer. For instance, the very first drawing in the representative '841 patent, a "diagram of the … synthesizer … of this invention," JA59 (col. 7, ll. 44–45), features a "Computer System," JA31 (fig. 1), and the specification states that the logic synthesizer "is loaded in [a] computer system … using techniques known to those skilled in the art," JA60 (col. 10, ll. 10–11). The specification further states that the "system and method of this invention are operable in a computer system," and explained that, while the inventors used a particular computer and program, the "particular computer language and the computer system used are not an essential aspect of this invention," because "those skilled in the art can implement the invention

using a different computer language and/or a different computer system." *Id.* (col. 9, ll. 42–43, col. 10, ll. 35–39). The patents even included 200 pages of computer code attached to the specification that illustrated how the patents could be implemented on a computer. Pet. App. 20a.

B. Procedural Background

Synopsys filed suit alleging that certain of respondent Mentor's logic synthesis tools infringe the Gregory patents. In response, Mentor asserted that, among other things, the Gregory patents are directed to an abstract idea and hence unpatentable under § 101.

1. The district court analyzed the Gregory patents under the two-step framework established in *Alice*. At step one, the district court found that the patents were directed to a mental process (i.e., an abstract idea) because they claimed a way to design the circuitry of a microchip "from a user's description of what the user needs the chip to do," which the district court found "can be performed by a skilled designer either mentally or with the aid of a pencil and paper." Pet. App. 35a, 37a. The district court acknowledged that the patented method "is primarily intended for use with a computer," that the "patents append source code for a computer program implementing the claimed inventions," and that the text of the patents themselves states that "[t]he system and method of this invention are operable in a computer system." *Id.* at 31a–32a. But the court nevertheless found that the patents included practicing the invention mentally or with pen and paper because no computer "is specifically mentioned" in the claims themselves. *Id.* at 36a; see also *id.* at 31a ("the claims themselves do

not expressly call for a computer").[2] Likewise, the district court concluded that the Gregory patents failed *Alice* Step 2 because they "add nothing other than a way to implement [a] mental process on a computer." *Id.* at 40a.

2. The Federal Circuit affirmed. At the first step of the *Alice* framework, the court of appeals held that the Gregory patents are drawn to an unpatentable mental process because it is possible for them to be "performed mentally or with pencil and paper." Pet. App. 17a. The Federal Circuit did not dispute Synopsys's showing that the patents' specification demonstrated that the patents were limited to implementation on a computer. *Id.* at 20a & n.12. Indeed, the court admitted that "the written description of the Gregory Patents" "supported" claims "directed to a computerized design tool." *Id.* at 27a. And the court did not disagree with Synopsys's argument that the Gregory patents were intended to be, and would in fact be, performed on a computer. *Id.* at 19a–20a; see also *id.* at 22a (accepting Synopsys's argument that "a human circuit designer may not use the specific method claimed"). Nonetheless, the Federal Circuit, like the district court, held that the Gregory patents were drawn to a mental process because "the language of the Asserted Claims themselves" did not expressly limit them to computer implementation. *Id.* at 20a. For

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[2] Alternatively, the district court concluded that, "even if the claims are read to require implementation with a computer," such implementation is merely "generic" and thus "will not serve to transform the nature of the instant claims from an abstract idea into something else." Pet. App. 36a. The Court reached this conclusion notwithstanding its finding that the Gregory patents had changed the microchip industry, obviating the need for microchip engineers to have "detailed logic knowledge for most practical circuits," *id.* at 30a, by allowing computers to design the entirety of complex microchips for the first time.

this reason, despite the undisputed advance in automated microchip design that the Gregory patents brought about, the Federal Circuit held that "[b]y their terms … the Asserted Claims do not involve the use of a computer in any way" and "cannot be characterized as an improvement in computer technology." *Id.* at 22a.

The only reason the Federal Circuit advanced for declining to evaluate the claims in light of the specification is that "Synopsys stops short of arguing that the Asserted Claims must be *construed* as requiring a computer to perform the recited steps." Pet. App. 20a. The Federal Circuit did not fault Synopsys for failing to argue that the claims should be *interpreted*, in light of the specification, as implemented on a computer; to the contrary, the court noted that Synopsys made precisely this argument. See, *e.g.*, *id.* at 20a n.12 (acknowledging that Synopsys, relying on the specification, "repeatedly describe[d] the claimed methods as implemented on a computer"). The Federal Circuit objected, rather, that Synopsys should have sought a formal claim construction—i.e., at a *Markman* evidentiary hearing—that limited the claims to computer implementation. *Id.* at 20a.[3]

Moving to the second step of *Alice*, the Federal Circuit held that, because the claims were drawn to a mental process, the Gregory patents necessarily failed to include an "inventive concept" and thus were

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[3] The parties here participated in a *Markman* hearing before the district court, but neither party sought construction there on the question of whether the patents are limited to computer implementation. *See Synopsys, Inc.* v. *Mentor Graphics Corp.*, No. C 12-6467, 2013 WL 5957866 (N.D. Cal. Nov. 7, 2013). That fact alone suggests that both parties understood the invention would be implemented on a computer.

invalid. Pet. App. 26a. The Federal Circuit did not disagree with Synopsys that the patents "add … to the abstract idea" at issue "the use of assignment conditions as an intermediate step in the translation process." *Id.* But this innovation was, in the court of appeals' view, irrelevant: Because "the claims are for a mental process" and adding assignment conditions simply assists with that mental process, the Gregory patents necessarily do not include "an inventive concept." *Id.*

REASONS FOR GRANTING THE PETITION

I. CERTIORARI IS NEEDED TO RESOLVE THE CONFLICTS CREATED BY THE DECISION BELOW AND RE-ESTABLISH THAT PATENT CLAIMS MUST BE READ AS A WHOLE.

Viewed as a whole, the Gregory patents limit the invention—and are directed—to implementation on a computer. The Federal Circuit refused to look at that limitation on the grounds that it appeared in the wrong part of the patent. But with patents as with statutes, this Court has forbidden "looking over a crowd and picking out your friends." *Exxon Mobil Corp.* v. *Allapattah Servs., Inc.*, 545 U.S. 546, 568 (2005). Instead, courts must evaluate the limitations on a patent's claims in light of its specification. That obligation does not, as the court of appeals believed, depend on whether the parties previously sought to have the patent construed to contain a particular limitation at a formal *Markman* hearing. Such a procedural step is simply not needed to decide the purely legal question of whether the claims are directed to an abstract idea, at least where, as here, there is no underlying factual dispute and the specification is clear.

This Court has long held that a patent's validity may be judged only after reading the claims "in light of the specification delineating the patent." *Nautilus, Inc.* v. *Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). By holding that the specification may not be consulted outside a formal *Markman* hearing, the Federal Circuit fundamentally misunderstood the role of the specification and imposed a procedural hurdle that Congress has not authorized. The Federal Circuit's decision is inconsistent with this Court's pronouncements on interpreting patents generally and with the Court's cases governing invalidity and § 101 specifically.

a. The Federal Circuit's refusal to view the claims in light of the specification is inconsistent with the longstanding approach to ascertaining the meaning of patent claims. Congress has required that each patent application include a specification, which "shall contain a written description of the invention … in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains … to make and use the same." 35 U.S.C. § 112(a). The requirement of a detailed specification dates back to the early days of the Republic. "[W]hen Congress enacted the first Patent Act in 1790, it directed that patent grantees file a written specification 'containing a description … of the thing or things … invented or discovered,' which 'shall be so particular' as to 'distinguish the invention or discovery from other things before known and used.'" *Nautilus*, 134 S. Ct. at 2124–25 (omissions in original). In these early days, "it was *the specification* … that represented the key to the patent." *Markman* v. *Westview Instruments, Inc.*, 517 U.S. 370, 379 (1996) (emphasis added). Even as the patent laws evolved to require distinct claims,

Congress continued to demand a detailed specification. *Nautilus*, 134 S. Ct. at 2125; see also 35 U.S.C. § 112.

Today the specification continues to play a critical role. While "it is the claim which measures the grant to the patentee," *Graver Tank*, 336 U.S. at 277, "it is fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention," *Adams*, 383 U.S. at 49. That principle dates from at least the mid-nineteenth century. See *Brooks* v. *Fiske*, 56 U.S. (15 How.) 212, 215 (1854) ("The claim … is not to be taken alone, but in connection with the specification and drawings; the whole instrument is to be construed together."). As the Federal Circuit has explained, "the specification is always highly relevant to the claim construction analysis" and "is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315 (en banc). 35 U.S.C. § 112's demand for a detailed specification makes clear the precise boundaries of an inventor's monopoly in his invention and is thus "essential to promote progress, because it enables efficient investment in innovation." *Festo Corp.* v. *Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 730–31 (2002). The Federal Circuit's determination that courts should ascertain the invention's subject matter without consulting the specification is inconsistent with this longstanding approach to patent interpretation.

The Federal Circuit's approach is also inconsistent with the approach to other invalidity doctrines. This Court's cases leave no doubt that courts must consult the specification in determining a patent's validity. For instance, just a few Terms ago, the Court explained that "in assessing definiteness, claims are to be read in light of the patent's specification." *Nautilus*, 134 S. Ct. at 2128; see also *Teva Pharm. USA, Inc.* v.

Sandoz Inc., 135 S. Ct. 831, 842–44 (2015) (resolving challenge to validity based on claim of indefiniteness by consulting drawing in specification). Likewise, the specification must be consulted in assessing novelty under 35 U.S.C. § 102. See *Adams*, 383 U.S. at 48–49.

The same is true of the Court's cases addressing patent eligibility under § 101. The framework for assessing whether a patent is directed to an abstract idea that this Court articulated in *Mayo* and again in *Alice* requires that the patent "must be considered as a whole." *Alice*, 134 S. Ct. at 2355 n.3. As the Court explained in *Parker* v. *Flook*, the inquiry focuses on whether the patent "application, *considered as a whole*, contains no patentable invention." 437 U.S. at 594 (emphasis added). And that can only be achieved by interpreting the claims in light of the specification which gives them shape. *Adams*, 383 U.S. at 49. It is thus unsurprising that this Court has looked to the specification to assess whether a patent is impermissibly drawn to an abstract idea under § 101. See *Alice*, 134 S. Ct. at 2352 (consulting specification to determine scope of invention for abstractness inquiry).

The Federal Circuit's wooden approach in this case conflicts with this precedent. Here, the Federal Circuit refused to consult the specification to determine whether the patents are directed to an abstract idea. See Pet. App. 20a (relating argument by Synopsys that specification and attachments showed that patents were limited to computerized implementation). Instead, while admitting that the patents may well be "intended to be used in conjunction with computer-based design tools," the lower court held that the "§ 101 inquiry must focus on the language of the Asserted Claims themselves." *Id.* Because "the claims do not call for any form of computer implementation of

the claimed methods," the Federal Circuit held that they contained no limitation that saved them from being drawn to an abstract idea. *Id.*

The Federal Circuit's flat refusal to consult the specification directly contradicts this Court's longstanding instruction that "[t]he claim … is not to be taken alone, but in connection with the specification and drawings; the whole instrument is to be construed together." *Brooks*, 56 U.S. (15 How.) at 215. Courts must determine that the patent "application, *considered as a whole*, contains no patentable invention." *Flook*, 437 U.S. at 594 (emphasis added).

b. Had the Federal Circuit consulted the specification, as this Court has instructed, it would have readily seen that the invention in the Gregory patents is limited to implementation on a computer. The specification explicitly instructs that the synthesizer "is loaded in [a] computer system … using techniques known to those skilled in the art," JA60 (col. 10, ll. 10–12). It explains further that the "system and method of this invention are operable in a computer system" and that, while the inventors used a particular computer and program, the "particular computer language and the computer system used are not an essential aspect of this invention," because "those skilled in the art can implement the invention using a different computer language and/or a different computer system." *Id.* (col. 10, ll. 35–39). The very first drawing in the patent is a diagram featuring a "Computer System." JA31 (fig.1). And the patents featured 200 pages of computer code appended to the specification that illustrated how the invention can be implemented on a computer. Pet. App. 20a. Indeed, as the Federal Circuit itself recognized, *id.* at 5a, the specification made clear that "flow control statements" and "directive statements"—terms expressly recited in

the claims themselves, JA86 (col. 62, ll. 61–65)—are computer coding concepts and are thus necessarily implemented on a computer. JA61 (col. 11, ll. 1–39).

c. The Federal Circuit acknowledged Synopsys's argument that the claims should be interpreted as limited to implementation on a computer. See, *e.g.*, Pet. App. 20a n.12 (acknowledging that "Synopsys repeatedly describes the claimed methods as implemented on a computer"). But it believed its refusal to consult the specification was justified because, in the court's view, Synopsys did not "argu[e] that the Asserted Claims must be *construed*"—i.e., at a formal *Markman* hearing—"as requiring a computer to perform the recited steps." *Id.* at 20a. Requiring that a particular limitation—entirely clear in light of the specification, and devoid of any underlying factual dispute—cannot be considered unless sought at a formal *Markman* construction hearing is inconsistent with this Court's and the Federal Circuit's cases.

The Federal Circuit has approved interpreting a patent's claims in light of its specification under § 101 without first considering that interpretation at a formal *Markman* hearing. See, *e.g.*, *In re TLI Commc'ns LLC Patent Litig.*, 823 F.3d 607, 613 (Fed. Cir. 2016); *Ultramercial, Inc.* v. *Hulu, LLC*, 772 F.3d 709, 713 (Fed. Cir. 2014), *cert. denied*, 135 S. Ct. 2907 (2015). So has this Court: In *Alice* the Court relied on a specification to interpret a patent notwithstanding the fact that a *Markman* hearing had not yet occurred. See 134 S. Ct. at 2352; see also *CLS Bank Int'l* v. *Alice Corp. Pty. Ltd.*, 768 F. Supp. 2d 221, 236 n.6 (D.D.C. 2011) (no *Markman* hearing had occurred in *Alice*). The requirement of a specific *Markman* construction of limitations completely clear in light of the specification, and lacking any underlying factual dispute, is inconsistent with this precedent.

Moreover, such a formal procedural requirement is entirely unnecessary. As the Court recently explained, the interpretation of a patent's text—including the specification—"presents a 'question solely of law.'" *Teva*, 135 S. Ct. at 837. When a court merely "examine[s] and … construe[s] the document's words without … resolv[ing] any underlying factual disput[e]," no extrinsic evidence need be consulted and hence no evidentiary hearing under *Markman* is necessary. *Id.* at 841; see also generally *Markman*, 517 U.S. 370 (*Markman* hearing exists to gather evidence of patent's meaning). While a *Markman* hearing is certainly warranted in some cases—such as when extrinsic evidence is needed to interpret the specification itself—the Federal Circuit erred by adopting a *per se* rule that the specification may not be consulted in the absence of a *Markman* hearing.

d. The Federal Circuit's anomalous approach to ascertaining the invention under § 101 would create a host of problems. For one, it would result in interpreting claims divorced from the written context in which they appear. As the Federal Circuit itself has acknowledged, a patent's claims "are part of 'a fully integrated written instrument' consisting principally of a specification." *Phillips*, 415 F.3d at 1315 (citation omitted). But in the decision below, the court of appeals ignored much of this "integrated written instrument." That disregards the "cardinal rule" of textual interpretation: words must be read in context. See, *e.g.*, *Gen. Dynamics Land Sys., Inc.* v. *Cline*, 540 U.S. 581, 596 (2004).

Furthermore, the Federal Circuit's approach "interpret[s] § 101 in ways that make patent eligibility depend simply on the draftsman's art"—precisely the error against which this Court has repeatedly warned. *Alice*, 134 S. Ct. at 2360; see also *Mayo*, 132 S. Ct. at

1294. Under the decision below, patentees whose lawyers insert a particular limitation in the claims are rewarded, while patentees, like Synopsys, who make clear precisely the same limitation in the specification are punished. Such a formalistic distinction "would ill serve the principles underlying the prohibition against patents for" abstract ideas. *Flook*, 437 U.S. at 593. Indeed, the Federal Circuit's rule here is entirely divorced from the purpose of the § 101 inquiry—i.e., determining whether the *subject matter* of the invention is patentable—and focuses instead on the form of the patent. Section 101 is not, and has never been, about the form of the patent. As a consequence, millions of patent holders may find that their patents were drafted incorrectly, jeopardizing numerous inventions that fall within the subject matter of § 101, but fail the Federal Circuit's unsupportable drafting rules.

To avoid the Federal Circuit's new interpretive rule, parties will be forced to undergo a *Markman* hearing and raise numerous arguments to preserve interpretations that are otherwise clear from the specification and without factual dispute. Such hearings, and the time and expense they involve, will be entirely futile. The hearings only effect will be to run up the cost of litigation for the parties and to consume judicial resources. See, *e.g.*, *Eon-Net LP* v. *Flagstar Bancorp*, 653 F.3d 1314, 1327 (Fed. Cir. 2011) (accused infringer had "expended over $600,000 in attorney fees and costs to litigate th[e] case through claim construction," even without full discovery).

Certiorari is urgently needed to correct the Federal Circuit's departure from this Court's case law and sound judicial procedure. The unjustified procedural requirements created by the decision below will affect patent litigation in every federal district court in

America, see 28 U.S.C. § 1295(a)(1), and countless patents granted before the court's draftsmanship requirements may be endangered. Nor will the Federal Circuit correct this error on its own: Synopsys sought rehearing en banc, raising precisely this issue, but the court of appeals denied Synopsys's petition. See Pet. Reh'g at 10–13, No. 15-1599 (ECF No. 79); Pet. App. 44a. Only this Court's intervention can reinstate the correct methodology for interpreting the thousands of patents that are litigated throughout the country every year.[4]

II. THE FEDERAL CIRCUIT'S RULE FOR PROCESS PATENTS INVOLVING MENTAL STEPS SHOULD BE REJECTED.

Certiorari is warranted for another reason: The Federal Circuit departed from this Court's decisions in *Alice* and *Bilski*, fabricating a *per se* rule of invalidity under § 101 for certain types of patents without regard to whether they disclose an "inventive concept." *Alice*, 134 S. Ct. at 2354–55. The Federal Circuit's break with this Court's precedents threatens all the harms which *Alice* and *Bilski* were designed to prevent. Certiorari is necessary to avoid these harms and resolve the conflict with this Court's cases created by the decision below.

In *Alice*, this Court explained that, if the challenged claims "are directed to … patent-ineligible concepts"

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[4] The Federal Circuit did not opine on whether the Gregory patents would be patentable if implementable solely on a computer. Pet. App. 21a. That fact in no way detracts from the urgent need for this Court's review. That the Federal Circuit could someday find the Gregory patents invalid under the proper standard does not prevent this Court from clarifying what the standard should be—clarification that is desperately needed in light of the decision below.

under step one, a court must proceed to the second step, 134 S. Ct. at 2355, by asking whether the claims nonetheless contain an "inventive concept"—i.e. "additional features" beyond the abstract idea that "ensure that the [claim] is more than a drafting effort designed to monopolize" that idea, *id.* at 2357 (alteration in original). The Court took pains to emphasize the importance of step two. After all, "[a]t some level, 'all inventions … embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.'" *Id.* at 2354 (omission in original) (quoting *Mayo*, 132 S. Ct. at 1293). That is why "an invention is not rendered ineligible for patent simply because it involves an abstract concept." *Id.* The search for an "inventive concept" in step two beyond the abstract idea is designed to preserve patents that may involve an abstract idea but achieve "a new and useful end." *Id.*

The importance of this search for an "inventive concept" explains why, under this Court's cases, a court may not simply stop after deciding at step one that a patent is drawn to a particular abstract idea—here, a mental process. *Benson* illustrates the proper treatment of abstract ideas, such as mental processes, under the second step of *Alice*. *Id.* at 2357 (drawing on *Benson* to inform step two analysis). There, the Court determined under step one that the challenged patent was drawn to a mental process for using an algorithm to convert one type of numeral into another. *Gottschalk* v. *Benson*, 409 U.S. 63, 66–67 (1972). The Court then analyzed under step two whether the patent nonetheless applied the algorithm "to a new and useful end." *Id.* at 67; see also *id.* at 71–72; *Alice*, 134 S. Ct. at 2357. Because the algorithm could be applied on "existing computers long in use," the Court concluded that the patent "did not supply the

necessary inventive concept" to save it from unpatentability. *Alice*, 134 S. Ct. at 2357; see also *Benson*, 409 U.S. at 67, 71–72.

The Federal Circuit's approach "differ[ed]" from this Court's § 101 framework in *Alice* and its forebears. Pet. App. 26a n.15. After determining (erroneously, as explained *supra* at 11–19) that the Gregory patents are directed to a mental process under step one, Pet. App. 15a–24a, the court of appeals decided that being drawn to this particular type of abstract idea *also* meant that the patents did not include an inventive concept under step two, *id.* at 24a–26a. The Federal Circuit did not dispute that the Gregory patents "add … to the abstract idea [of] translating a functional description of a logic circuit into a hardware component description of the logic circuit." *Id.* at 26a. The patents do this by disclosing "the use of assignment conditions"—which enable computers to design the most complex aspects of microchip circuitry for the first time—"as an intermediate step in the translation process." *Id.* But achieving this "new and useful end," *Alice*, 134 S. Ct. at 2354, was not enough for the Federal Circuit; the court held that the Gregory patents were invalid simply because they "are for a mental process" rather than restricted exclusively to implementation on a computer. Pet. App. 26a. By holding that merely being drawn to a mental process is enough to invalidate a patent, no matter the "new and useful end" it may obtain, the Federal Circuit adopted a *per se* rule that is flatly inconsistent with this Court's approach in *Alice*.

As this case illustrates, the Federal Circuit's decision to jettison step two for patents drawn to mental processes threatens precisely the harms that this second step was designed to prevent. As this Court explained in *Alice*, courts must "tread carefully in

construing [the] exclusionary principle" implicit in § 101 "lest it swallow all of patent law" by rendering invalid patents that achieve "new and useful end[s]." 134 S. Ct. at 2354. Here, the Federal Circuit invalidated patents that, the undisputed record shows, revolutionized an industry by allowing engineers to use computers to design breathtakingly complex microchip circuitry for the first time. "[I]mprov[ing] the functioning of the computer" by allowing it to design microchips better is a prime example of an invention the patent laws should protect. *Id.* at 2359. But the Federal Circuit's *per se* rule strips the Gregory patents of that protection.

That *per se* rule also violates this Court's decision in *Bilski*. In that case, the Court rejected another Federal Circuit *per se* rule that maintained a process patent was patentable under § 101 only if it was implementable on a machine or transformed an article. 130 S. Ct. at 3227. This Court dismissed this "machine-or-transformation" test, explaining that nothing in the statutory text limited a patentable process to implementation on a machine or transformation of an article. *Id.* at 3226. And a plurality of the Court emphasized the dangers of applying the rigid machine-or-transformation test to inventions of the Information Age, such as computer programs. *Id.* at 3227 (plurality opinion). The Federal Circuit's machine-or-transformation test, the plurality explained, risked distracting from the fundamental question in § 101 cases: whether the challenged patent protects a "valuable invention[] without transgressing the public domain." *Id.*

By conditioning patentability on whether the Gregory patents are implementable exclusively on a computer—regardless of the "new and useful" ends the invention achieved—the Federal Circuit's decision

below effectively revives the "machine-or-transformation" test this Court rejected in *Bilski*. The Federal Circuit expressly based its holding of invalidity solely on its belief that the Gregory patents were not exclusively computer-implementable. It held that the patents failed the first step of *Alice* because they were drawn to mental processes rather than implementable on a computer. *See* Pet. App. 15a–24a. And, as the Federal Circuit explained, the claims failed *Alice*'s second step for the same reason, *id.* at 24a–26a, regardless of the patents' revolutionary effect on the microchip design industry.

The Federal Circuit's rule in this case, like the one struck down in *Bilski*, has no basis in the statutory text. The term "process" in § 101 is defined as a "process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material." 35 U.S.C. § 100(b). No "ordinary, contemporary, common meaning of the definitional terms 'process, art or method' … require[s] these terms to be tied to a machine." *Bilski*, 130 S. Ct. at 3226 (internal citation omitted). And the courts are not permitted to impose atextual *per se* limits on the type of process that may be patentable. *Id.* at 3226–27.

Furthermore, the latest version of the *per se* rule threatens precisely the same dangers as the machine-or-transformation test that was discarded in *Bilski*. The plurality in that case cautioned that the machine-or-transformation test was unsuitable for Information Age inventions such as computer programs, because "[i]n the course of applying the … test to emerging technologies, courts may pose questions of such intricacy and refinement that they risk obscuring the larger object" of the patent laws. *Id.* at 3227 (plurality opinion). That is precisely what happened here: The Federal Circuit spent an entire opinion discussing

whether the Gregory patents are implementable exclusively on a computer without stepping back to ask the larger question: do the Gregory patents protect a "valuable invention[] without transgressing the public domain." *Id.* For the reasons given *supra* at 19–23, they clearly do.

This Court's review is needed to vindicate the principles laid down in *Alice* and *Bilski* and protect the thousands of patents that "improve the functioning of the computer," *Alice*, 134 S. Ct. at 2359, "without transgressing the public domain," *Bilski*, 130 S. Ct. at 3227 (plurality opinion).

CONCLUSION

For the foregoing reasons, the petition should be granted.

Respectfully submitted,

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APPENDIX

APPENDIX A

UNITED STATES COURT OF APPEALS,
FEDERAL CIRCUIT

2015-1599

SYNOPSYS, INC., A DELAWARE CORPORATION,

Plaintiff-Appellant,

v.

MENTOR GRAPHICS CORPORATION,
AN OREGON CORPORATION,

Defendant-Appellee.

Decided: October 17, 2016

OPINION

Before LOURIE, MOORE, AND CHEN, *Circuit Judges.*

CHEN, *Circuit Judge.*

Synopsys, Inc. appeals the District Court for the Northern District of California's grant of summary judgment invalidating certain claims of U.S. Patent Nos. 5,530,841; 5,680,318; and 5,748,488 (collectively, the Gregory Patents) under 35 U.S.C. § 101. *See Synopsys, Inc. v. Mentor Graphics Corp.*, 78 F.Supp.3d 958 (N.D. Cal. 2015) (*Summary Judgment Order*). Synopsys argues that, contrary to the district court's holding, the Gregory Patents are not directed to ineligible subject matter because they relate to complex algorithms used in computer-based synthesis of logic circuits. We disagree. A review of the actual claims at issue shows that they are directed to the abstract idea

of translating a functional description of a logic circuit into a hardware component description of the logic circuit.[1] This idea of reviewing a description of certain functions and turning it into a representation of the logic component that performs those functions can be—and, indeed, was—performed mentally or by pencil and paper by one of ordinary skill in the art. Moreover, the claims do not call for the involvement of a computer. They therefore cannot be characterized as an improvement in a computer as a tool. The claims add nothing to the abstract idea that rises to the level of an "inventive concept" as required by precedent. We therefore *affirm* the district court's grant of summary judgment of invalidity.

BACKGROUND

I. The Gregory Patents

The Gregory Patents are continuations of since-abandoned U.S. Patent Application No. 07/632,439 and all share a common specification.[2] The patents relate generally to the logic circuit design process. The logic circuit design process has evolved significantly over time. Synopsys describes the inventions of the Gregory Patents as critical steps in this evolution.

In the early days of logic circuits,[3] a designer was required to specify his design in great detail. He would

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[1] For example, the claim the parties identify as representative calls for generating a schematic or netlist representation of a level sensitive latch when given a description of the logic operation of a level sensitive latch. '841 patent, 62:61–63:12.

[2] Unless otherwise noted, all references to the common specification will be to the specification of the '841 patent. Equivalent disclosures can be found in the '318 and '488 patents.

[3] A "logic circuit" is an electrical circuit where all signals take the form of a logic high (also known as "true" and often

do so in the form of a schematic diagram that identified individual hardware components and the interconnections between them or via a set of Boolean logic equations that specified the precise functionality of the design. '841 patent, 1:41-44. A fabrication facility would then build the corresponding physical circuit based on the architecture presented in the detailed design.

Over time, logic circuits became more and more complex. As complexity increased, many designers began to focus on the higher-level functionality of their designs and became less concerned with the detailed schematics or Boolean logic equations necessary to implement that functionality. *Id.* at 1:47-49. These developments created a need for a form of computer code that a designer could use to describe a logic circuit at a functional level. This led to the advent of various functional computer languages known as hardware description languages (HDLs). *Id.* at 1:50-55. HDLs allowed designers to "describe only the desired operation of the logic circuit, i.e., the signals generated by the logic circuit," rather than having to specify the actual individual components and interconnections of the logic circuit. *Id.* at 1:62-64; *see also id.* at 1:50-55 (describing HDLs as operating "at least one level of abstraction removed from a schematic diagram or a set of [B]oolean logic equations").

The introduction of HDLs necessitated the development of computerized design tools that could translate the functional description of the logic circuit into a detailed design for fabrication. *Id.* at 1:64-67. Early computerized design tools, however, could only recognize and translate simple circuit elements. *Id.* at 2:1-3. "For many circuit elements, such as high

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represented by the binary digit "1") or a logic low (also known as "false" and often represented by the binary digit "0").

impedance drivers, level sensitive latches and edge sensitive flip-flops, the designer was required first to specify [(i.e., instantiate)] the specific circuit element and then the desired connection of that element using the HDL." *Id.* at 2:3-7.

The Gregory Patents describe constructs known as "control flow graphs," *id.* at 2:65-3:8, and "assignment conditions," *id.* at 3:22–30, that provide a scheme to translate HDL-based functional descriptions of logic circuits into hardware component descriptions of those same circuits without requiring the designer to instantiate any individual hardware components—not even high impedance drivers, level sensitive latches, or edge sensitive flip-flops. *Id.* at 2:27-36. The patent specification goes through several examples for different components to illustrate how control flow graphs and assignment conditions are used to translate a functional description of a logic circuit to a hardware component description of that logic circuit.

We will explore in detail one such example, which is claimed in claim 1 of the '841 patent.[4] But, first, one must understand the general concept of binary logic as well as the constructs introduced in the Gregory Patents—namely flow control statements, directive statements, asynchronous load functions, and asynchronous data functions—what they are and how they work. We can gain this understanding through a review of the following simple example of HDL code:

```
If(COND)
   Q: = 1;
else
   Q: = 0;
endif
```

[4] The parties agree that claim 1 of the '841 patent is representative of all claims on appeal.

Here, "Q" is the output of the segment of code and "COND" is a condition. The value of output Q is dictated by the line of code "If(COND)," which the specification labels as a "flow control statement." *See* '841 patent, 11:20–23. This line of code asks the question "Is condition COND true?"—i.e., does it equal 1?[5] As the moniker "flow control statement" suggests, the answer to this question *controls the flow* of how the rest of the code runs. *Id.* at 11:18-20. In the above example, when condition COND is true (i.e., has the value "1"), the code *flows* to the immediately-following line of code, i.e., "Q: = 1." The specification labels this line of code as a "directive statement" for it directs that output Q be assigned the value 1. *Id.* at 11:1-8. In contrast, when condition COND is false (i.e., has the value "0"), the code skips the directive statement "Q: = 1" and *flows* directly to the line of code "else." Here, we find another directive statement: "Q: = 0." Pursuant to this directive statement, Q is assigned the value 0. The relationship between condition COND and output Q can be summarized in the following table:

COND	Q
1	1
0	0

The Gregory Patents describe how the invention converts the statements from the HDL code into two constructs the specification calls "assignment conditions": (1) an "asynchronous load function;" and (2) an

[5] In the field of binary logic to which the Gregory Patents belong, data is represented by "bits." A bit can either equal 1 (also known as logic "true") or 0 (also known as logic "false").

"asynchronous data function." These two assignment conditions provide another type of description of the functionality of the HDL code. The district court construed "asynchronous load function," represented "AL( )," as "a hardware description function for load specifying the condition or conditions under which the variable is [asynchronously[6]] assigned a value." *Claim Construction Order*, 2013 WL 5957866, at *4. In the above example, the "asynchronous load function" for output Q is "1" (i.e., AL(Q) = 1), because output Q is assigned a new value (i.e., it is "loaded") both when condition COND is true (Q: = 1) and when it is false (Q: = 0). *See* '841 patent, 4:21-23.

The district court construed "asynchronous data function," represented "AD( )," as "a hardware description function for data specifying the condition or conditions under which the variable is [asynchronously] assigned a value." *Claim Construction Order*, 2013 WL 5957866, at *3. Here, the "asynchronous data function" for output Q is "COND" because output Q is assigned the value "1" if, and only if, condition COND is true. '841 patent, 4:23-25. Therefore, AD(Q) = COND.

The asynchronous load function for this example HDL code (i.e., AL(Q) = 1) is *constant*, because it always equals 1. In that way it differs from the asynchronous data function. The value of the asynchronous data function (i.e., AD(Q) = COND) is *non-constant* or

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[6] The district court construed "asynchronous" to mean "not triggered by a clock signal." *Synopsys, Inc. v. Mentor Graphics Corp.*, No. C 12–6467 MMC, 2013 WL 5957866, at *4 (N.D. Cal. Nov. 7, 2013) (*Claim Construction Order*). "Asynchronous" is the opposite of "synchronous," which the district court construed to mean "triggered by a clock signal." *Id.* The example HDL code is asynchronous, because it does not take a clock signal as an input.

variable, because it can be 1 or 0 depending on the value of condition COND. The concept of constant—as opposed to non-constant or variable—assignment conditions will be important as we next explore claim 1.

Representative claim 1 and the associated portion of the specification detail the method of using assignment conditions to translate from a functional description of a level sensitive latch into a hardware component description of that same latch. Claim 1 reads:

> A method for converting a hardware independent user description of a logic circuit, that includes flow control statements including an IF statement and a GOTO statement, and directive statements that define levels of logic signals, into logic circuit hardware components comprising:
>
> converting the flow control statements and directive statements in the user description for a logic signal Q into an assignment condition AL(Q) for an asynchronous load function AL( ) and an assignment condition AD(Q) for an asynchronous data function AD( ); and
>
> generating a level sensitive latch when both said assignment condition AL(Q) and said assignment condition AD(Q) are non-constant;
>
> wherein said assignment condition AD(Q) is a signal on a data input line of said flow through latch;
>
> said assignment condition AL(Q) is a signal on a latch gate line of said flow through latch; and
>
> an output signal of said flow through latch is said logic signal Q.

Id. at 62:61–63:12.

A level sensitive latch is a basic form of memory. It is a hardware component that stores a binary input (i.e., the value "1" or "0"), but only when a specified condition is true. A level sensitive latch can be described functionally using HDL code as follows:

TABLE 8

An Example of User Description 110

```
If( COND)
    Q: = D
    else
    endif
```

Id. at 21:49-56. Here, "D" represents the input to the latch and "Q" the output.

The relationship between input D and output Q is dictated by the "flow control statement" defined by the line of code "If(COND)." In this example, when condition "COND" is true (i.e., has the value "1"), the code *flows* to the immediately following line of code—i.e., "Q: = D"—and output Q is assigned the value of input D. In contrast, when condition COND is false (i.e., has the value "0"), the code skips the directive statement "Q: = D" and *flows* directly to the line of code "else." In this example, no instructions follow "else." The value of output Q therefore remains unchanged. In sum, when condition COND is true, output Q is assigned the value of input D; when condition COND is false, output Q retains its prior value regardless of whether the value of input D remains the same or changes. The relationship between condition COND, input D, and output Q can be summarized in the following table:

COND	D	Q
1	1	1
1	0	0
0	1	Q
0	0	Q

The claimed method takes the functional description of the latch as an input. *Id.* at 62:61-62. It then converts the functional description into an equivalent description in the form of (1) an asynchronous load function; and (2) an asynchronous data function. *Id.* 62:66-63:3. Here, the asynchronous load function for output Q is COND because output Q is assigned a new value (i.e., it is "loaded") whenever condition COND is true. The asynchronous data function for Q is "COND*D"[7] because output Q is assigned the value "1" if, and only if, both condition COND and input D are true.

The assignment conditions associated with the functional description of the latch are summarized in the table below:

TABLE 9

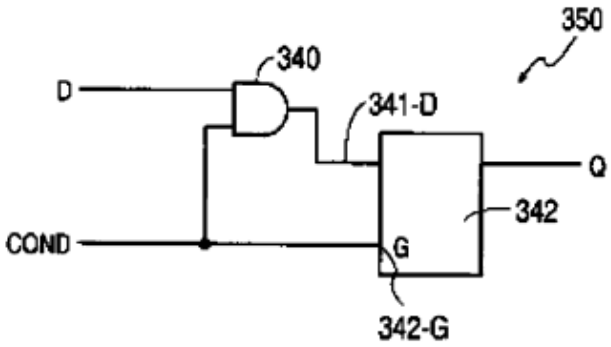
	Assignment Conditions					
Variable	AL()	AD()	SL()	SD()	DC()	Z()
Q	COND	COND*D	0	0	0	0

Id. at 21:58–65.

[7] "*" symbolizes a logic AND. The logic AND of two variables is true if, and only if, both variables are true. If either variable is false, the logic AND of the variables is also false.

Claim 1 specifies that where, as here, the asynchronous load function and the asynchronous data function are non-constant,[8] the claimed method generates a level sensitive latch. *Id.* at 63:4-6; *see also id.* at 24:56-63. Claim 1 further specifies that the latch's data input is the asynchronous data function (i.e., COND*D); the latch's gate is the asynchronous load function (i.e., COND); and the latch's output is Q. *Id.* at 63:7-12; *see also id.* at 22:12-23, 24:56-63.

A hardware component description of the level sensitive latch is shown below:



Id. at Fig. 8A. In this hardware component description, the rectangle marked with 342 represents the level sensitive latch, itself. Consistent with the above description, the latch's input (341-D) is the logic AND (340) of input D and condition COND; and, its gate (342-G) is condition COND. *Id.* at 22:12–23.

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[8] The asynchronous load function and the asynchronous data function are "non-constant" (i.e., variable) because each can change—COND in the case of the asynchronous load function and COND*D in the case of the asynchronous data function. Claim 1 does not specify what component is generated if either the asynchronous load function or the asynchronous data function (or both) were constant—for example, if one of the functions was always true (e.g., AL(Q) = 1).

Importantly, the Gregory Patents make clear that HDL code existed in the prior art. *See id.* at 1:49-50 ("Hardware description language (HDL) was developed to assist such designers."). The HDL code for the level sensitive latch shown in Table 8 was already well known by the time the claimed inventions of the Gregory Patents were conceived. The same is true of the circuit diagram for a level sensitive latch shown in Figure 8A; circuit diagrams like this existed long before the Gregory Patents. *See id.* at 1:41-44 ("Historically, a user was required typically to supply either a logic schematic diagram for use in the automated design process . . . ."). What Gregory instead claims to have invented is a process for interpreting the HDL code in Table 8 that uses the assignment conditions of Table 9 to identify the circuit diagram of Figure 8A as the hardware that performs the function recited in the HDL code. At bottom, the information provided in Table 8 (code), Table 9 (assignment conditions), and Figure 8A (circuit diagram) are all equivalent representations of the same thing: a level sensitive latch.

The Gregory Patents describe and claim additional examples relating to other circuit components, specifically high impedance drivers and edge sensitive flip-flops, that involve the use of different assignment conditions—namely synchronous load functions, synchronous data functions, don't care functions, and high-impedance functions.

II. Procedural History

Synopsys filed suit against Mentor Graphics Corp. on December 12, 2012, in the Northern District of California alleging infringement of the Gregory Patents and U.S. Patent No. 6,836,420 (collectively, the patents-in-suit). In particular, Synopsys alleged that Mentor

Graphics' "Precision" family of logic synthesis products and its "Veloce" family of emulators infringed the following claims of the patents-in-suit: claim 1 of the '841 patent; claims 32, 35, and 36 of the '318 patent; claims 1, 2, 8, and 9 of the '488 patent; and claims 1-3, 10-13, and 20 of the '420 patent.

Based on disputed issues raised by the parties, the court construed certain claim terms of the patents-in-suit on November 7, 2013. Notably, the court did not construe any claim of the Gregory Patents to require the use of a computer—general purpose or otherwise—or any other type of hardware.[9] *See Claim Construction Order*, 2013 WL 5957866, at *2-5. Neither party challenges any of the district court's claim constructions on appeal.

The parties subsequently cross-moved for summary judgment on Mentor Graphics' defense that the Gregory Patents were invalid under 35 U.S.C. § 101. The court granted Mentor Graphics' motion and invalidated all asserted claims of the Gregory Patents. *See Summary Judgment Order*, 78 F.Supp.3d at 966. In reaching its decision, the court applied the now common two-step test described by the Supreme Court in *Alice Corp. v. CLS Bank International*, ——U.S. ——, 134 S.Ct. 2347, 189 L.Ed.2d 296 (2014). *See Summary Judgment Order*, 78 F.Supp.3d at 962-63. The court observed that "[e]ach of the steps in the claimed methods can be performed by a skilled designer either mentally or with pencil and paper." *Id.* at 961. Due to the

[9] Perhaps more notably, none of Synopsys' proposed constructions required the use of a computer or any type of hardware. J.A. 2395-422. In particular, representative claim 1's "generating a . . . latch" means, not creating the physical component, but generating a representation (e.g., description, schematic, etc.) of such a component.

breadth of the claims, the court found, under the first step of the *Alice* test, that "the claims are directed to a mental process . . . 'a subcategory of unpatentable abstract ideas.'" *Id.* at 963 (quoting *CyberSource Corp. v. Retail Decisions*, *Inc.*, 654 F.3d 1366, 1371 (Fed. Cir. 2011)); *see also id.* at 961 (noting that while the claimed method "is primarily intended for use with a computer," "the claims themselves do not expressly call for a computer or other piece of equipment"); *id.* at 963 ("The claimed methods here at issue do not entail anything physical. Rather, as discussed above, the asserted claims are directed to the process of inference, which is fundamental to IC design and can be performed mentally."); *id.* at 964 ("[T]he claimed methods do not require complex calculations; as noted, the claimed steps were performed mentally by the inventors and can be performed by a skilled designer either mentally or with the aid of a pencil and paper.").

Turning to the second step of the *Alice* test, the court rejected Synopsys' argument that the claims necessarily contained an inventive concept because Mentor Graphics failed to present prior art that disclosed the claimed methods. *Id.* at 964. The court then found that, while the claims were directed to a "specific" mental process, they nonetheless "preempt[ed] a building block of human ingenuity." *Id.* at 965. Finally, it found that the claims concerned "well-understood, routine, conventional activity, previously engaged in by those in the field." *Id.* ("As acknowledged in the specification, skilled designers had been inferring the necessary parts and connections for ICs long before the Gregory patents issued.").

The court entered final judgment with respect to the Gregory Patents on April 20, 2015.[10] Synopsys appeals from this final judgment. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

DISCUSSION

"We review a district court's grant of summary judgment according to the law of the regional circuit, here the Ninth Circuit, where summary judgment is reviewed de novo." *Kaneka Corp. v. Xiamen Kingdomway Grp. Co.*, 790 F.3d 1298, 1303 (Fed. Cir. 2015) (citations omitted). "In the Ninth Circuit, summary judgment is appropriate when, drawing reasonable inferences in favor of the non-moving party, there is no genuine issue of material fact." *Id.* (citing *Comite de Jornaleros de Redondo Beach v. City of Redondo Beach*, 657 F.3d 936, 942 (9th Cir. 2011)).

A patent may be obtained for "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35 U.S.C. § 101. The Supreme Court has "'long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.'" *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, —— U.S. ——, 133 S.Ct. 2107, 2116, 186 L.Ed.2d 124 (2013) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*,

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[10] In that same order, the court stayed further proceedings on the '420 patent in view of a then-pending *inter partes* review. The Patent Trial and Appeal Board (Board) subsequently found the challenged claims of the '420 patent unpatentable as obvious. *Mentor Graphics Corp. v. Synopsys, Inc.*, IPR2014-00287, 2015 WL 3637569 (PTAB June 11, 2015). We recently affirmed the Board's decision. *Synopsys, Inc. v. Mentor Graphics Corp.*, No. 2015–2056, —— Fed.Appx. ——, 2016 WL 5899745 (Fed. Cir. Oct. 11, 2016).

—— U.S. ——, 132 S.Ct. 1289, 1293, 182 L.Ed.2d 321 (2012)) (alteration omitted). First in *Mayo* and later in *Alice*, the Supreme Court set forth a two-step analytical framework to identify patents that, in essence, claim nothing more than abstract ideas. The court must first "determine whether the claims at issue are directed to a patent-ineligible concept." *Alice Corp.*, 134 S.Ct. at 2355. If so, the court must then "consider the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id.* (quoting *Mayo*, 132 S.Ct. at 1298, 1297). The Supreme Court has described this second step of the analysis as "a search for an 'inventive concept.'" *Id.*

I. *Alice* Step 1: Are the Asserted Claims directed to an abstract idea?

The district court based its *Alice* Step 1 analysis on a basic premise: "the claims are directed to a mental process." *Summary Judgment Order*, 78 F.Supp.3d at 963. We held in *CyberSource* that mental processes are "a subcategory of unpatentable abstract ideas." 654 F.3d at 1371. As we explained:

> Methods which can be performed entirely in the human mind are unpatentable not because there is anything wrong with claiming mental method steps as part of a process containing non-mental steps, but rather because computational methods which can be performed *entirely* in the human mind are the types of methods that embody the "basic tools of scientific and technological work" that are free to all men and reserved exclusively to none.

Id. at 1373 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67, 93 S.Ct. 253, 34 L.Ed.2d 273 (1972)) (emphasis in original). While the Supreme Court has altered the § 101 analysis since *CyberSource* in cases like *Mayo* and *Alice*, we continue to "treat[ ] analyzing information by steps people go through in their minds, or by mathematical algorithms, without more, as essentially mental processes within the abstract-idea category." *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016) (citations omitted).

Although the Asserted Claims (i.e., claim 1 of the '841 patent; claims 32, 35, and 36 of the '318 patent; and claims 1, 2, 8, and 9 of the '488 patent), which are all method claims, are devoid of any reference to a computer or any other physical component, Synopsys disputes the district court's characterization of the claims as mental processes. It suggests that the "complexity" of the claimed methods would make it implausible—if not impossible—for a skilled logic circuit designer to perform the methods mentally or with pencil and paper. Appellant's Opening Br. 21. It distinguishes these supposedly "complex" claims from the "simple" concepts found unpatentable in cases like *Alice* and *Bilski*[11]. Appellant's Opening Br. 39.

But, Synopsys' argument is belied by the actual claims at issue. The parties agree that claim 1 of the '841 patent, discussed above, is representative of all Asserted Claims. For convenience, we present the claim again here:

> A method for converting a hardware independent user description of a logic circuit, that includes flow control statements including an IF statement

[11] *Bilski v. Kappos*, 561 U.S. 593, 130 S.Ct. 3218, 177 L.Ed.2d 792 (2010).

and a GOTO statement, and directive statements that define levels of logic signals, into logic circuit hardware components comprising:

converting the flow control statements and directive statements in the user description for a logic signal Q into an assignment condition AL(Q) for an asynchronous load function AL( ) and an assignment condition AD(Q) for an asynchronous data function AD( ); and

generating a level sensitive latch when both said assignment condition AL(Q) and said assignment condition AD(Q) are non-constant;

wherein said assignment condition AD(Q) is a signal on a data input line of said flow through latch;

said assignment condition AL(Q) is a signal on a latch gate line of said flow through latch; and

an output signal of said flow through latch is said logic signal Q.

'841 patent, 62:61-63:12. The claim recites a method of changing one description of a level sensitive latch (i.e., a functional description) into another description of the level sensitive latch (i.e., a hardware component description) by way of a third description of that very same level sensitive latch (i.e., assignment conditions). As demonstrated above, *supra* at 1142-44, and in the patent specification itself, '841 patent, 21:45-22:23, the method can be performed mentally or with pencil and paper. The skilled artisan must simply analyze a four-line snippet of HDL code:

TABLE 8

An Example of User Description 110

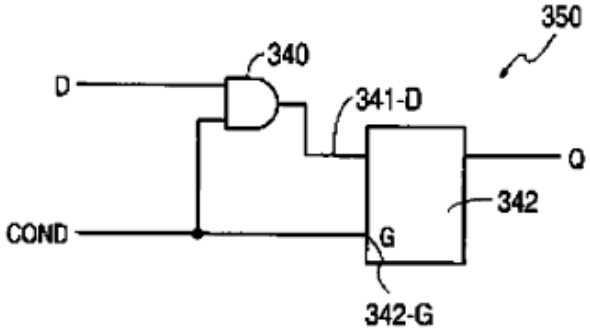
If(COND)
Q: = D
else
endif

id. at 21:49–56; translate this short piece of code into assignment conditions:

TABLE 9

	Assignment Conditions					
Variable	AL()	AD()	SL()	SD()	DC()	Z()
Q	COND	COND*D	0	0	0	0

id. at 21:58-65; and further translate those two assignment conditions into a schematic representation of a level sensitive latch:



id. at Fig. 8A. Although an understanding of logic circuit design is certainly required to perform the steps, the limited, straightforward nature of the steps involved in the claimed method make evident that a skilled artisan could perform the steps mentally. The inventors of the Gregory Patents confirmed this point

when they admitted to performing the steps mentally themselves. *Summary Judgment Order*, 78 F.Supp.3d at 961, 964.

Synopsys' reliance on *TQP Development, LLC v. Intuit Inc.*, No. 2:12-cv-180-WCB, 2014 WL 651935 (E.D. Tex. Feb. 19, 2014), is therefore misplaced. *See* Appellant's Opening Br. 39 n.8. In that case, the district court denied the defendant's motion for summary judgment that claims for a specific data encryption method for computer communication were invalid under § 101. *TQP*, 2014 WL 651935, at *1. It distinguished the claims at issue from the mental processes found unpatentable in cases like *Gottschalk*. It explained that unlike those "simple," "basic" processes, the plaintiff's "invention involves a several-step manipulation of data that, *except in its most simplistic form, could not conceivably be performed in the human mind or with pencil and paper*." *Id.* at *4 (emphasis added). This case is different. Representative claim 1 is directed to generating a representation of a single specific hardware component and can be—and was—performed mentally or with pencil and paper.

Synopsys next argues that even if the Asserted Claims *could* be performed mentally they *would*, in practice, be performed on a computer. *See*, *e.g.*, Appellant's Opening Br. 39 n.8 ("The methods here are designed for use by computers, and a skilled artisan would understand that the process is designed solely for computers."), Appellant's Reply Br. 9 n.6 ("Mentor's argument completely ignores that the purpose of the claimed inventions was to avoid the need to design certain circuit elements by hand and enable the increasingly necessary automation of circuit design through the use of synthesis software."). It attempts to tie the

claims to those computerized design tools now common in industry. In support of this argument, counsel for Synopsys during oral argument pointed to the "200 pages of code" attached to the specifications of the Gregory Patents that he contended reveal the "true novelty" of the Asserted Claims. Oral Argument Tr. 4:25-4:37.

While Synopsys may be correct that the inventions of the Gregory Patents were intended to be used in conjunction with computer-based design tools, the Asserted Claims are not confined to that conception. The § 101 inquiry must focus on the language of the Asserted Claims themselves. *See Accenture Global Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed. Cir. 2013) (admonishing that "the important inquiry for a § 101 analysis is to look to the claim"); *see also Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1346 (Fed. Cir. 2014) ("We focus here on whether the claims of the asserted patents fall within the excluded category of abstract ideas."), *cert. denied*, —— U.S. ——, 136 S.Ct. 119, 193 L.Ed.2d 208 (2015).

On their face, the claims do not call for any form of computer implementation of the claimed methods. Synopsys stops short of arguing that the Asserted Claims must be *construed* as requiring a computer to perform the recited steps. Synopsys never sought such a construction before the district court and it does not press for such a construction here.[12] Its argument

[12] While Synopsys repeatedly describes the claimed methods as implemented on a computer, *see*, *e.g.*, Appellant's Opening Br. 12 ("The patents claim methods for a computer running specialized software to take 'flow control statements' and 'directive statements' in a user's description written in HDL, and convert them into 'assignment conditions' for 'hardware description functions,'

therefore fails. Because the Asserted Claims make no mention of employing a computer or any other physical device, they are so broad as to read on an individual performing the claimed steps mentally or with pencil and paper. Just as we have held that complex details from the specification cannot save a claim directed to an abstract idea that recites generic computer parts, the Gregory Patents' incorporation of software code cannot save claims that lack any computer implementation at all. *See Accenture*, 728 F.3d at 1345 ("[T]he complexity of the implementing software or the level of detail in the specification does not transform a claim reciting only an abstract concept into a patent-eligible system or method.").

For this reason, we need not decide whether a computer-implemented version of the invention would not be "directed to" an abstract idea. And, for the same reasons, Synopsys cannot rely on our decisions in *Enfish*[13] and *McRO*[14] to support the patentability of the Asserted Claims. In *Enfish*, we held that claims "directed to a specific improvement to the way computers operate" to store and retrieve data were not unpatentably abstract. 822 F.3d at 1336. The claims were not simply drawn to a disembodied data table. *See id.* at 1337 ("Here, the claims are not simply

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which, in turn, are used by the computer to determine the appropriate hardware and connections." (citations omitted)), its counsel recognized at oral argument that the words of the Asserted Claims do not require a computer and he referred instead to the patent specification and extrinsic evidence that a human would not use the methods as claimed. Oral Argument Tr. 12:26-13:01.

[13] *Enfish*, *LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016).

[14] *McRO*, *Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 2016 WL 4896481 (Fed. Cir. Sept. 13, 2016).

directed to any form of storing tabular data, but instead are specifically directed to a *self-referential* table for a computer database." (emphasis in original)). In *McRO*, we similarly held that claims that recited "a specific asserted improvement in computer animation" were not directed to an unpatentable abstract idea. 2016 WL 4896481, at *8. By their terms and the district court's unchallenged constructions, the Asserted Claims do not involve the use of a computer in any way. *See* J.A. 2080 (Synopsys' counsel stating that "computers aren't called out" in representative claim 1); Oral Argument Tr. 12:26-12:48 (Synopsys' counsel conceding that the claims do not "speak[ ]" in terms of using a computer the way the specification does). The Asserted Claims thus cannot be characterized as an improvement in computer technology.

That a human circuit designer may not use the specific method claimed when translating a functional description of a logic circuit into a hardware component description of the logic circuit as Synopsys contends does not change this result. Indeed, the Supreme Court rejected this argument in *Gottschalk*. There, the Court reviewed a claimed "method for converting binary-coded decimal (BCD) numerals into pure binary numerals." *Gottschalk*, 409 U.S. at 64, 93 S.Ct. 253. It recognized that the claimed method had been designed for use on a computer and "varie[d] the ordinary arithmetic steps a human would use by changing the order of the steps, changing the symbolism for writing the multiplier used in some steps, and by taking subtotals after each successive operation." *Id.* at 67, 93 S.Ct. 253. It found that the claimed method, which "c[ould] be performed without a computer," was nonetheless not patent-eligible. *Id.*

Synopsys' argument that "[t]he [A]sserted [C]laims . . . do not preempt *all* conversions" from functional descriptions of logic circuits to hardware component descriptions of logic circuits, Appellant's Opening Br. 18 (emphasis in original), likewise misses the mark. "While preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility." *Ariosa Diagnostics*, *Inc. v. Sequenom*, *Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015). "Where a patent's claims are deemed only to disclose patent ineligible subject matter under the *Mayo* framework, as they are in this case, preemption concerns are fully addressed and made moot." *Id.*

The district court did not define the abstract idea of the Asserted Claims. Synopsys likewise makes no proposal. Mentor Graphics argues that the Asserted Claims are directed to the abstract idea of "translating a functional description of an existing, intangible logic element into its corresponding assignment-condition description, and then into yet another abstract description of the same logic element." Appellee's Br. 28-29.

We recognize that defining the precise abstract idea of patent claims in many cases is far from a "straightforward" exercise. *DDR Holdings*, *LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257 (Fed. Cir. 2014). But, here, the Asserted Claims are drawn to the abstract idea of: translating a functional description of a logic circuit into a hardware component description of the logic circuit. As detailed above, this translation is a mental process. In contrast to Mentor Graphics' articulation of the abstract idea, which largely restates representative claim 1 in different words, we believe our definition more accurately captures the "basic thrust" of the Asserted Claims. *BASCOM Global Internet Servs.*, *Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1348

(Fed. Cir. 2016). And, it is wholly consistent with the Gregory Patents' own descriptions of the invention, as laid out in the Abstract, specification, and claims:

- "A method and system are provided for generating a logic network using a hardware independent description means." '841 Patent, Abstract.
- "This invention relates generally to methods and systems used to convert a hardware language description to a logic circuit . . . ." *Id.* at 1:30-32.
- "A method for converting a hardware independent user description of a logic circuit . . . into logic circuit hardware components . . . ." *Id.* at 62:61-65.

Having now defined the abstract idea of the Asserted Claims we turn to the second step of the *Alice* analysis.

II. *Alice* Step 2: Do the Asserted Claims include an inventive concept?

In *Alice*, the Supreme Court described an "inventive concept" 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.'" *Alice*, 134 S.Ct. at 2355 (quoting *Mayo*, 132 S.Ct. at 1294) (alteration in original). Synopsys equates the inventive concept inquiry with novelty and contends that the Asserted Claims contain an inventive concept because they were not shown to have been anticipated by (35 U.S.C. § 102) or obvious over (35 U.S.C. § 103) the prior art. *See* Appellant's Opening Br. 43 ("[T]he district court ignored the fact that the methods in the asserted claims of the Gregory patents were entirely novel solutions and could not be found anywhere in the prior

art."). That position misstates the law. It is true that "the § 101 patent-eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap." *Mayo*, 132 S.Ct. at 1304. But, a claim for a *new* abstract idea is still an abstract idea. The search for a § 101 inventive concept is thus distinct from demonstrating § 102 novelty.

That being said, the contours of what constitutes an inventive concept are far from precise.

In *DDR Holdings*, we held that claims "directed to systems and methods of generating a composite web page that combines certain visual elements of a 'host' website with content of a third-party merchant" contained the requisite inventive concept. 773 F.3d at 1248. We explained that the claims at issue involved a technological solution that overcame a specific challenge unique to the Internet. *Id.* at 1259. This distinguished the claims at issue from those claims found unpatentable in earlier cases. *Id.* And, it ensured that the claims satisfied the *Alice* Step 2 inquiry under any conceivable articulation of the claims' underlying abstract idea. *Id.* at 1257.

In *BASCOM*, we likewise held that claims "directed to filtering content on the Internet" contained an inventive concept. 827 F.3d at 1348. We recognized that "the limitations of the claims, taken individually, recite generic computer, network and Internet components, none of which is inventive by itself." *Id.* at 1349. We explained, however, that "an inventive concept can be found in the non-conventional and non-generic arrangement of known, conventional pieces." *Id.* at 1350. We found that the claims at issue contained just such an inventive arrangement through "the installation of a filtering tool at a specific location, remote

from the end-users, with customizable filtering features specific to each end user." *Id.* The claimed custom filter could be located remotely from the user because the invention exploited the ability of Internet service providers to associate a search request with a particular individual account. *Id.* This technical solution overcame defects in prior art embodiments and elevated an otherwise abstract idea to a patentable invention. *Id.*

The Asserted Claims, in contrast to those at issue in *DDR Holdings* and *BASCOM*, contain no such technical solution. To the extent the Asserted Claims add anything to the abstract idea (i.e., translating a functional description of a logic circuit into a hardware component description of the logic circuit), it is the use of assignment conditions as an intermediate step in the translation process. *See* Appellant's Reply Br. 21 ("The use of assignment conditions in converting user descriptions into specific logic circuits is, without question, an inventive concept."). But, given that the claims are for a mental process, assignment conditions, which merely aid in mental translation as opposed to computer efficacy, are not an inventive concept that takes the Asserted Claims beyond their abstract idea.[15] Unlike the claims at issue in *DDR Holdings* and *BASCOM*, the Asserted Claims do not introduce a technical advance or improvement. They contain nothing that "amounts to significantly more than a patent upon the [abstract idea] itself.'" *Alice*, 134 S.Ct. at 2355 (citation omitted).

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[15] The inventive concept inquiry as it relates to the Asserted Claims thus differs from the one we often face in cases under § 101, i.e., whether the claimed invention is merely an abstract idea running on a general purpose computer as opposed to a concrete improvement in how the computer itself functions.

CONCLUSION

Whether different claims otherwise supported by the written description of the Gregory Patents directed to a computerized design tool that uses assignment conditions to more efficiently identify and generate logic circuits from a functional description could pass muster under § 101 is not before us. Our analysis focuses, as it must, on the Asserted Claims. Those claims are directed to an abstract mental process and contain no inventive concept. The claims are therefore invalid under 35 U.S.C. § 101. We *affirm* the district court's grant of summary judgment.

AFFIRMED

COSTS

Each party shall bear its own costs.

APPENDIX B

UNITED STATES DISTRICT COURT,
N.D. CALIFORNIA

No. C 12-6467 MMC

SYNOPSYS, INC.,

Plaintiff,

v.

MENTOR GRAPHICS CORPORATION,

Defendant.

Signed 01/20/2015

ORDER ON MOTIONS FOR SUMMARY JUDGMENT

MAXINE M. CHESNEY, *United States District Judge.*

Before the Court are cross-motions for summary judgment, filed October 3, 2014, by plaintiff Synopsys Inc. ("Synopsys") and defendant Mentor Graphics Corporation ("Mentor"), by which the parties set forth their respective positions as to the patent eligibility of eight claims as recited in three patents held by Synopsys,[1] specifically, claims 1, 2, 8, and 9 of U.S. Patent No. 5,748,488 ("'488 patent"), claim 1 of U.S. Patent No. 5,530,841 ("'841 patent"), and claims

[1] Synopsys' motion addresses other issues as well. This order concerns only the issue of patent eligibility.

32, 35, and 36 of U.S. Patent No. 5,680,318 ("'318 patent").[2]

BACKGROUND[3]

The three patents at issue (hereinafter "the Gregory patents") relate generally to the field of integrated circuit ("IC" or "chip") design. ICs are composed of logic circuits and memory circuits, which themselves are composed of "tens, hundreds, or even potentially thousands, of transistors, resistors, capacitors, or other hardware components." (*See* Decl. of Ronald D. Blanton, Ph.D. ("Blanton Decl."), filed October 3, 2014, ¶ 8.) In the 1950s, when ICs were first developed, engineers would hand draw the chip designs with symbols or schematics representing the hardware components to be used. In the mid-1980s, a method of automating chip design, EDA, was developed to help solve the problem of the ever-increasing number of hardware components capable of being integrated on a chip. EDA "involves the use of computers to, among other things, create integrated circuit designs, simulate the designs using only software, and emulate the designs using a combination of hardware and software." (*Id.* ¶ 14.)

The Gregory patents are directed to a form of EDA known as "logic synthesis." In the subject field, logic synthesis is generally understood to mean the process of "using a computer tool to interpret or 'synthesize' a human designer's descriptions of the operations of the integrated circuit" and then "generat[ing]," typically as a "netlist," the "electronic circuit components (e.g.,

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[2] The patents are attached to the Complaint as Exhibits A, B, and C, respectively.

[3] The facts set forth below are derived from the patents and the declarations submitted by the parties, and are undisputed.

logic circuits) ... that perform those operations." (*See id.* ¶ 15.) The human-generated descriptions are written by an engineer, or "user," in a hardware description language (HDL), one of several languages developed specifically for EDA. (*Id.* at ¶ 16.)

The Gregory patents claim a way of performing synthesis, described therein as "[a] method and system . . . for generating a logic network using a hardware independent description means." *See* '841 patent, Abstract. Prior to the issuance of the Gregory patents, chip design required "detailed logic knowledge for most practical circuits." *Id.*, col. 2:9-10. In particular, for more complex circuit elements, such as "high impedance drivers, level sensitive latches and edge sensitive flip-flops," the designer, using HDL, was required to specify the circuit element and the desired connections. *Id*., col. 2:5-7. The Gregory patents describe a method for synthesizing a complex logic circuit from a "user description specifying only signals and the circumstances under which the signals are produced, i.e., without requiring the designer to specify the hardware components or connections needed to implement them. As set forth below, the patents claim a method for taking two types of HDL statements, "flow control statements" and "directive statements," *see id*., col. 62:6264, and converting them into "assignment conditions," *id.* col. 63:2,[4] which, in turn, are used to determine the appropriate hardware and connections.

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[4] An "assignment condition" is "the condition under which the hardware description function is true for a particular variable in the user description." (*See* Order Construing Claims, Doc. No. 100, at 5:3-4); *see also* '841 Patent, col.15:66-16:1 (stating hardware description functions "represent specific operations that are implemented with specific hardware").

Claim 1 of the '841 patent, which is representative of the asserted claims, states:

> 1. A method for converting a hardware independent user description of a logic circuit, that includes flow control statements including an IF statement and a GOTO statement, and directive statements that define levels of logic signals, into logic circuit hardware components comprising:
>
> converting the flow control statements and directive statements in the user description for a logic signal Q into an assignment condition AL(Q) for an asynchronous load function AL( ) and an assignment condition AD(Q) for an asynchronous data function AD( ); and
>
> generating a level sensitive latch when both said assignment condition AL(Q) and said assignment condition AD(Q) are non-constant;
>
> wherein said assignment condition AD(Q) is a signal on a data input line of said flow through latch;
>
> said assignment condition AL(Q) is a signal on a latch gate line of said flow through latch; and
>
> an output signal of said flow through latch is said logic signal Q.

Id., col. 62:60–col. 63:12.

Each of the steps in the claimed methods can be performed by a skilled designer either mentally or with pencil and paper, and the examples in the patents were created by the inventors without use of a computer. Although the claims themselves do not expressly call for a computer or other piece of equipment, the method is primarily intended for use with a computer, and the patents append source code for a

computer program implementing the claimed inventions. (*See* Decl. of Maria Beier, filed October 3, 2014, Ex. F (Deposition of Russ Segal) at 26:13-27 (stating "we emulated what a computer would do in order to generate these tables"); *see also* '841 Patent, col. 9:42-45 (stating "[t]he system and method of this invention are operable in a computer system that includes a data input device, such as a keyboard, a processing unit, and an output display device").

LEGAL STANDARD

Pursuant to Rule 56 of the Federal Rules of Civil Procedure, a "court shall grant summary judgment if the movant shows that there is no genuine issue as to any material fact and that the movant is entitled to judgment as a matter of law." *See* Fed.R.Civ.P. *56(a)*.

The Supreme Court's 1986 "trilogy" of *Celotex Corp. v. Catrett*, 477 U.S. 317, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986), *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986), and *Matsushita Electric Industrial Co. v. Zenith Radio Corp.*, 475 U.S. 574, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986), requires that a party seeking summary judgment show the absence of a genuine issue of material fact. Once the moving party has done so, the nonmoving party must "go beyond the pleadings and by [its] own affidavits, or by the depositions, answers to interrogatories, and admissions on file, designate specific facts showing that there is a genuine issue for trial." *See Celotex*, 477 U.S. at 324, 106 S.Ct. 2548 (citation and quotation omitted). "When the moving party has carried its burden under Rule 56(c), its opponent must do more than simply show that there is some metaphysical doubt as to the material facts." *Matsushita*, 475 U.S. at 586, 106 S.Ct. 1348. "If the [opposing

party's] evidence is merely colorable, or is not significantly probative, summary judgment may be granted." *Liberty Lobby*, 477 U.S. at 249-50, 106 S.Ct. 2505 (citations omitted). "[I]nferences to be drawn from the underlying facts," however, "must be viewed in the light most favorable to the party opposing the motion." *See Matsushita*, 475 U.S. at 587, 106 S.Ct. 1348 (citation and quotation omitted).[5]

Additionally, as patents are presumed to be valid, *see* 35 U.S.C. § 282, an alleged infringer asserting an invalidity defense pursuant to § 101 bears the burden of proving invalidity by clear and convincing evidence. *Microsoft Corp. v. i4i L.P.*, —— U.S. ——, 131 S.Ct. 2238, 2242, 180 L.Ed.2d 131 (2011).

DISCUSSION

As set forth in § 101, "whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor." *See* 35 U.S.C. § 101. The Supreme Court, however, has carved out "three specific exceptions to § 101's broad patent-eligibility principles," *Bilski v. Kappos*, 561 U.S. 593, 601, 130 S.Ct. 3218, 177 L.Ed.2d 792 (2010), namely, "laws of nature, physical phenomena, and abstract ideas." *See id.* (internal quotation and citation omitted); *see also Gottschalk v. Benson*, 409 U.S. 63, 67, 93 S.Ct. 253, 34 L.Ed.2d 273 (1972) (holding "[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable,

[5] Here, as noted, the parties have filed cross-motions. Consequently, as to each said motion, the Court, in deciding whether to enter judgment as requested therein, has viewed the evidence in the light most favorable to the opposing party.

as they are the basic tools of scientific and technological work").

Most recently, in *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, ——U.S. ——, 134 S.Ct. 2347, 189 L.Ed.2d 296 (2014), the Supreme Court provided the following "framework" for distinguishing patents that claim laws of nature, natural phenomena, abstract ideas and mental processes from those that claim patent-eligible applications of those concepts:

> First, [a court] determine[s] whether the claims at issue are directed to one of those patent-ineligible concepts. If so, [the court] then ask[s], "[w]hat else is there in the claims before [it]?" To answer that question, [the court] consider[s] the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application . . . . [S]tep two of this analysis [has been described] as a search for an "inventive concept"—i.e., 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.

Id. at 2355 (internal quotations and citations omitted).

Mentor contends the claims at issue cover patent-ineligible abstract ideas and that there are no additional elements transforming the abstract ideas into patent-eligible applications of such ideas. Synopsys argues to the contrary.

A. Abstract Idea

"The 'abstract ideas' category embodies the long-standing rationale that an idea of itself is not

patentable." *Alice*, 134 S.Ct. at 2355. Indeed, more than 150 years ago, the Supreme Court made clear that "[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." *Le Roy v. Tatham*, 55 U.S. 156, 175, 14 How. 156, 14 L.Ed. 367 (1852). Since that time, "the unpatentable nature of abstract ideas has repeatedly been confirmed." *In re Comiskey*, 554 F.3d 967, 977-78 (Fed.Cir.2009).

The claimed methods here at issue do not entail anything physical. Rather, as discussed above, the asserted claims are directed to the process of inference, which is fundamental to IC design and can be performed mentally. The claims describe, in essence, various algorithms for determining the hardware components and layout of an IC from a user's description of what the user needs the chip to do, i.e., the "specified signals and circumstances under which the signals are produced." (*See* '841 patent, Abstract.) In other words, the claims are directed to a mental process. A "mental process [is] a subcategory of unpatentable abstract ideas." *CyberSource Corporation v. Retail Decisions, Inc.*, 654 F.3d 1366, 1371 (Fed.Cir.2011).

Synopsys' contention that the asserted claims are not directed to an abstract idea because they describe "concrete steps in a computerized process for creating a netlist of hardware elements" (Synopsys Mot. at 9:16-17) is unpersuasive. As Mentor points out, however, there is an abundance of Supreme Court and Federal Circuit authority invalidating on § 101 grounds patents that likewise could be described as including "concrete steps." *See*, *e.g.*, *Alice*, 134 S.Ct. 2357-58 (discussing cases wherein claimed methods were held to constitute unpatentable abstract ideas);

(*see also* Mentor Opp'n at 4:22-27) (listing cases)). Further, even if the claims are read to require implementation with a computer, although none is specifically mentioned therein, the Supreme Court has made clear that "merely requir[ing] generic computer implementation" will not serve to transform the nature of the instant claims from an abstract idea into something else. *See Alice*, 134 S.Ct. at 2357; *see e.g.*, *DietGoal Innovations LLC v. Bravo Media LLC*, 33 F.Supp.3d 271, 2014 WL 3582914, at *10 (S.D.N.Y. July 8, 2014) (holding plaintiff's "attempts to dress up the claims as a computerized process" unavailing).

The Court also finds unpersuasive Synopsys' argument that any distinction as to the "subject matter" of the claimed abstract idea (*see* Synopsys Mot. at 10:7-9) is significant at step one of the analysis. Although, as Synopsys points out, a number of cases characterizing patents as directed to abstract ideas have considered "claims for processes for organizing human activities" (*see id.* (internal quotation and citation omitted)); *see*, *e.g.*, *Alice*, 134 S.Ct. at 2352 (considering method for mitigating settlement risk in financial transactions); *Bilski*, 561 U.S. at 597-98, 130 S.Ct. 3218 (considering method for hedging risk in field of commodities trading), others concern claims directed to a field of technology, *see*, *e.g.*, *Benson*, 409 U.S. at 65, 93 S.Ct. 253 (considering method for converting signals from binary-coded decimal form into pure binary form); *Parker v. Flook*, 437 U.S. 584, 98 S.Ct. 2522, 57 L.Ed.2d 451 (1978) (considering method for updating alarm limits in catalytic conversion).

Similarly unpersuasive is Synopsys' argument that the claimed methods somehow lose their quality as abstract ideas because they are not as "simple" (Synopsys Mot. at 11:1) as the methods held to be

abstract in some of the cases cited to this Court. First, the claimed methods do not require complex calculations; as noted, the claimed steps were performed mentally by the inventors and can be performed by a skilled designer either mentally or with the aid of a pencil and paper. Moreover, and more importantly, Synopsys points to nothing in the authority it endeavors to distinguish that would suggest that at this stage of the analysis, any such decision hinged in any manner on the complexity of the abstract idea at issue therein.

Accordingly, the Court finds the asserted claims in the Gregory patents are directed to an abstract idea. The Court next turns to the second step of the analysis.

B. Inventive Concept

An invention is not necessarily ineligible for patent protection because it involves an abstract idea. As set forth above, once a court determines a claim is directed to a patent-ineligible concept, it must "consider the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application." *Alice*, 134 S.Ct. at 2355 (internal quotation and citation omitted). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* at 2357 (quoting *Mayo Collaborative Services v. Prometheus Laboratories*, *Inc*., —— U.S. ——, 132 S.Ct. 1289, 1294, 1298, 182 L.Ed.2d 321) (alterations in original). Neither adding the words "apply it" nor limiting its use to a specified technological environment will suffice to transform an abstract idea into a patent-eligible invention. *See id.* at 2358. Rather, as

noted, the added element or combination of elements must be such that "'the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Id.* at 2355 (quoting *Mayo*, 132 S.Ct. at 1294) (alteration in original).

Here, in an effort to demonstrate the requisite "inventive concept," Synopsys first points to the lack of any reference to the claimed methods in the prior art. Synopsys' reliance on a lack of prior art is misplaced, however. As one district court has noted, "[i]t is important to distinguish novelty and obviousness from the 'inventive feature' inquiry required by the Supreme Court in *Alice*." *See Cogent Med., Inc. v. Elsevier Inc.*, 70 F.Supp.3d 1058, 2014 WL 4966326, at *4, n. 3 (N.D.Cal. Sept. 30, 2014) (distinguishing § 101 inquiry from § 102 inquiry; finding method patent-ineligible "even if [plaintiff] is right that no previous software system implemented a similar feature").

Similarly unavailing is Synopsys' argument that the asserted claims do not "pose a risk of preemption," as logic synthesis can be performed "without using assignment conditions." (*See* Synopsys Mot. at 12:10-21.) Certainly, *Alice* cautioned courts to "distinguish between patents that claim the building blocks of human ingenuity and those that integrate the building blocks into something more." *Alice*, 134 S.Ct. at 2354 (internal quotation, alterations, and citation omitted). Here, however, the asserted claims do preempt a building block of human ingenuity, a mental process, albeit a specific one. As was observed in *Mayo*, the Supreme Court has "not distinguished among differing laws of nature according to whether or not the principles they embody are sufficiently narrow." *See Mayo*, 132 S.Ct. at 1303 (citing *Flook*, 437 U.S. 584, 98 S.Ct. 2522); *Flook*, 437 U.S. at 586, 98 S.Ct.

2522 (finding claims incorporating narrow mathematical formula patent-ineligible). Further, and consistent therewith, "[t]he prohibition against patenting abstract ideas cannot be circumvented by attempting to limit the use of [a] formula to a particular technological environment." *See Bilski*, 561 U.S. at 610-11, 130 S.Ct. 3218 (internal quotation and citation omitted). As the Supreme Court in *Mayo* explained, "[c]ourts and judges are not institutionally well suited to making the kinds of judgments needed to distinguish among different laws of nature[;] [a]nd so the cases have endorsed a bright-line prohibition against patenting laws of nature, mathematic formulas and the like, which serves as a somewhat more easily administered proxy for the underlying building-block' concern." *Mayo*, 132 S.Ct. at 1303.

Synopsys also argues the claims here at issue recite more than the "conventional steps" found ineligible in *Alice* and *Mayo.* (*See* Synopsys Mot. at 11:19-23 (citing *Alice*, 134 S.Ct. at 2357).)[6] The claims here, however, as in *Alice* and *Mayo*, concern "well-understood, routine, conventional activity, previously engaged in by those in the field." *See Mayo*, 132 S.Ct. at 1299. As acknowledged in the specification, skilled designers

[6] Synopsys also notes that the Gregory patents' "disclosure includes 64 columns of drawings, explanation, and examples, and approximately 200 pages of computer code for a program implementing the claimed inventions." (*See* Synopsys Mot. at 11:24-25.) "The complexity of the implementing software or the level of detail in the specification does not transform a claim reciting only an abstract concept into a patent-eligible system or method," however. *See Accenture Global Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed.Cir.2013).

had been inferring the necessary parts and connections for ICs long before the Gregory patents issued. *See* '841 patent, col. 1:41–44.

The asserted claims, like those in *Alice* and *Mayo*, add nothing other than a way to implement that mental process on a computer. As one of the two named inventors explained:

> [T]he methods that humans were using to convert HDLs to circuits weren't methods that were—that you could run on a computer and do automatically.
>
> So the thing that Russ and I were charged with was figuring out how to take this manual process that human beings were doing . . . and figure out how we could come up with a method so a computer could do it.
>
> And that's sort of the essence of, I think, what we were asked to do and what we did.

(Gregory Dep. at 239:2-12; *see also id.* at 238:23-239:1 ("All of [the claims'] concepts and ideas are what Russ and I came up with in order to automate what the humans were doing to convert it into such a method that a computer could run.").)

The fact that previously a designer would not have followed the exact same thought process does not change the analysis. A method primarily designed for use by a computer is, almost by definition, going to differ from the manner in which a natural person thinks through a problem. (*See* Gregory Dep. at 237:15-19 (describing claimed method as "really tuned for a computer[,] which operates differently from a human being").) In *Benson*, for example, the Supreme Court found the claims asserted therein patent

ineligible although the method claimed "varie[d] the ordinary arithmetic steps a human would use by changing the order of the steps, changing the symbolism for writing the multiplier used in some steps, and by taking subtotals after each successive operation." *See Benson*, 409 U.S. at 67, 93 S.Ct. 253. Similarly, in *Flook*, the Supreme Court held ineligible a "new and presumably better method" that added a novel algorithm to otherwise conventional methods. *See Flook*, 437 U.S. at 586, 98 S.Ct. 2522.

Lastly, Synopsys contends the claimed methods qualify as transformative under the "machine-or-transformation test," *see Bilski*, 561 U.S. at 602, 604, 130 S.Ct. 3218 (explaining, under machine-or-transformation test, process is patent-eligible if it is "tied to a particular machine or apparatus" or "transforms a particular article into a different state or thing"). In that regard, the Court first acknowledges that the machine-or-transformation test is not the exclusive test for patent eligibility, *see id.* at 604, 130 S.Ct. 3218 (holding, although machine-or-transformation test may provide "a useful and important clue, an investigative tool," it is "not the sole test"), but, rather, an alternative to the test set forth in *Alice.* Next, turning to Synopsys' argument, the Court again notes that the addition of a generic computer, even if the methods are deemed to require such a machine, is not sufficient. *See Alice*, 134 S.Ct. at 2357–58. Further, Synopsys' effort to analogize the claimed methods to methods found transformative in the field of encryption is unavailing. "In the field of encryption, . . . the entire object of the invention is to transform data from one form into another." *TQP Dev*., *LLC*, *v. Intuit Inc*., 2014 WL 651935, at *5-*7 (E.D.Tex. Feb. 19, 2014) (finding claim patent-eligible where method "involve[d] a way

of making computer communication itself more effective by making that communication more secure"). Here, by contrast, the claimed methods do not transform the user description into another form. Rather, the description is used as a starting point in a logical progression by which the necessary parts and layout of a chip are inferred from that description. The initial description remains unchanged. Under such circumstances, Synopsys' reliance on the machine-or-transformation test is unavailing.

Accordingly, for all of the reasons set forth above, the Court finds the asserted claims in the Gregory patents lack the inventive concept necessary to transform a patent-ineligible abstract idea into a patent-eligible invention.

CONCLUSION

For the reasons stated, the Court concludes the asserted claims are invalid under § 101, and, accordingly:

1. Mentor Graphics' motion for summary judgment is hereby GRANTED.

2. Synopsys' motion for summary judgment is hereby DENIED.

IT IS SO ORDERED.

APPENDIX C

NOTE: This order is nonprecedential

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2015-1599

SYNOPSYS, INC., A DELAWARE CORPORATION,

Plaintiff-Appellant,

v.

MENTOR GRAPHICS CORPORATION,
AN OREGON CORPORATION,

Defendant-Appellee.

Appeal from the United States District Court
for the Northern District of California in
No. 3:12-cv-06467-MMC, Judge Maxine M. Chesney

ON PETITION FOR PANEL REHEARING
AND REHEARING EN BANC

Before PROST, *Chief Judge*, NEWMAN, LOURIE, DYK, MOORE, O'MALLEY, REYNA, WALLACH, TARANTO, CHEN, HUGHES, and STOLL, *Circuit Judges.*

PER CURIAM.

ORDER

Plaintiff-Appellant Synopsys, Inc. filed a combined petition for panel rehearing and rehearing en banc. A response to the petition was invited by the court and filed by Appellee Mentor Graphics Corporation. The petition was referred to the panel that heard the appeal, and thereafter the petition for rehearing en banc was referred to the circuit judges who are in regular active service.

Upon consideration thereof,

IT IS ORDERED THAT:

The petition for panel rehearing is denied.

The petition for rehearing en banc is denied.

The mandate on the court will issue on January 4, 2017.

FOR THE COURT

December 28, 2016
Date

/s/ Peter R. Marksteiner
Peter R. Marksteiner
Clerk of Court