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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte CHANDRA M. ALLURI

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Appeal 2018-004606
Application 12/345,084
Technology Center 2100

_____

Before BRADLEY W. BAUMEISTER, MICHAEL J. STRAUSS, and RUSSELL E. CASS, *Administrative Patent Judges*.

BAUMEISTER, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1–23, which constitute all of the pending claims.[1] Appeal Br. 5. These claims stand rejected under 35 U.S.C. § 101 as being directed to a judicial exception to patent-eligible subject matter without significantly more and under 35 U.S.C. § 103 as being obvious. Final Action mailed February 16, 2017 ("Final Act."), 2–6. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Federal Home Loan Mortgage Corporation ("Freddie Mac"). Appeal Brief filed December 5, 2017 ("Appeal Br."), 3.

STANDARD OF REVIEW

We review the appealed rejections for error based upon the issues identified by Appellant, and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential).

CLAIMED SUBJECT MATTER

Appellant describes the present invention, as follows:

> Systems, methods, and computer-readable storage media are described for modeling the requirements of software to generate test requirements. In one exemplary embodiment, a computer-implemented method comprises generating a model of the requirements using a tree graph model, identifying primary paths of the tree graph model using an algorithm, and creating test cases based on the identified primary paths.

Abstract.[2]

THE SECTION 101 REJECTION

Independent claim 1, illustrative of the appealed claims, is reproduced below with paragraph numbering added for clarity and emphasis added to the claim language that recites an abstract idea[3]:

> 1. A computer-implemented method for automated software performance testing, performed by a processor hosted on a server

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[2] Rather than repeat the Examiner's positions and Appellant's arguments in their entirety, we refer to the above-mentioned Appeal Brief, as well as the following documents, for their respective details: Appellant's Specification originally filed December 29, 2008 ("Spec."); the Final Action mailed February 16, 2017 ("Final Act."); the Examiner's Answer mailed January 25, 2018 ("Ans."); and the Reply Brief filed March 26, 2018 ("Reply Br.").
[3] Appellant argues all of the claims together as a group. Appeal Br. 13–39. Accordingly, we select independent claim 1 as representative. *See* 37 C.F.R. § 41.37(c)(1)(iv).

and connected via a network connection to at least one networked database, a modeling tool, and a client system, the method comprising:

[i]   *retrieving modeling requirements of software*;

[ii]   *receiving*, via a graphical user interface, *a user's selection of one or more portions of previously-created models*;

[iii]   *generating*, using the modeling tool, *a tree graph model based on the modeling requirements and the one or user-selected more portions of previously-created models*;

[iv]   *analyzing the tree graph model and verifying complete path coverage for the modeling requirements, by determining whether predicate and clause coverage criteria of the tree graph model yields n+1 truth values, wherein n is a number of clauses in a predicate of a logical expression in the tree graph model*;

[v]   *selecting, using an algorithm based on the tree graph model, a test path for traversing the tree graph model*;

[vi]   *storing*, in a memory, *data associated with one or more expected outcomes from traversing the selected test path*;

[vii]   *generating, using an algorithm and based on the selected test path, one or more data values that cause the processor to traverse one or more branches of the selected test path for the software without bugs or errors*;

[viii] *generating*, on a display screen of the client system, a graphical user interface including *a plurality of test cases based on the tree graph model and the data values*;

[ix]   generating one or more test outcomes by traversing the entire selected test path using the generated data values;

[x]   retrieving the one or more expected outcomes; and

[xi]   *comparing the one or more test outcomes to the one or more expected outcomes at multiple intermediate verification points along the selected test path*.

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Principles of Law

A. SECTION 101:

Inventions for a "new and useful process, machine, manufacture, or composition of matter" generally constitute patent-eligible subject matter. 35 U.S.C. § 101. However, the U.S. Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: "[l]aws of nature, natural phenomena, and abstract ideas" are not patentable. *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Court's two-step framework, described in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66 (2012), and *Alice*. *Alice*, 573 U.S. at 217–18 (citing *Mayo*, 566 U.S. at 75–77). In accordance with that framework, we first determine what concept the claim is "directed to." *See Alice*, 573 U.S. at 219 ("On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.,* the use of a third party to mitigate settlement risk."); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) ("Claims 1 and 4 in petitioners' application explain the basic concept of hedging, or protecting against risk.").

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S. 175, 191

(1981)); "tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1853))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Court held that "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula." *Diehr*, 450 U.S. at 187; *see also id.* at 191 ("We view respondents' claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula."). Having said that, the Court also indicated that a claim "seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." *Id.* at 191 (citing *Benson* and *Flook*) (citation omitted); *see also, e.g.*, *id.* at 187 ("It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221 (internal quotation marks 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.* (alterations in original) (quoting *Mayo*,

566 U.S. at 77). "[M]erely requir[ing] generic computer implementation[]
fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

B. USPTO SECTION 101 GUIDANCE:

In January 2019, the United States Patent and Trademark Office
("USPTO") published revised guidance on the application of 35 U.S.C.
§ 101. 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed.
Reg. 50 (Jan. 7, 2019) ("2019 Guidance"), *updated by* USPTO, *October
2019 Update: Subject Matter Eligibility* (available at https://www.uspto.gov/
sites/default/files/documents/peg_oct_2019_update.pdf) (jointly referred to
as "the 2019 Guidance"); *see also* October 2019 Patent Eligibility Guidance
Update, 84 Fed. Reg. 55942 (Oct. 18, 2019) ("October 2019 PEG Update")
(notifying the public of the availability of the October update).

Under the 2019 Guidance, we first look to whether the claim recites
the following:

> (1) any judicial exceptions, including certain groupings of abstract
> ideas (i.e., mathematical concepts, certain methods of organizing
> human activities such as a fundamental economic practice, or mental
> processes); and
>
> (2) additional elements that integrate the judicial exception into a
> practical application (*see* MPEP §§ 2106.05(a)–(c), (e)–(h)).

2019 Guidance, 84 Fed. Reg. at 52–55.

Only if a claim (1) recites a judicial exception and (2) does not
integrate that exception into a practical application, do we then look to
whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not
"*well-understood, routine, [and] conventional*" in the field (*see* MPEP
§ 2106.05(d)); or

(4) simply appends well-understood, routine, conventional activities
previously known to the industry, specified at a high level of
generality, to the judicial exception.

2019 Guidance, 84 Fed. Reg. at 56.

Analysis

STEP 2A, PRONG 1:

Under step 2A, prong 1, of the 2019 Guidance, we first look to
whether claim 1 recites any judicial exceptions, including certain groupings
of abstract ideas (i.e., mathematical concepts, certain methods of organizing
human activities such as a fundamental economic practice, or mental
processes). 2019 Guidance, 84 Fed. Reg. at 52–54.

Limitation [i] recites "retrieving modeling requirements of software."
Retrieving data reasonably can be characterized as a mental process. More
specifically, retrieving data reasonably can be characterized as an
observation that can be performed in the human mind. The 2019 Guidance
recognizes mental processes, including observations, as constituting a
patent-ineligible abstract idea. 2019 Guidance, 84 Fed. Reg. at 52–54.
Accordingly, limitation [i] reasonably can be characterized as reciting a
patent-ineligible abstract idea.

Limitation [ii] recites "receiving . . . a user's selection of one or more
portions of previously-created models." Receiving data, like retrieving data,
reasonably can be characterized as an observation that can be performed in
the human mind. For the reasons discussed in relation to limitation [i], the

data-receiving step of limitation [ii] also reasonably can be characterized as reciting a patent-ineligible abstract idea.

Limitation [iii] recites "generating . . . a tree graph model based on the modeling requirements and the one or user-selected more portions of previously-created models." Generating a tree graph model reasonably can be characterized as a mental process, such as an evaluation, judgment, or opinion that can be performed in the human mind. The 2019 Guidance expressly recognizes such mental processes as constituting a patent-ineligible abstract idea. 2019 Guidance, 84 Fed. Reg. at 52. Accordingly, limitation [iii] reasonably can be characterized as reciting a patent-ineligible abstract idea.

Limitation [iv] recites "analyzing the tree graph model and verifying complete path coverage for the modeling requirements, by determining whether predicate and clause coverage criteria of the tree graph model yields n+1 truth values, wherein n is a number of clauses in a predicate of a logical expression in the tree graph model." Like generating a tree graph model, analyzing a tree graph model also reasonably can be characterized as a mental process, such as an evaluation that can be performed in the human mind. Accordingly, limitation [iv] reasonably can be characterized as reciting a patent-ineligible abstract idea.

Limitation [v] recites "selecting, using an algorithm based on the tree graph model, a test path for traversing the tree graph model." Using an algorithm to select a test path reasonably can be characterized as a mental process, such as an evaluation, judgment, or opinion that can be performed in the human mind. Accordingly, limitation [v] reasonably can be characterized as reciting a patent-ineligible abstract idea.

Limitation [vi] recites "storing . . . data associated with one or more expected outcomes from traversing the selected test path." Storing data reasonably can be characterized as a mental process such as making note of a mental observation either in the mind or with the aid of paper and pencil. *See* October 2019 PEG Update at 9 ("A claim that encompasses a human performing the step(s) mentally with the aid of a pen and paper recites a mental process") (emphasis omitted). Accordingly, limitation [vi] reasonably can be characterized as reciting a patent-ineligible abstract idea.

Limitations [vii] through [ix] read as follows:

[vii] generating, using an algorithm and based on the selected test path, one or more data values that cause the processor to traverse one or more branches of the selected test path for the software without bugs or errors.
[viii] generating . . . a plurality of test cases based on the tree graph model and the data values;
[ix] generating one or more test outcomes by traversing the entire selected test path using the generated data values;

As explained in relation to limitation [iii], generating data reasonably can be characterized as a mental process, such as a mental evaluation or judgment that can be performed in the mind. For the reasons explained in relation to limitation [iii], then, limitations [vii] through [iv] reasonably can be characterized as reciting a patent-ineligible abstract idea.

Limitation [x] recites "retrieving the one or more expected outcomes." As explained in relation to limitation [i], retrieving data reasonably can be characterized as an observation that can be performed in the human mind. Accordingly, limitation [x] reasonably can be characterized as reciting a patent-ineligible abstract idea.

Limitation [xi] recites "comparing the one or more test outcomes to the one or more expected outcomes at multiple intermediate verification

points along the selected test path." Comparing data reasonably can be characterized as a mental process, such as an evaluation or judgment that can be performed in the human mind. Accordingly, limitation [xi] reasonably can be characterized as reciting a patent-ineligible abstract idea.

For these reasons, each of claim 1's limitations [i]–[xi] reasonably can be characterized as reciting a judicial exception to patent-eligible subject matter under step 2A, prong 1, of the 2019 Guidance.

STEP 2A, PRONG 2:

Under step 2A, prong 2, of the 2019 Guidance, we next analyze whether claim 1 recites additional elements that, individually or in combination, integrate the judicial exception into a practical application. 2019 Guidance, 84 Fed. Reg. at 53–55. The 2019 Guidance provides exemplary considerations that are indicative of an additional element or combination of elements integrating the judicial exception into a practical application, such as an additional element reflecting an improvement in the functioning of a computer or an improvement to other technology or technical field. *Id.* at 55; MPEP § 2106.05(a).

Appellant argues that claim 1 cannot have a scope pre-emptive of an abstract idea because the claims are not "broad enough to encompass any method or system for performing the alleged abstract idea." Appeal Br. 19; *see also id.* at 25 (again discussing the preemption doctrine). This argument is unpersuasive.

We recognize that the Supreme Court has described "the concern that drives this exclusionary principle [i.e., the exclusion of abstract ideas from patent-eligible subject matter] as one of pre-emption." *Alice*, 573 U.S. at 216. However, characterizing preemption as a driving concern for patent

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eligibility is not the same as characterizing preemption as the sole test for patent eligibility. As our reviewing court has explained: "The Supreme Court has made clear that the principle of preemption is the basis for the judicial exceptions to patentability" and "[f]or this reason, questions on preemption are inherent in and resolved by the § 101 analysis." *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) (citing *Alice*, 573 U.S. at 216). Although "preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility." *Ariosa*, 788 F.3d at 1379.

Appellant also argues that claim 1 is "directed to the use of limited rules in a specifically-designed process, similar to the patent-eligible claims in McRO." Appeal Br. 27 (emphasis omitted) (citing *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299 (Fed. Cir. 2016)).

Appellant argues that

[in c]haracterizing "[t]he claimed improvement" as "allowing computers to produce 'accurate and realistic lip synchronization and facial expressions in animated characters' that previously could only be produced by human animators," the Federal Circuit found that "[*McRO's*] claim uses . . . limited rules in a process specifically designed to achieve an improved technology result in conventional industry practice." That is, the claim was not "directed to" an abstract idea because it did not focus on "a result or effect that is itself an abstract idea"; rather, by reciting such "limited rules[,]" the claim focused on a "specific means or method" of achieving the result or effect. Accordingly, the court concluded, the claim was "directed to a patentable, technological improvement over the existing, manual 3-D animation techniques."

Appeal Br. 28 (underlining omitted) (citing *McRO*, 837 F.3d at 1314).

This argument is unpersuasive because *McRO's* claim is distinguishable from Appellant's claim. As Appellant acknowledges,

McRO's claim was directed towards an improved method of enhancing

visual animation *products* by generating "accurate and realistic lip

synchronization and facial expressions in animated characters." Appeal Br.

28 (citing *McRO*, 837 F.3d at 1314). Appellant's claim 1, on the other hand,

does not produce any improved product, such as a visual animation.

Appellant, instead, claims a computer-implemented method of retrieving

data ([i] modeling requirements of software, [ii] a selection of portions of

previously created models, and [x] expected outcomes of test-path

traversals) and using that data to analyze whether software produces

expected outcomes.

Claim 1's data-gathering steps of limitations [i], [ii], and [x]

reasonably can be characterized as merely constituting insignificant extra-

solution activity:

> An example of pre-solution activity is a step of gathering data for
> use in a claimed process, *e.g.,* a step of obtaining information
> about credit card transactions [that] is recited as part of a claimed
> process of analyzing and manipulating the gathered information
> by a series of steps in order to detect whether the transactions
> were fraudulent.

MPEP § 2106.05(g).

Also, as noted previously, claim 1's limitation [vi] recites "storing, in

a memory, data associated with one or more expected outcomes from

traversing the selected test path." It was well-understood that received

computer data typically must be stored—either in long-term storage or in a

short-term cache or buffer so that the data can be processed as intended. By

determining that gathering, transmitting, and displaying data constitutes

insignificant extra-solution activity, the courts also have determined, at least

implicitly, that storing data, without more, also constitutes insignificant

extra-solution activity. As such, limitation [vi] reasonably can be characterized as merely being directed to the insignificant extra-solution activity of storing data.

Claim 1's other steps—limitations [iii]–[v], [vii]–[ix], and [xi]—entail using a computer to model and analyze the accuracy of software code. But the acts of modeling and analyzing software code merely constitute the underlying abstract ideas—the mental processes that can be performed in the human mind or with pencil and paper. *See BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290 (Fed. Cir. 2018) ("It has been clear since *Alice* that a claimed invention's use of the ineligible concept to which it is directed cannot supply the inventive concept that renders the invention 'significantly more' than that ineligible concept."); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016) ("[A] claim for a new abstract idea is still an abstract idea.") (emphasis omitted); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1168 (Fed. Cir. 2018) ("What is needed is an inventive concept in the non-abstract application realm.").

Appellant's arguments confirm that the claimed invention is directed to the underlying abstract idea (the particular mental steps for testing software code), as opposed to an in improvement in a computer or technology: "*Appellant's claims employ 'rules'—a 'specific means or method'—that enable a 'technological improvement over the existing, manual . . . techniques' performed by existing prior art systems.*" Appeal Br. 29 (emphasis added) (underlining omitted).

Appellant also argues that *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016) supports their position that "Appellant's claims are focused on specific and narrowly-defined systems and methods [that] . . .

focus 'on an improvement to computer functionality itself,' rather than on achieving the abstract idea.[]" Appeal Br. 32 (underlining omitted) (citing *Enfish*, 822 F.3d at 1336). According to Appellant, "Appellant's claims recite specific features describing a distinct process related to solving problems rooted in computerized automated software performance testing techniques." *Id.* (citing Spec. ¶¶ 4–6, 25–48).

Appellant's arguments are unpersuasive. Appellant's allegedly "distinct process" merely entails automating the kind of computer-code testing or debugging that previously was performed manually. But "mere automation of manual processes using generic computers does not constitute a patentable improvement in computer technology." *Credit Acceptance Corp. v. Westlake Servs.*, 859 F.3d 1044, 1055 (Fed. Cir. 2017); *see also DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257 (Fed. Cir. 2014) (distinguishing a claimed solution necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks from claims that "merely recite the performance of some business practice known from the pre-Internet world along with the requirement to perform it on the Internet"); *OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1363 (Fed. Cir. 2015) (relying on a "processor" to "perform routine tasks more quickly or more accurately is insufficient to render a claim patent eligible"). *Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Can. (U.S.)*, 687 F.3d 1266, 1278 (Fed. Cir. 2012) ("[T]he fact that the required calculations could be performed more efficiently via a computer does not materially alter the patent eligibility of the claimed subject matter.").

For these reasons, Appellant does not persuade us that claim 1 is directed to an improvement in the functioning of a computer or to any other technology or technical field. MPEP § 2106.05(a). Nor is claim 1 directed to a particular machine or transformation. MPEP §§ 2106.05(b), (c). Nor has Appellant persuasively demonstrated that claim 1 adds any other meaningful limitations for purposes of the analysis under Section 101. MPEP § 2106.05(e). Accordingly, Appellant has not persuaded us that claim 1 integrates the recited abstract ideas into a practical application within the meaning of the 2019 Guidance. 2019 Guidance, 84 Fed. Reg. at 52–55.

STEP 2B:

Under step 2B of the 2019 Guidance, we next analyze whether claim 1 adds any specific limitations beyond the judicial exception that, either alone or as an ordered combination, amount to more than "well-understood, routine, conventional" activity in the field. 2019 Guidance, 84 Fed. Reg. at 56; MPEP § 2106.05(d).

In the present case, Appellant acknowledges that software for modeling computer code with directed acyclic graphs was conventional. Spec. ¶ 32 ("There are multiple modeling designs and tools, such as the entity-relationship model (ERM), Unified Modeling Language (UML), directed acyclic graph (DAG), transaction flows, activity diagrams, and the like. As disclosed herein, modeling and testing tool 170 may model the requirements of a software using a DAG design.").

Appellant also acknowledges, as noted above, that the additional computer elements being used for carrying out the abstract mental rules for testing the computer code were well-understood, routine, and conventional.

Appeal Br. 29 ("*Appellant's claims employ 'rules'*—a 'specific means or method'—that enable a 'technological improvement over the existing, manual . . . techniques' *performed by existing prior art systems.*") (emphasis added) (underlining omitted).

Additionally, we have analyzed the steps of claim 1 together and determine that, when considered as an ordered combination, they do not add anything of significance to the eligibility analysis as compared to considering the limitations individually.

For these reasons, we determine that claim 1 does not recite additional elements that, either alone or as an ordered combination, amount to significantly more than the judicial exception within the meaning of the 2019 Guidance. 2019 Guidance, 84 Fed. Reg. at 52–55; MPEP § 2106.05(d).

Accordingly, we sustain the Examiner's rejection of claim 1 under 35 U.S.C. § 101 as being directed to an exception to patent-eligible subject matter without reciting significantly more. We, likewise, sustain the section 101 rejection of claims 2–23, which Appellant does not argue separately. Appeal Br. 13–39.

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THE SECTION 103(a) REJECTION

The Grounds of Rejection
</div>

Claims 1–23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Berenbach, Gehlot, Nehab, and Chilenski, as detailed in the following table. Final Act. 8–15.

Name	Reference	Date
Gehlot	US 6,353,806 B1	Mar. 5, 2002
Nehab	US 2004/0103396 A1	May 27, 2004
Berenbach	US 2005/0076328 A1	Apr. 7, 2005
Chilenski et al., *Applicability of modified condition/design coverage to software testing*, Software Engineering Journal, 193–200, Sept. 1994.		

The Examiner finds that Berenbach discloses a computer-implemented method for automated software performance testing, a modeling tool, and a client system that comprises generating test cases for nodes, as well as verifying the overall system. Final Act. 8–9.

The Examiner finds that Gehlot teaches an analogous modeling system that is performed by a processor hosted on a server and connected via a network connection to at least one networked database. Final Act. 9. According to the Examiner, Gehlot additionally teaches the step of "receiving, via a graphical user interface, a selection of one or more portions of previously[]created models." *Id.* at 9–10. The Examiner determines that motivation existed to combine the teachings of these two references. *Id.* at 10.

The Examiner finds that Nehab teaches an analogous system that includes the following functionalities: (1) "selecting, using an algorithm based on the tree graph model, a test path for traversing the tree graph model"; (2) "storing one or more expected outcomes from traversing the selected test path"; and (3) "retrieving the one or more expected outcomes." Final Act. 11. The Examiner further finds that Nehab teaches "generating one or more test outcomes by traversing the entire selected test path using the generated data values; [and] comparing the one or more test outcomes to

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the one or more expected outcomes at multiple intermediate verification points along the selected test path." *Id.*

The Examiner finds that Berenbach in combination with Nehab discloses "generating, using an algorithm and based on the selected test path, one or more data values for test cases, wherein the data values are generated to traverse one or more branches of the selected test path for the software without bugs or errors." Final Act. 11.

The Examiner determines that one of ordinary skill would have been motivated to combine the teachings of Berenbach and Nehab because "applying the known technique would have yielded predictable results." Final Act. 12. The Examiner further reasons that "Berenbach already discloses testing behavior and comparing to expected or desired behaviors[, and as such,] . . . the substitution of techniques would have resulted in predictable results." *Id.*

The Examiner further finds that Chilenski teaches "verifying that the tree graph model provides complete path coverage for the modeling requirements, by determining whether predicate and clause coverage criteria of the tree graph model yield[] n+1 truth values, wherein n is a number of clauses in a predicate of a logical expression in the tree graph model." Final Act. 12.

The Examiner determines that testing a system according to the combination of Berenbach, Gehlot, and Nehab in this manner would have been predictable because the cited prior art already performs testing, so testing the prior art's system in this manner would test all possible scenarios, and, thereby, avoid the possibility of accidentally missing possible bugs. Final Act. 12–13.

Appellant presents four arguments in its principal brief. Appeal Br. 29–46. We address these arguments *seriatim*.

Contentions and Analysis

(I)

Appellant argues that Gehlot does not disclose "generating, using the modeling tool, a tree graph model based on the modeling requirements and the one or more user-selected portions of previously-created models." Appeal Br. 40. According to Appellant, "*Gehlot* 'relates generally to hardware simulation and more specifically to the automation of hardware simulation using symbolic models.'" *Id.* at 41 (citing Gehlot col. 1, ll. 5–7).

Appellant argues that at best, Gehlot "discloses that symbolic model symbols can be cut and pasted on the graphic display, resulting in automatic updating of the interconnection list[,] and that the user can store and later recall for use the symbolic model symbol." Appeal Br. 42. Appellant further argues that Gehlot, however, "does not disclose generating a tree graph model, let alone 'generating, using the modeling tool, a <u>tree graph model</u> based on the <u>modeling requirements and</u> the one or more user-selected <u>portions</u> of previously-created models,'" as claimed. *Id.* Appellant further argues that neither Nehab nor Chilenski cure this deficiency. *Id.*

The Examiner finds, and we agree, that this argument is unpersuasive because Appellant's arguments do not address the rejection, as set forth in the Final Action. Ans. 9. As the Examiner explains, Gehlot was used only to teach the portion of the claim limitation relating to "receiving, via a graphical user interface, a selection of one or more portions of previously-created models," but that the remainder of the claim limitation was taught by the combination of Berenbach and Gehlot. *Id.* (citing Final Act. 10).

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Because Appellant's arguments are not directed to the combination of

Berenbach and Gehlot, they do not persuade us of error in the Examiner's

obviousness rejection.

(II)

Appellant argues that "Berenbach does not disclose 'generating one or

more data values that cause the processor to traverse one or more branches

of the selected test path for the software without bugs or errors.'" Appeal

Br. 42 (emphasis omitted). According to Appellant,

> *Berenbach,* at most, discloses that creating a tree comprises
> (1) traversing a directed graph beginning with a root use case,
> and (2) creating a relationship use case node corresponding to a
> next use case. However, *Berenbach* does not disclose using an
> algorithm to generate one or more data values, let alone
> "generating, using an algorithm and based on the selected test
> path, one or more data values that cause the processor to traverse
> one or more branches of the selected test path for the software
> <u>without bugs or errors</u>," (emphases added)[,] as recited in
> amended claim 1.

Id. at 43 (some underlining omitted).

Appellant's arguments do not persuade us of error. As noted by the

Examiner (Ans. 10), the rejection relied upon the combination of Berenbach

and Nehab for teaching this limitation—not Berenbach alone. *Id.*; *see also*

Final Act. 11 (explaining that Nehab teaches generating data values for test

cases in order to traverse one or more branches of the selected test path).

Appellant does not present arguments in this section of the Appeal Brief

regarding Nehab, as opposed to Berenbach. Appeal Br. 42.

(III)

Appellant argues "[t]he Examiner's interpretation of 'travers[ing] the

selected test path for the software without bugs or error' as the software

having 'expected outcomes' is clearly erroneous." Appeal Br. 43 (emphasis omitted). Appellant cites to a passage of Appellant's Specification as evidence that "the expected outcome may differ from the outcome received from [a] sensitize[d] test path." *Id.* at 43–44 (citing Spec. 48). Appellant further argues that the Specification indicates that "a test path may be sensitized by inputting specific data values that would cause the software to do the equivalent of traversing the selected path if there were no bugs or errors in the path." Appeal Br. 44.

The Examiner responds that the cited portion of the Specification neither appears in claim 1, nor expressly defines or further narrows the traversal limitation. Ans. 10–11. We agree. As such, Appellant's argument does not persuade of error because the argument is not commensurate in scope with the language of the disputed claim.

(IV)

Finally, Appellant argues that "Nehab fails to cure the deficiencies of Berenbach because Nehab, at most, discloses comparison of expected results of test runs against actual results and adjustment to the test in order to increase actual coverage of the complete set of all tests." Appeal Br. 44 (emphasis omitted). More specifically, Appellant argues that

> *Nehab,* at best, discloses determining expected results using a description of a business process as a plurality of states, executing the state machine to determine expected results, comparing the expected results to actual test results from test runs, calculating actual coverage of tests in a set, and managing the tests by making adjustment to the tests in order to increase coverage.

Id. at 45. Appellant contends that

> nowhere does *Nehab* disclose or suggest "generating, using an

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> algorithm and based on the selected test path, <u>one or more data</u>
> <u>values</u> that <u>cause the processor to traverse one or more branches</u>
> <u>of the selected test path</u> for the software without bugs or errors,"
> (emphases added)[,] as required by amended claim 1.

Id. at 45–46 (some underlining omitted).

The Examiner responds that Appellant's argument is directed to the teachings of Nehab alone, but that the rejection is based on the teachings of Berenbach and Nebab, as combined,—not on the teachings of either reference alone. Ans. 11 (discussing the teachings of Berenbach that the Examiner additionally relies upon).

For the reasons set forth by the Examiner, we agree that Appellant's arguments are unpersuasive of error.

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(V)

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In the Reply Brief, Appellant newly argues that the obviousness rejection should be reversed because "neither the [*Final*] *Action* nor the *Examiner's Answer* sets forth a clearly articulated basis explaining why it would have been obvious to combine the [four] cited references." Reply Br. 14.

We do not see this argument presented earlier in the Appeal Brief, and Appellant has not explained what good cause there might be to consider this newly raised arguments. *See* Reply Br. 14. Accordingly, we decline to consider this belated argument and, instead, affirm the Examiner's obviousness rejection of claims 1–23 for the all of the reasons articulated above. *See Ex parte Borden*, 93 USPQ2d 1473 (BPAI 2010) (informative) ("[C]onclud[ing] that the regulations set out in 37 C.F.R. § 41, *Practice Before the Board of Patent Appeals and Interferences*, do not require the Board to consider such belated arguments").

CONCLUSION

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1–23	101	Eligibility	1–23	
1–23	103(a)	Berenbach, Gehlot, Nehab, Chilenski	1–23	
Overall Outcome			1–23	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED