

**DEPARTMENT OF COMMERCE****United States Patent and Trademark Office****37 CFR Part 1**

[Docket No.: PTO-P-2015-0034]

**July 2015 Update on Subject Matter Eligibility**

**AGENCY:** United States Patent and Trademark Office, Commerce.  
**ACTION:** Update; Request for comments.

**SUMMARY:** The United States Patent and Trademark Office (USPTO) prepared interim guidance (2014 Interim Patent Eligibility Guidance) for use by USPTO personnel in determining subject matter eligibility in view of then-recent decisions by the U.S. Supreme Court (Supreme Court). The USPTO published the 2014 Interim Patent Eligibility Guidance in the **Federal Register**, and sought public comment on the 2014 Interim Patent Eligibility Guidance. The USPTO has since produced an update pertaining to patent subject matter eligibility titled July 2015 Update: Subject Matter Eligibility, which is available to the public on the USPTO's Internet Web site, in response to the public comment on the 2014 Interim Patent Eligibility Guidance. The July 2015 Update: Subject Matter Eligibility includes a new set of examples and discussion of various issues raised by the public comments, and is intended to assist examiners in applying the 2014 Interim Patent Eligibility Guidance during the patent examination process. The USPTO is now seeking public comment on the July 2015 Update: Subject Matter Eligibility.

**COMMENT DEADLINE DATE:** To be ensured of consideration, written comments on July 2015 Update: Subject Matter Eligibility must be received on or before October 28, 2015.

**ADDRESSES:** Comments on the July 2015 Update: Subject Matter Eligibility must be sent by electronic mail message over the Internet addressed to: [2014\\_interim\\_guidance@uspto.gov](mailto:2014_interim_guidance@uspto.gov). Electronic comments submitted in plain text are preferred, but also may be submitted in ADOBE® portable document format or MICROSOFT WORD® format. The comments will be available for viewing via the Office's Internet Web site (<http://www.uspto.gov>). Because comments will be made available for public inspection, information that the submitter does not desire to make public, such as an address or phone number, should not be included in the comments.

**FOR FURTHER INFORMATION CONTACT:** Raul Tamayo, Senior Legal Advisor, Office of

Patent Legal Administration, by telephone at 571-272-7728, or Michael Cygan, Senior Legal Advisor, Office of Patent Legal Administration, by telephone at 571-272-7700.

**SUPPLEMENTARY INFORMATION:** The 2014 Interim Patent Eligibility Guidance, prepared for use by USPTO personnel in determining subject matter eligibility under 35 U.S.C. 101, was published in the **Federal Register** on December 16, 2014. See *2014 Interim Guidance on Patent Subject Matter Eligibility*, 79 FR 74618 (Dec. 16, 2014). The USPTO also sought public comment on the 2014 Interim Patent Eligibility Guidance, along with additional suggestions on claim examples for explanatory example sets.

The USPTO received over sixty comments from the public. The public comments include the following six major themes: (1) requests for additional examples, particularly for claims directed to abstract ideas and laws of nature; (2) further explanation of the markedly different characteristics analysis; (3) further information regarding how examiners identify abstract ideas; (4) discussion of the *prima facie* case and the role of evidence with respect to eligibility rejections; (5) information regarding application of the 2014 Interim Patent Eligibility Guidance in the Patent Examining Corps; and (6) explanation of the role of preemption in the eligibility analysis, including a discussion of the streamlined analysis.

The USPTO has produced a July 2015 Update: Subject Matter Eligibility responding to each of the six major themes from the public comments. The July 2015 Update: Subject Matter Eligibility includes three appendices. The first appendix (Appendix 1) provides new examples that are illustrative of major themes from the comments. The second appendix (Appendix 2) is a comprehensive index of examples for use with the 2014 Interim Patent Eligibility Guidance, including new and previously issued examples. The third appendix (Appendix 3) lists and discusses selected eligibility cases from the Supreme Court and the U.S. Court of Appeals for the Federal Circuit. The July 2015 Update: Subject Matter Eligibility is intended to assist examiners in applying the 2014 Interim Patent Eligibility Guidance during the patent examination process.

The July 2015 Update: Subject Matter Eligibility, including the appendices, are available to the public on the USPTO's Internet Web site. The USPTO is now seeking public comment on the

July 2015 Update: Subject Matter Eligibility.

Dated: July 15, 2015.

**Michelle K. Lee,**

*Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office.*

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**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Part 52**

[EPA-R10-OAR-2015-0330; FRL-9931-46-Region 10]

**Approval and Promulgation of Implementation Plans; Washington: Interstate Transport of Fine Particulate Matter**

**AGENCY:** Environmental Protection Agency.

**ACTION:** Final rule.

**SUMMARY:** The Clean Air Act (CAA) requires each State Implementation Plan (SIP) to contain adequate provisions prohibiting air emissions that will have certain adverse air quality effects in other states. On May 11, 2015, the State of Washington submitted a SIP revision to the Environmental Protection Agency (EPA) to address certain interstate transport requirements with respect to the 2006 24-hour fine particulate matter (PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS). The EPA has determined that Washington adequately addressed these CAA interstate transport requirements for the 2006 24-hour PM<sub>2.5</sub> NAAQS.

**DATES:** This final rule is effective August 31, 2015.

**ADDRESSES:** The EPA has established a docket for this action under Docket ID No. EPA-R10-OAR-2015-0330. All documents in the docket are listed on the [www.regulations.gov](http://www.regulations.gov) Web site. Although listed in the index, some information is not publicly available, e.g., Confidential Business Information (CBI) or other information the disclosure of which is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through [www.regulations.gov](http://www.regulations.gov) or in hard copy at the Air Programs Unit, Office of Air, Waste and Toxics, EPA Region 10, 1200 Sixth Avenue, Seattle, WA, 98101. The EPA requests that if at all possible, you contact the individual listed in the **FOR**

## July 2015 Update: Subject Matter Eligibility

This document is an update pertaining to patent subject matter eligibility. The *2014 Interim Guidance on Subject Matter Eligibility* (2014 IEG) published on Dec. 16, 2014 (79 Fed. Reg. 74618), and comments were solicited from the public.<sup>1</sup> Over sixty comments were received, and have been carefully reviewed. Using new and previously issued examples and further explanation, this update responds to the six major themes from the comments. The Office plans to continue providing updates on eligibility based on case law developments and further public input. Additional comments are being solicited via a Federal Register notice issued simultaneously herewith.

In the discussion below, the response to each theme is addressed in a separate section, including: (1) requests for additional examples, particularly for claims directed to abstract ideas and laws of nature; (2) further explanation of the markedly different characteristics (MDC) analysis; (3) further information regarding how examiners identify abstract ideas; (4) discussion of the *prima facie* case and the role of evidence with respect to eligibility rejections; (5) information regarding application of the 2014 IEG in the corps; and (6) explanation of the role of preemption in the eligibility analysis, including a discussion of the streamlined analysis.

Three appendices are also attached. Appendix 1 provides new examples that are illustrative of major themes from the comments. Appendix 2 is a comprehensive index of examples for use with the 2014 IEG, including new and previously issued examples. Appendix 3 lists selected eligibility cases from the U.S. Supreme Court and the U.S. Court of Appeals for the Federal Circuit that are discussed herein and provides information such as citation, subject matter and classification.

Since the 2014 IEG published, the Federal Circuit has issued a number of decisions on eligibility, including several very recent precedential decisions, such as *Ariosa Diagnostics v. Sequenom*, relating to detecting fetal nucleic acids, and several decisions relating to computer implemented abstract ideas. These recent decisions, which may be subject to further judicial developments, are being reviewed closely to determine whether any changes in guidance are warranted.<sup>2</sup>

### I. Additional Examples

Additional examples were requested, particularly of eligible claims, and of examples illustrating the application of the significantly more inquiry in Step 2B. To assist examiners and the public in applying the principles of the 2014 IEG, new examples are attached in Appendix 1, including claims directed to abstract ideas, particularly in the business method, graphical user interface (GUI), and software areas. Examples in the biotechnology area, especially diagnostic and other method claims directed to laws of nature and natural phenomena, are in process in light of recent judicial developments.

These examples provide additional eligible claims in various technologies, as well as sample analyses applying the Supreme Court and Federal Circuit's considerations for determining whether a claim with additional elements amounts to significantly more than the judicial exception itself. The examples, along with the case law precedent identified in the training materials as pertinent to the considerations,<sup>3</sup> will assist examiners in evaluating claim elements that can lead to eligibility (*i.e.*, by amounting to significantly more) in a consistent manner across the corps. Examiners can locate the new and previously issued examples that are pertinent to each of the considerations by referring to Appendix 2, which identifies the subject matter, statutory category, judicial exception (if any), and relevant considerations for each example.

Comments also stressed the importance of the 2014 IEG's instruction that in Step 2B, examiners are to consider all additional elements both individually and in combination to determine whether

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the claim as a whole amounts to significantly more than an exception. It is agreed that this instruction is vital to ensuring the eligibility of many claims, because even if an element does not amount to significantly more on its own (*e.g.*, because it is merely a generic computer component performing generic computer functions), it can still amount to significantly more when considered in combination with the other elements of the claim. The importance of considering the additional elements in combination was emphasized in examiner training (*see* Section V below), and in numerous examples. For instance, Examples 3 (AI-3: digital image processing), 4 (AI-4: global positioning system), 21 (transmission of stock quote data), and 25 (rubber manufacturing) illustrate how generic computer components that individually perform merely generic computer functions (*e.g.*, a CPU that performs mathematical calculations or a clock that produces time data) are able in combination to perform functions that are not generic computer functions and that amount to significantly more.

### II. Further Explanation Of The Markedly Different Characteristics Analysis

Additional explanation of the markedly different characteristics (MDC) analysis was requested, some comments suggested moving the MDC analysis from Step 2A to Step 2B, and some comments suggested retaining the MDC analysis in Step 2A. After full consideration of the proposed alternatives, the MDC analysis will be retained in Step 2A, because that location provides three benefits to applicants: it allows many claims to qualify as eligible earlier in the analysis; it provides an additional pathway to eligibility for many claims directed to “product of nature” exceptions;<sup>4</sup> and it ensures consistent eligibility analyses across all technologies and claim types. These benefits, and the MDC analysis in general, are explained further in the following discussion.

Early Eligibility. The 2014 IEG implemented the Supreme Court’s two-part framework set forth in *Alice Corp.* (also called the *Mayo* test) as Steps 2A and 2B of the eligibility analysis. Locating the MDC analysis in Step 2A allows many claims to qualify as eligible early in the analysis, *i.e.*, as soon as it is determined that no “product of nature” is recited in the claim. For instance, in Example 10 (NBP-2: pomelo juice) claim 2, once it is determined that the recited nature-based product has MDC from what occurs in nature, the claim qualifies as eligible subject matter. This early eligibility mirrors how the claims in *Chakrabarty* and *Myriad* (with respect to cDNA) were held eligible after the Step 2A analysis, *i.e.*, after the Supreme Court determined that no “product of nature” was recited in the claims at issue.<sup>5</sup> If the MDC analysis was moved to Step 2B, however, then these claims as well as every other claim reciting a nature-based product limitation would be subjected to the significantly more inquiry before they could be held eligible. Such lengthening of the eligibility inquiry is difficult to reconcile with the judicial precedent and would unnecessarily consume examination resources.

Additional Pathway To Eligibility. Locating the MDC analysis in Step 2A and the significantly more inquiry in Step 2B provides an additional pathway to eligibility for many claims directed to “product of nature” exceptions. As explained in the 2014 IEG and the training materials, claims that fail to immediately qualify as eligible in Step 2A because they are directed to judicial exceptions have a second chance at eligibility in Step 2B when they are evaluated to determine if the claim as a whole amounts to significantly more. This is illustrated, *e.g.*, by Example 17 (NBP-9: cells) claim 5, which achieves eligibility in Step 2B because the addition of the pacemaker cells to the scaffold confines the claim to a particular useful application of the scaffold, and improves the technology of regenerative medicine by facilitating faster tissue regeneration than when pacemaker cells are implanted by themselves.<sup>6</sup> If the MDC analysis was moved to Step 2B as

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suggested, however, then the conclusion for claim 5 might change because the Step 2B additional pathway to eligibility would no longer exist for claims directed to “product of nature” exceptions.

Consistency. Placing the MDC analysis (which the courts have used to identify “product of nature” exceptions)<sup>7</sup> in Step 2A ensures that all claims are consistently analyzed for eligibility regardless of statutory category or the type of exception recited. As many examiners are faced with claims that contain different types of exceptions, this ensures a more uniform approach to examination for eligibility because all exceptions are identified in the same manner (*i.e.*, in Step 2A), and examiners are not required to distinguish between exceptions which can prove to be difficult. This consistency is illustrated in the examples, *e.g.*, by comparing the analysis for Example 10 (NBP-2: pomelo juice) claim 2 with the analysis for Example 1 (AI-1: method of isolating and removing malicious code from electronic messages) claim 1. Although these two examples concern different statutory categories (composition of matter vs. process) and different judicial exceptions (“product of nature” vs. abstract idea), the overall analysis is the same, *i.e.*, once it is determined that the claim is not directed to a judicial exception (*Step 2A: NO*), the claim qualifies as eligible subject matter and the eligibility analysis ends.

### III. Further Information on Identifying Abstract Ideas in Step 2A

Additional guidance on identifying abstract ideas was requested in order to assist examiners in clearly articulating grounds of rejection with respect to eligibility. The abstract idea exception, like the other judicial exceptions, was created by the courts to protect the building blocks of ingenuity, scientific exploration, technological work, and the modern economy. Because the courts have declined to define abstract ideas, other than by example, the 2014 IEG instructs examiners to refer to the body of case law precedent in order to identify abstract ideas by way of comparison to concepts already found to be abstract. Accordingly, the following discussion provides more information about the types of concepts the courts have considered to be abstract ideas, by associating Supreme Court and Federal Circuit eligibility decisions with judicial descriptors (*e.g.*, “certain methods of organizing human activities”) based on common characteristics. These associations define the judicial descriptors in a manner that stays within the confines of the judicial precedent, with the understanding that these associations are not mutually exclusive, *i.e.*, some concepts may be associated with more than one judicial descriptor. This discussion is meant to guide examiners and ensure that a claimed concept is not identified as an abstract idea unless it is similar to at least one concept that the courts have identified as an abstract idea.

When identifying abstract ideas, examiners should keep in mind that judicial exceptions need not be old or long-prevalent, and that even newly discovered judicial exceptions are still exceptions, despite their novelty. For example, the mathematical formula in *Flook*, the laws of nature in *Mayo*, and the isolated DNA in *Myriad* were all novel, but nonetheless were considered by the Supreme Court to be judicial exceptions because they were “‘basic tools of scientific and technological work’ that lie beyond the domain of patent protection.”<sup>8</sup> The Supreme Court’s cited rationale for considering even “just discovered” judicial exceptions as exceptions stems from the concern that “without this exception, there would be considerable danger that the grant of patents would ‘tie up’ the use of such tools and thereby ‘inhibit future innovation premised upon them.’”<sup>9</sup> The Federal Circuit has also applied this principle, for example, when holding the concept of using advertising as an exchange or currency abstract in *Ultramercial*, despite the patentee’s arguments that the concept was “new”.<sup>10</sup>

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### A. “Fundamental economic practices”

The phrase “fundamental economic practices” is used to describe concepts relating to the economy and commerce, such as agreements between people in the form of contracts, legal obligations, and business relations. The term “fundamental” is used in the sense of being foundational or basic, and not in the sense of necessarily being “old” or “well-known.” As shown below, these concepts have common characteristics.

- At least two cases have found concepts relating to agreements between people or performance of financial transactions abstract, such as creating a contractual relationship (*buySAFE*), and hedging (*Bilski*).
- At least two cases have found concepts relating to mitigating risks abstract, such as hedging (*Bilski*), and mitigating settlement risk (*Alice Corp.*).

### B. “Certain Methods of Organizing Human Activity”

The phrase “certain methods of organizing human activity” is used to describe concepts relating to interpersonal and intrapersonal activities, such as managing relationships or transactions between people, social activities, and human behavior; satisfying or avoiding a legal obligation; advertising, marketing, and sales activities or behaviors; and managing human mental activity. The 2014 IEG uses the term “certain” to qualify this category description, in order to remind examiners that (1) not all methods of organizing human activity are abstract ideas, and (2) this category description is not meant to cover human operation of machines. Like the other categories, some methods of organizing human activities can also be economic practices or “ideas.” For example, the concept of hedging claimed in *Bilski* was described by the Supreme Court as both a method of organizing human activity and a fundamental economic practice. As shown below, these concepts have common characteristics.

- Several cases have found concepts relating to managing relationships or transactions between people abstract, such as creating a contractual relationship (*buySAFE*), hedging (*Bilski*), mitigating settlement risk (*Alice Corp.*), processing loan information (*Dealertrack*), managing an insurance policy (*Bancorp*), managing a game of Bingo (*Planet Bingo*), allowing players to purchase additional objects during a game (*Gametek*), and generating rule-based tasks for processing an insurance claim (*Accenture*).<sup>11</sup>
- At least two cases have found concepts relating to satisfying or avoiding a legal obligation abstract, such as tax-free investing (*Fort Properties*) or arbitration (*In re Comiskey*).
- Several cases have found concepts relating to advertising, marketing and sales activities or behaviors abstract, such as using advertising as an exchange or currency (*Ultramercial*), structuring a sales force or marketing company (*In re Ferguson*), using an algorithm for determining the optimal number of visits by a business representative to a client (*In re Maucorps*), allowing players to purchase additional objects during a game (*Gametek*), and computing a price for the sale of a fixed income asset and generating a financial analysis output (*Freddie Mac*).
- At least two cases have found concepts relating to managing human behavior abstract, such as a mental process that a neurologist should follow when testing a patient for nervous system malfunctions (*In re Meyer*), and meal planning (*DietGoal*).

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### C. “An Idea ‘Of Itself’”

The phrase “an idea ‘of itself,’” is used to describe an idea standing alone such as an uninstigated concept, plan or scheme, as well as a mental process (thinking) that “can be performed in the human mind, or by a human using a pen and paper.”<sup>12</sup> Some concepts that are “ideas” can also fall within other categories. For example, in *Ultramerical*, the steps of displaying an advertisement in exchange for access to copyrighted media was called an “idea”, but could also be considered organizing human activity because the claim describes advertising. As shown below, these concepts have common characteristics.

- Several cases have found concepts relating to processes of comparing data that can be performed mentally abstract, such as comparing information regarding a sample or test subject to a control or target data (*Ambry*, *Myriad CAFC*), collecting and comparing known information (*Classen*), comparing data to determine a risk level (*Perkin-Elmer*), diagnosing an abnormal condition by performing clinical tests and thinking about the results (*In re Grams*),<sup>13</sup> obtaining and comparing intangible data (*Cybersource*), and comparing new and stored information and using rules to identify options (*SmartGene*).
- Several cases have found concepts relating to processes of organizing information that can be performed mentally abstract, such as using categories to organize, store and transmit information (*Cyberfone*), data recognition and storage (*Content Extraction*), and organizing information through mathematical correlations (*Digitech*).
- At least one case has found the steps of displaying an advertisement in exchange for access to copyrighted media to be “an idea, having no particular concrete or tangible form” (*Ultramerical*).

### D. “Mathematical relationships/formulas”

The phrase “mathematical relationships/formulas” is used to describe mathematical concepts such as mathematical algorithms, mathematical relationships, mathematical formulas, and calculations. As shown below, these concepts have common characteristics. It is also noted that the courts have described some mathematical concepts as laws of nature.

- At least five cases have found concepts relating to a mathematical relationship or formula abstract, for example an algorithm for converting binary coded decimal to pure binary (*Benson*), a formula for computing an alarm limit (*Flook*), a formula describing certain electromagnetic standing wave phenomena (*Mackay Radio*), the Arrhenius equation (*Diehr*), and a mathematical formula for hedging (*Bilski*).
- Several cases have found concepts relating to performing mathematical calculations abstract, such as managing a stable value protected life insurance policy by performing calculations and manipulating the results (*Bancorp*), reducing the amount of calculations in known and established computations (*FuzzySharp*), an algorithm for determining the optimal number of visits by a business representative to a client (*In re Maucorps*), an algorithm for calculating parameters indicating an abnormal condition (*In re Grams*), computing a price for the sale of a fixed income asset and generating a financial analysis output (*Freddie Mac*), and calculating the difference between local and average data values (*In re Abele*).

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### IV. Requirements Of A *Prima Facie* Case

Concern was expressed about examiners satisfying the proper burden for a *prima facie* case when making an eligibility rejection. Accordingly, the following discussion clarifies the requirements of a *prima facie* case, in order to guide examiners in satisfying their burden and ensuring that they reject on eligibility grounds only where appropriate. Examiner training (*see* Section V below) also emphasized that performing a thorough analysis and writing a clear rejection is a critical part of satisfying the examiner's burden. This discussion is meant to help examiners and applicants understand when a proper *prima facie* case has been made, so there is no doubt as to whether examiners have met their burden.

The concept of the *prima facie* case is a procedural tool of patent examination, which allocates the burdens going forward between the examiner and applicant. In particular, the initial burden is on the examiner to explain why a claim or claims are unpatentable clearly and specifically, so that applicant has sufficient notice and is able to effectively respond.<sup>14</sup> For subject matter eligibility, the examiner's burden is met by clearly articulating the reason(s) why the claimed invention is not eligible, for example by providing a reasoned rationale that identifies the judicial exception recited in the claim and why it is considered an exception, and that identifies the additional elements in the claim (if any) and explains why they do not amount to significantly more than the exception.<sup>15</sup> This rationale may rely, where appropriate, on the knowledge generally available to those in the art, on the case law precedent, on applicant's own disclosure, or on evidence. Sample rejections satisfying this burden are found in the training materials, particularly the worksheets for Examples 5-8. Once the examiner has satisfied her initial burden, the burden then shifts to the applicant.

The courts consider the determination of whether a claim is eligible (which involves identifying whether an exception such as an abstract idea is being claimed) to be a question of law.<sup>16</sup> Accordingly, courts do not rely on evidence that a claimed concept is a judicial exception, and in most cases resolve the ultimate legal conclusion on eligibility without making any factual findings. For example:

- *Alice Corp., Myriad, Mayo, Bilski, Diehr, Flook* and *Benson* relied solely on comparisons to concepts found to be exceptions in past decisions when identifying judicial exceptions.
  - In *Bilski*, when affirming the Office's eligibility rejection (which was not supported by evidence), the Supreme Court cited several documents describing "hedging" (a high level description of the detailed concept in the claim). The documents were modern day textbooks (that were not prior art) cited as examples that "hedging" is "a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class."<sup>17</sup> These documents cannot be evidence, however, because the Supreme Court is an appellate court limited to review of the record created below, *i.e.*, by the Office's rejection.<sup>18</sup>
  - *Alice Corp.* followed a similar approach to *Bilski*, when affirming the Federal Circuit's *en banc* judgment that the claims were ineligible (which was not supported by evidence). In *Alice Corp.*, the documents were textbooks and an article (only one of which qualified as prior art) cited as examples that using a third-party intermediary is a building block of the modern economy.<sup>19</sup>
- *Alice Corp., Bilski, Diehr, Flook* and *Benson* did not cite any evidence in support of the significantly more inquiry, even where additional elements were identified as well-

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understood, routine and conventional in the art. *Mayo* did not cite any evidence in support of identifying additional elements as mere field-of-use or data gathering steps, but did cite the patent's specification when identifying other limitations as well-understood, routine and conventional.

The 2014 IEG follows the analysis used by the Supreme Court and the Federal Circuit by comparing claimed concepts to prior court decisions to identify a law of nature, a natural phenomenon, or an abstract idea for Step 2A. For Step 2B, examiners should rely on what the courts have recognized, or those in the art would recognize, as elements that are well-understood, routine and conventional. For example, the courts have recognized the following computer functions to be well-understood, routine, and conventional functions when they are claimed in a merely generic manner:

- performing repetitive calculations,<sup>20</sup>
- receiving, processing, and storing data,<sup>21</sup>
- electronically scanning or extracting data from a physical document,<sup>22</sup>
- electronic recordkeeping,<sup>23</sup>
- automating mental tasks,<sup>24</sup> and
- receiving or transmitting data over a network, *e.g.*, using the Internet to gather data.<sup>25</sup>

This listing is not meant to imply that all computer functions are well-understood, routine and conventional, or that a claim reciting a generic computer component performing a generic computer function is necessarily ineligible. Courts have held computer-implemented processes not to be significantly more than an abstract idea (and thus ineligible) where the claim as a whole amounts to nothing more than generic computer functions merely used to implement an abstract idea, such as an idea that could be done by a human analog (*i.e.*, by hand or by merely thinking). This is illustrated, *e.g.*, by Examples 7 (AI-7: e-commerce with transaction performance guaranty), 22 (GUI for meal planning), and 24 (updating alarm limits). In contrast, courts have held computer-implemented processes to be significantly more than an abstract idea (and thus eligible), where generic computer components are able in combination to perform functions that are not merely generic. This is illustrated in, *e.g.*, Examples 3 (AI-3: digital image processing), 23 (GUI for relocating obscured textual information), and 25 (rubber manufacturing).

Courts have not identified a situation in which evidence was required to support a finding that the additional elements were well-understood, routine or conventional, but rather treat the issue as a matter appropriate for judicial notice. As such, a rejection should only be made if an examiner relying on his or her expertise in the art can readily conclude in the Step 2B inquiry that the additional elements do not amount to significantly more (*Step 2B: NO*). If the elements or functions are beyond those recognized in the art or by the courts as being well-understood, routine or conventional, then the elements or functions will in most cases amount to significantly more (*Step 2B: YES*).

### V. Application Of The 2014 IEG In The Patent Examining Corps

Concern was expressed about application of the 2014 IEG in the patent examining corps, and suggestions were made as to the need for examiner training. The Office has already taken steps to enhance examiners' understanding of the eligibility guidance, and will continue to work with examiners as part of its ongoing efforts to enhance patent quality. The following discussion notes efforts that have been made so far to provide examiners with appropriate guidance and training on the application of the 2014 IEG. It is also noted that many comments were received prior to



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completion of the first phase of eligibility training, and thus likely reflect rejections made prior to the issuance of the 2014 IEG and the examiner training.

Guidance Materials. The Office’s eligibility guidance includes: the 2014 IEG; the *2014 Interim Eligibility Guidance Quick Reference Sheet* (issued December 16, 2014), which is intended as a reference guide to the 2014 IEG; *Examples: Nature-Based Products* (issued December 16, 2014); *Examples: Abstract Ideas* (issued on January 27, 2015); and the examples contained in Appendix 1 to this update. To assist examiners in understanding the principles discussed in the 2014 IEG and illustrated in the examples, Appendix 2 hereto is a comprehensive index of the examples, and Appendix 3 hereto provides a listing of eligibility case law precedent. The examples are intended to illustrate the proper application of the eligibility analysis to a variety of claims in multiple technologies, and to guide examiners in evaluating eligibility in a consistent manner across the corps.

Training. The examining corps was trained on the 2014 IEG in January – February 2015, on the *Examples: Nature-Based Products* in February – March 2015, and on the *Examples: Abstract Ideas* in April – May 2015. Training was conducted in a variety of modalities, including instructor-led training, group discussion, and in workshop format. The training materials including video lectures, slides, and worksheets are posted on the Office website. The worksheets were designed for use in the workshop training, and are available for optional use by examiners to walk through the eligibility analysis of other claims. Sample “answer keys” for Examples 1-8 demonstrate how the worksheets can be used to guide the analysis, and also provide examples of rejections that satisfy the *prima facie* burden of clearly articulating the reason(s) why a claimed invention is not eligible.

### VI. The Role Of Preemption, And The Streamlined Analysis

Clarification was requested about the role of preemption in the eligibility analysis, and suggestions were made as to where examiners should consider preemption, including in the streamlined analysis. After full consideration of the proposed alternatives, the current analysis as set forth in Steps 2A and 2B will be retained, since it already incorporates many aspects of preemption at a level that is consistent with the case law precedent. Further, as suggested by many comments, the streamlined analysis will be retained, because it provides an important benefit to applicants and examiners by permitting claims whose eligibility is self-evident to qualify as eligible without performing a full eligibility analysis.

The 2014 IEG Already Incorporates Preemption Where Appropriate. The Supreme Court has described the concern driving the judicial exceptions as preemption,<sup>26</sup> however, the courts do not use preemption as a stand-alone test for eligibility.<sup>27</sup> Instead, questions of preemption are inherent in the two-part framework from *Alice Corp.* and *Mayo* (incorporated in the 2014 IEG as Steps 2A and 2B), and are resolved by using this framework to distinguish between preemptive claims, and “those that integrate the building blocks into something more...the latter pose no comparable risk of pre-emption, and therefore remain eligible”.<sup>28</sup> It should be kept in mind, however, that while a preemptive claim may be ineligible, the absence of complete preemption does not guarantee that a claim is eligible.<sup>29</sup> This principle is illustrated, *e.g.*, by Example 8 (AI-8: distribution of products over the Internet).

Streamlined Analysis. For the convenience of examiners, the 2014 IEG presented a streamlined analysis that is available for claims that “clearly do not seek to tie up any judicial exception such that others cannot practice it.”<sup>30</sup> The use of “tie up” refers to the results of Steps 2A and 2B, and is

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not meant to imply that the streamlined analysis is either a preemption test or a means of avoiding the results that would occur if a claim were to undergo the full eligibility analysis. In fact, the results of the streamlined analysis will always be the same as the full analysis, in that a claim that qualifies as eligible after Step 2A or Step 2B of the full analysis would also be eligible if the streamlined analysis were applied to that claim. *E.g.*, if the streamlined analysis were applied to the claims in new Example 25 (rubber manufacturing), the end result of eligibility would be the same. A claim that does not qualify as eligible after Step 2B<sup>31</sup> of the full analysis would not be suitable for the streamlined analysis, because the claim lacks self-evident eligibility. Thus, *e.g.*, the streamlined analysis is not available for the claim in new Example 24 (updating alarm limits). It is also noted that because the result of employing the streamlined analysis is a conclusion that the claim is eligible, there will be no rejection of the claim on eligibility grounds, and thus the examiner will not need to indicate which analysis was used to reach the eligibility conclusion. *Compare, e.g.*, Example 25 (rubber manufacturing), which illustrates how a hypothetical examiner would determine that the exemplary rubber manufacturing claims qualify as eligible in Step 2B of the full analysis, *with* Examples 26 (internal combustion engine) and 27 (system software – BIOS), which illustrate how a hypothetical examiner would determine that the exemplary claims qualify as eligible under the streamlined analysis. In practice, the record may reflect the conclusion of eligibility simply by the absence of an eligibility rejection or may include clarifying remarks, when appropriate.

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<sup>1</sup> The current guidance documents on subject matter eligibility, including the 2014 IEG and the example sets, all examiner training materials to date, and the public comments, are available on USPTO.GOV at the *2014 Interim Guidance on Subject Matter Eligibility* webpage.

<sup>2</sup> Federal Circuit decisions since publication of the 2014 IEG include *Versata, Intellectual Ventures, Webb, Internet Patents, Sequenom, OIP Tech., Freddie Mac, Dietgoal, Gametek, Fuzzysharp, Content Extraction, and Ambry Genetics*. Because they are so recent, it not yet certain whether *Versata, Intellectual Ventures, Webb, Internet Patents, Sequenom, and OIP Tech.* will be subject to further judicial developments such as rehearing by the Federal Circuit and/or certiorari to the Supreme Court. In addition, a petition for certiorari in *Content Extraction* is currently pending at the Supreme Court. All citations for the cases in this Update appear in Appendix 3.

<sup>3</sup> *See, e.g.*, Computer Based Training at discussion of slides 21 and 22 (discussing case law precedent relating to each consideration). Note that a full transcript of the Computer Based Training is available by selecting the “notes” tab while viewing the video presentation.

<sup>4</sup> The courts consider “products of nature” to be exceptions because they tie up the use of naturally occurring things, but have labeled “products of nature” as both laws of nature and natural phenomena. *See Association for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. \_\_, 133 S. Ct. 2107, 2111 (2013). Step 2A of the flowchart uses the terms “law of nature” and “natural phenomenon” as inclusive of “products of nature”.

<sup>5</sup> Neither *Chakrabarty* nor *Myriad* applied the significantly more inquiry to the claims before holding them eligible. Although the omission of the Step 2B inquiry could be interpreted as due to the fact that none of the claims at issue recited anything other than the nature-based product limitations, it can also be interpreted as deeming the significantly more inquiry irrelevant to claims that do not recite a judicial exception. The 2014 IEG follows the latter interpretation, and its placement of the MDC analysis in Step 2A ensures the achievement of eligibility results consistent with the judicial precedent, *i.e.*, that claims similar to those considered in *Chakrabarty* and *Myriad* will also be held eligible without proceeding to Step 2B for consideration of significantly more.

<sup>6</sup> The provision of this additional pathway ensures that claims directed to “products of nature” obtain the same second chance at eligibility in Step 2B that is afforded to claims directed to other judicial exceptions. *Compare, e.g.*, Example 17 (NBP-9: cells) claim 5, which is directed to a “product of nature” with new Example 25 (rubber manufacturing)

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claims 1 and 2, which are directed to an abstract idea. In both examples, the claims achieve eligibility via Step 2B because the additional elements amount to significantly more than the recited exception.

<sup>7</sup> For example, *Chakrabarty* relied on a comparison of the claimed bacterium to naturally occurring bacteria when determining that the claimed bacterium was not a “product of nature” because it had “markedly different characteristics from any found in nature”. *Diamond v. Chakrabarty*, 447 U.S. 303, 310 (1980). Similarly, *Roslin* relied on a comparison of the claimed sheep to naturally occurring sheep when determining that the claimed sheep was a “product of nature” because it “does not possess ‘markedly different characteristics from any [farm animals] found in nature.’” *In re Roslin Institute (Edinburgh)*, 750 F.3d 1333, 1337 (Fed. Cir. 2014), quoting *Chakrabarty*, 447 U.S. at 310 (alterations in original).

<sup>8</sup> *Parker v. Flook*, 437 U.S. 584, 591-92 (1978); and *Myriad Genetics*, 133 S. Ct. at 2116, quoting *Mayo Collaborative Svcs. v. Prometheus Labs.*, 566 U.S. \_\_\_, 132 S. Ct. 1289, 1293 (2012).

<sup>9</sup> *Myriad*, 133 S. Ct. at 2116, quoting *Mayo*, 132 S. Ct. at 1293. *See also Myriad*, 133 S. Ct. at 2217 (“Groundbreaking, innovative, or even brilliant discovery does not by itself satisfy the §101 inquiry.”).

<sup>10</sup> *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 714-15 (Fed. Cir. 2014) (“According to Ultramercial, abstract ideas remain patent-eligible under § 101 as long as they are new ideas, not previously well known, and not routine activity. ... But here, the ‘545 claims are indeed directed to an abstract idea, which is, as the district court found, a method of using advertising as an exchange or currency. We do not agree with Ultramercial that the addition of merely novel or non-routine components to the claimed idea necessarily turns an abstraction into something concrete. In any event, any novelty in implementation of the idea is a factor to be considered only in the second step of the *Alice* analysis.”).

<sup>11</sup> *See Content Extraction and Transmission LLC v. Wells Fargo Bank, N.A.*, 776 F.3d 1343, 1358-59 (Fed. Cir. 2014) (describing the abstract ideas in *buySAFE*, *Accenture*, *Bancorp*, and *Dealertrack*).

<sup>12</sup> *Cybersource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1372 (Fed. Cir. 2011). As the Federal Circuit explained, “methods which can be performed mentally, or which are the equivalent of human mental work, are unpatentable abstract ideas--the ‘basic tools of scientific and technological work’ that are open to all.” *Id.* at 1371, citing *Gottschalk v. Benson*, 409 U.S. 63 (1972).

<sup>13</sup> *See Cybersource*, 654 F.3d at 1372 n.2 (describing the abstract idea in *Grams*).

<sup>14</sup> *Hyatt v. Dudas*, 492 F.3d 1365, 1369-70 (Fed. Cir. 2007); *see also* 35 U.S.C. § 132; MPEP 2106(III).

<sup>15</sup> *See* MPEP 707.07(d), which explains that the burden is on the Office to establish a *prima facie* case by clearly articulating the reasoning behind a rejection, and MPEP 2106(III), explaining that after the examiner has identified and explained in the record the reasons why a claim is ineligible, then the burden shifts to the applicant to either amend the claim or make a showing of why the claim is eligible for patent protection.

<sup>16</sup> *See, e.g., Roslin*, 750 F.3d at 1335; *Accenture Global Services, GmbH v. Guidewire Software*, 728 F.3d 1336, 1340-41 (Fed. Cir. 2013); *Fort Properties, Inc. v. American Master Lease LLC*, 671 F.3d 1317, 1320 (Fed. Cir. 2012); *Cybersource*, 654 F.3d at 1369; *SiRF Tech. Inc. v. Int’l Trade Commission*, 601 F.3d 1319, 1331 (Fed. Cir. 2010); *In re Ferguson*, 558 F.3d 1359, 1363 (Fed. Cir. 2009); *In re Bilski*, 545 F.3d 943, 951 (Fed. Cir. 2008) (*en banc*), affirmed by *Bilski v. Kappos*, 561 U.S. 593 (2010).

<sup>17</sup> *Bilski*, 561 U.S. at 611.

<sup>18</sup> It is a fundamental principle of law that an appellate court does not act on evidence that was not before the lower court(s). *See, e.g., Rosewell v La Salle Nat’l Bank*, 450 U.S. 503, 518 n.22 (1981). *See also VirtualAgility Inc. v. Salesforce.com*, 759 F.3d 1307, 1312 (Fed. Cir. 2014); *Sky Techs. LLC v. SAP AG*, 576 F.3d 1374, 1377 n.4 (Fed. Cir. 2009); *In re Watts*, 354 F.3d 1362, 1367 (Fed. Cir. 2004).

<sup>19</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. \_\_\_, 134 S. Ct. 2347, 2356 (2014).

<sup>20</sup> *See Flook*, 437 U.S. at 594; *Bancorp Services v. Sun Life*, 687 F.3d 1266, 1278 (Fed. Cir. 2012) (“The computer required by some of Bancorp’s claims is employed only for its most basic function, the performance of repetitive calculations, and as such does not impose meaningful limits on the scope of those claims.”). *But see* Examples 3 (AI-3: digital image processing) and 25 (rubber manufacturing).

<sup>21</sup> *See Alice Corp.*, 134 S. Ct. at 2360. *But see* Example 4 (AI-4: global positioning system).

<sup>22</sup> *See Content Extraction*, 776 F.3d at 1358 (optical character recognition).

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<sup>23</sup> See *Alice Corp.*, 134 S. Ct. at 2359 (creating and maintaining “shadow accounts”); *Ultramercial*, 772 F.3d at 716 (updating an activity log).

<sup>24</sup> See *Benson*, 409 U.S. at 65-67; *Bancorp*, 687 F.3d at 1275; *CyberSource*, 654 F.3d at 1375.

<sup>25</sup> See *Ultramercial*, 772 F.3d at 716-17; *buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350, 1355 (Fed. Cir. 2014); *Cyberfone Systems, LLC v. CNN Interactive Group, Inc.*, 558 Fed. Appx. 988, 993 (Fed. Cir. 2014). But see *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1258 (Fed. Cir. 2014) (“Unlike the claims in *Ultramercial*, the claims at issue here specify **how** interactions with the Internet are manipulated to yield a desired result—a result that overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink.” (emphasis added)).

<sup>26</sup> See *Alice Corp.*, 134 S. Ct. at 2354:

We have described the concern that drives this exclusionary principle as one of pre-emption. See, e.g., *Bilski, supra*, at 611-612, 130 S. Ct. 3218, 177 L. Ed. 2d 792 (upholding the patent “would pre-empt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea”). Laws of nature, natural phenomena, and abstract ideas are “the basic tools of scientific and technological work.” *Myriad, supra*, at \_\_\_, 133 S. Ct. 2107, 186 L. Ed. 2d 124, 133. “[M]onopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it,” thereby thwarting the primary object of the patent laws. *Mayo, supra*, at \_\_\_, 132 S. Ct. 1289, 182 L. Ed. 2d 321, 327; see U.S. Const., Art. I, § 8, cl. 8 (Congress “shall have Power . . . To promote the Progress of Science and useful Arts”).

<sup>27</sup> For example, even though the claims in *Flook* did not “wholly preempt the mathematical formula”, and the claims in *Mayo* were directed to “narrow laws that may have limited applications”, the Supreme Court nonetheless held them ineligible because they failed to amount to significantly more than the recited exceptions. *Flook* at 589-90; *Mayo* at 1302. The Federal Circuit has followed the Supreme Court’s lead in rejecting arguments that a lack of total preemption equates with eligibility. See, e.g., *buySAFE*, 765 F.3d at 1355; *Ultramercial*, 772 F.3d at 716.

<sup>28</sup> *Alice Corp.*, 134 S. Ct. at 2355-56.

<sup>29</sup> See *Alice Corp.*, 134 S. Ct. at 2358:

Stating an abstract idea “while adding the words ‘apply it’” is not enough for patent eligibility. *Mayo, supra*, at \_\_\_, 132 S. Ct. 1289, 182 L. Ed. 2d 321, 325. Nor is limiting the use of an abstract idea “to a particular technological environment.” *Bilski, supra*, at 610-611, 130 S. Ct. 3218, 177 L. Ed. 2d 792. Stating an abstract idea while adding the words “apply it with a computer” simply combines those two steps, with the same deficient result. Thus, if a patent’s recitation of a computer amounts to a mere instruction to “implemen[t]” an abstract idea “on . . . a computer,” *Mayo, supra*, at \_\_\_, 132 S. Ct. 1289, 182 L. Ed. 2d 321, 337, that addition cannot impart patent eligibility. This conclusion accords with the pre-emption concern that undergirds our §101 jurisprudence.

<sup>30</sup> See 2014 IEG at Section I.B.3.

<sup>31</sup> Claims that are not eligible in Step 2A of the full analysis may or may not be suitable for the streamlined analysis, depending on whether the claims clearly demonstrate that they amount to significantly more. Thus, while new Example 26 (internal combustion engine) recites calculating the rate of change (a mathematical relationship), the claim overall clearly amounts to significantly more than this exception, and a full eligibility analysis is not needed.

## July 2015 Update: Interim Eligibility Guidance Quick Reference Sheet

This quick reference sheet provides a summary of the July 2015 Update: Subject Matter Eligibility (July 2015 Update). The July 2015 Update provides additional examples and further explanation responding to six major themes from the public comments on the 2014 Interim Guidance on Patent Subject Matter Eligibility (2014 IEG). Highlights of the update are summarized below.

**Prima Facie Case.** As explained in Section IV of the July 2015 Update, a *prima facie* case of eligibility requires the examiner to explain why a claim or claims are unpatentable clearly and specifically, so that applicant has sufficient notice and is able to effectively respond. For subject matter eligibility, the examiner's burden is met by clearly articulating the reason(s) why the claimed invention is not eligible, for example by providing a reasoned rationale that identifies the judicial exception recited in the claim and why it is considered an exception, and that identifies the additional elements in the claim (if any) and explains why they do not amount to significantly more than the exception. This rationale may rely, where appropriate, on the knowledge generally available to those in the art, on the case law precedent, on applicant's own disclosure, or on evidence. Sample rejections satisfying this burden are found in the training materials, particularly the worksheets for Examples 5-8.

**More Examples.** Appendix 1 to the July 2015 Update provides new examples that are illustrative of major themes from the comments. Examples 21-25 illustrate application of the Supreme Court and Federal Circuit's considerations for determining whether a claim with additional elements amounts to significantly more than the judicial exception itself. Examples 26 & 27 illustrate application of the streamlined analysis. Examples 23 & 27 also illustrate claims that are not directed to any judicial exception.

| Ex. # | Claimed Technology | Example Title  |
|-------|--------------------|--|
| 21    | Business Method    | Transmission Of Stock Quote Data                                     |
| 22    | GUI                | Graphical User Interface For Meal Planning                           |
| 23    | GUI                | Graphical User Interface For Relocating Obscured Textual Information |
| 24    | Software           | Updating Alarm Limits  |
| 25    | Software           | Rubber Manufacturing   |
| 26    | Mechanical         | Internal Combustion Engine   |
| 27    | Software           | System Software - BIOS   |

**Index of Examples.** Appendix 2 to the July 2015 Update is a comprehensive index of examples for use with the 2014 IEG, including new and previously issued examples. It provides information such as the subject matter, statutory category, judicial exception (if any), and relevant considerations for each example.

**Index of Eligibility Cases.** Appendix 3 to the July 2015 Update lists eligibility cases from the Supreme Court and the Federal Circuit, and provides information such as citation, subject matter and classification. This appendix is an updated version of the case summary chart that was used in conjunction with the Abstract Idea Workshop Training.

**Identifying Abstract Ideas In Step 2A.** Section III of the July 2015 Update, and the following graphic on page 2, provide further information on identifying abstract ideas. This information associates concepts held to be abstract ideas in Supreme Court and Federal Circuit eligibility decisions with judicial descriptors (*e.g.*, "certain methods of organizing human activities") based on common characteristics. This information is meant to guide examiners and ensure that a claimed concept is not identified as an abstract idea unless it is similar to at least one concept that the courts have identified as an abstract idea.

## July 2015 Update: Interim Eligibility Guidance Identifying Abstract Ideas

Concepts relating to the economy and commerce, such as agreements between people in the form of contracts, legal obligations, and business relations

An idea standing alone such as an uninstatiated concept, plan or scheme, as well as a mental process (thinking) that “can be performed in the human mind, or by a human using a pen and paper”

| “Fundamental Economic Practices”   | “An Idea ‘Of Itself’”  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Creating a contractual relationship</li> <li>• Hedging</li> <li>• Mitigating settlement risk</li> </ul>   | <ul style="list-style-type: none"> <li>• Comparing information regarding a sample or test subject to a control or target data</li> <li>• Collecting and comparing known information</li> <li>• Comparing data to determine a risk level</li> <li>• Diagnosing an abnormal condition by performing clinical tests and thinking about the results</li> <li>• Obtaining and comparing intangible data</li> </ul>  | <ul style="list-style-type: none"> <li>• Comparing new and stored information and using rules to identify options</li> <li>• Using categories to organize, store and transmit information</li> <li>• Data recognition and storage</li> <li>• Organizing information through mathematical correlations</li> <li>• Displaying an advertisement in exchange for access to copyrighted media</li> </ul>  |
| “Certain Methods of Organizing Human Activity”   | “Mathematical Relationships/Formulas”  |  |
| <ul style="list-style-type: none"> <li>• Creating a contractual relationship</li> <li>• Hedging</li> <li>• Mitigating settlement risk</li> <li>• Processing loan information</li> <li>• Managing an insurance policy</li> <li>• Managing a game of bingo</li> <li>• Allowing players to purchase additional objects during a game</li> <li>• Generating rule-based tasks for processing an insurance claim</li> <li>• Tax-free investing</li> <li>• Arbitration</li> </ul> | <ul style="list-style-type: none"> <li>• Using advertising as an exchange or currency</li> <li>• Structuring a sales force or marketing company</li> <li>• Using an algorithm for determining the optimal number of visits by a business representative to a client</li> <li>• Computing a price for the sale of a fixed income asset and generating a financial analysis output</li> <li>• A mental process that a neurologist should follow when testing a patient for nervous system malfunctions</li> <li>• Meal planning</li> </ul> | <ul style="list-style-type: none"> <li>• An algorithm for converting binary coded decimal to pure binary</li> <li>• A formula for computing an alarm limit</li> <li>• A formula describing certain electromagnetic standing wave phenomena</li> <li>• The Arrhenius equation</li> <li>• A mathematical formula for hedging</li> <li>• Managing a stable value protected life insurance policy by performing calculations and manipulating the results</li> <li>• Reducing the amount of calculations in known and established computations</li> <li>• An algorithm for determining the optimal number of visits by a business representative to a client</li> <li>• An algorithm for calculating parameters indicating an abnormal condition</li> <li>• Computing a price for the sale of a fixed income asset and generating a financial analysis output</li> <li>• Calculating the difference between local and average data values</li> </ul> |

Concepts relating to interpersonal and intrapersonal activities, such as managing relationships or transactions between people, social activities, and human behavior; satisfying or avoiding a legal obligation; advertising, marketing, and sales activities or behaviors; and managing human mental activity

Mathematical concepts such as mathematical algorithms, mathematical relationships, mathematical formulas, and calculations