

Statutory subject matter (United States)

Alice test under 35 U.S.C. § 101

(1) Step (1). Is the claim directed to a process, machine, manufacture, or composition of matter? See M.P.E.P. § 2106. Determine whether the claims are directed to one of these:

- (A) a method or process. See 35 U.S.C. § 101.
- (B) a machine or device. See 35 U.S.C. § 101.
- (C) a manufactured product. See 35 U.S.C. § 101.
- (D) a composition of matter or a chemical. See 35 U.S.C. § 101.
- (E) an improvement to a prior art invention. See 35 U.S.C. § 101.
- (F) If not, amend the claims to recite a statutory patent-eligible subject matter.

(2) Step (2A), Prong 1. Is the claim directed to a law of nature, natural phenomenon (product of nature), or an abstract idea? Determine whether the claims are directed to one of the patent-ineligible concepts of

(A) a law of nature. Discoveries, scientific theories and mathematical methods. Article 52(2) of European Patent Convention (the EPC) defines this category as “non-inventions.” Any of this subject-matter, when taken “as such” (alone), is considered non-technical in Europe.

(B) a natural phenomenon;

(C) a fundamental economic practice, including an agreement related to financial transactions, and hedging, insurance, or mitigating risk. See M.P.E.P. § 2106.04(a)(2), subsection II.

(D) a commercial or legal interaction, including agreements in the form of contracts, legal obligations, advertising, marketing or sales activities or behaviors; business relations. See M.P.E.P. § 2106.04(a)(2), subsection II.

(E) managing personal behavior or relationships or interactions between people (including social activities, teaching, and following rules or instructions. See M.P.E.P. § 2106.04(a)(2), subsection II.

(F) collecting, analyzing, classifying, and storing data. The presentation of information. Article 52(2) of European Patent Convention (the EPC) defines this category as “non-inventions.” Any of this subject-matter, when taken “as such” (alone), is considered non-technical.

(G) a mental process, including data comparison and analysis that can be done in the human mind or on pen and paper, concepts analogous to human mental work, ideas with no concrete or tangible form, including observations, evaluations, judgments, or opinions. See M.P.E.P. § 2106.04(a)(2), subsection III. Schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers. Article 52(2) of European Patent Convention (the EPC) defines this category as “non-inventions.” Any of this subject-matter, when taken “as such” (alone), is considered non-technical.

(H) mathematical relationships, mathematical formulae or equations, algorithms, or mathematical calculations. See M.P.E.P. § 2106.04(a)(2), subsection I. Discoveries, scientific theories and mathematical methods. Article 52(2) of European Patent Convention (the EPC) defines this category as “non-inventions.” Any of this subject-matter, when taken “as such” (alone), is considered non-technical in Europe.

(I) Aesthetic creations. Article 52(2) of European Patent Convention (the EPC) defines this category as “non-inventions.” Any of this subject-matter, when taken “as such” (alone), is considered non-technical.

(3) Step (2A), Prong 2. If the claim recites a judicial exception, does it recite additional elements that integrate the judicial exception into a practical application? Limitations that are indicative of integration into a practical application include:

(A) Improvements to the functioning of a computer, or to any other technology or technical field. See M.P.E.P. § 2106.05(a).

(B) Applying the judicial exception with, or by use of, a particular machine. See M.P.E.P. § 2106.05(b).

(C) Effecting a transformation or reduction of a particular article to a different state or thing. See M.P.E.P. § 2106.05(c).

(D) Applying or using a judicial exception to effect a particular treatment or prophylaxis for a disease or medical condition. See M.P.E.P. § 2106.05(d).

(E) Applying or using the judicial exception in some other meaningful way beyond generally linking the use of the judicial exception to a particular technological environment, such that the claim as a whole is more than a drafting effort designed to monopolize the exception. See M.P.E.P. § 2106.05(e).

(E) A particular treatment of prophylaxis is an example of integrating the exception into a practical application. M.P.E.P. § 2106.04(d)(2).

(F) Data gathering was found not to add significantly more as set forth in M.P.E.P. § 2106.05.

(4) Step (2B). Does the claim recite additional elements that amount to significantly different than the judicial exception such that they provide an inventive concept? This step includes evaluation of the same considerations under Step (2A), Prong 2, as well as the additional consideration:

(A) Adding a specific limitation or combination of limitations that are not well-understood, routine, or conventional activity in the field or industry, which is indicative that an inventive concept may be present.

(B) Determine whether the claims are directed to an additional feature by determining the difference between the claim and the judicial exception by considering whether the claim contains

(i) different biological or pharmacological functions or activities,

(ii) chemical and physical properties,

(iii) phenotype, including functional and structural characteristics, or

(iv) structure and form, whether chemical, genetic or physical.

(5) Older tests that are helpful but no longer determinative.

(A) Identify whether the process is implemented by a particular machine in a non-conventional and non-trivial manner.

(B) Identify whether the process transforms an article from one state to another.

(C) Identify whether the process results in a useful, tangible and concrete result.

Where a transformation is recited in a claim, the following factors are relevant to the analysis: 1.

The particularity or generality of the transformation. According to the Supreme Court, inventions comprising processes of ‘tanning, dyeing, making waterproof cloth, vulcanizing India rubber [or] smelting ores’ . . . are instances . . . where the use of chemical substances or physical acts, such as temperature control, changes articles or materials [in such a manner that is] sufficiently definite to confine the patent monopoly within rather definite bounds. *Gottschalk v. Benson*, 409 U.S. 63, 70, 175 USPQ 673, 676 (1972) discussing *Corning v. Burden*, 15 How. (56 U.S.) 252, 267-68 (1854)).

Where a transformation is recited in a claim, the following factors are relevant to the analysis: 2.

The degree to which the recited article is particular. A transformation applied to a generically recited article or to any and all articles would likely not provide significantly more than the judicial exception. A transformation that can be specifically identified, or that applies to only particular articles, is more likely to provide significantly more (or integrates a judicial exception into a practical application).

Where a transformation is recited in a claim, the following factors are relevant to the analysis: 3.

The nature of the transformation in terms of the type or extent of change in state or thing. A transformation resulting in the transformed article having a different function or use, would likely provide significantly more, but a transformation resulting in the transformed article merely having a different location, would likely not provide significantly more (or integrate a judicial exception into a practical application). For example, a process that transforms raw, uncured synthetic rubber into precision-molded synthetic rubber products, as discussed in *Diamond v. Diehr*, 450 U.S. 175, 209 USPQ 1 (1981)), provides significantly more (or integrate a judicial exception into a practical application).

Where a transformation is recited in a claim, the following factors are relevant to the analysis: 4.

The nature of the article transformed. Transformation of a physical or tangible object or substance is more likely to provide significantly more (or integrate a judicial exception into a practical application) than the transformation of an intangible concept such as a contractual obligation or mental judgment.

Where a transformation is recited in a claim, the following factors are relevant to the analysis: 5.

Whether the transformation is extra-solution activity or a field-of-use (i.e., the extent to which (or how) the transformation imposes meaningful limits on the execution of the claimed method steps). A transformation that contributes only nominally or insignificantly to the execution of the claimed method (e.g., in a data gathering step or in a field-of-use limitation) would not provide significantly more (or integrate a judicial exception into a practical application). In *Mayo* the Supreme Court found claims regarding calibrating the proper dosage of thiopurine drugs to be patent ineligible subject matter. The Federal Circuit had held that the step of administering the thiopurine drug demonstrated a transformation of the human body and blood. *Mayo*, 566 U.S. at 76, 101 USPQ2d at 1967. The Supreme Court disagreed, finding that this step was only a field-of-use limitation and did not provide significantly more than the judicial exception. *Id.* See **MPEP §**

2106.05(g) & (h) for more information on insignificant extra-solution activity and field of use, respectively.

Where a transformation is recited in a claim, the following factors are relevant to the analysis when determining whether additional elements define only well-understood, routine, conventional activity. 1. **An additional element (or combination of additional elements) that is known in the art can still be unconventional or non-routine.** The question of whether a particular claimed invention is novel or obvious is fully apart from the question of whether it is eligible. *Diamond v. Diehr*, 450 U.S. 175, 190, 209 USPQ 1, 9 (1981). Claims may exhibit an improvement over conventional computer functionality even if the improvement lacks novelty over the prior art.

Where a transformation is recited in a claim, the following factors are relevant to the analysis when determining whether additional elements define only well-understood, routine, conventional activity. 2. **A factual determination is required to support a conclusion that an additional element (or combination of additional elements) is well-understood, routine, conventional activity.** *Berkheimer v. HP, Inc.*, 881 F.3d 1360, 1368, 125 USPQ2d 1649, 1654 (Fed. Cir. 2018). However, this does not mean that a prior art search is necessary to resolve this inquiry. Instead, examiners should rely on what the courts have recognized, or those in the art would recognize, as elements that are well-understood, routine, conventional activity in the relevant field when making the required determination. In many instances, the specification of the application may indicate that additional elements are well-known or conventional.

Patentable subject matter

Adding a specific limitation other than what is well-understood, routine, conventional activity in the field, or adding unconventional steps that confine the claim to a particular useful application, e.g., a non-conventional and non-generic arrangement of various computer components for filtering Internet content, *BASCOM Global Internet v. AT&T Mobility, LLC*, 827 F.3d 1341, 1345-46, 119 USPQ2d 1236, 1239 (Fed. Cir. 2016) (finding that filtering content was an abstract idea under step 2A, but reversing an invalidity judgment of ineligibility due to an inadequate step 2B analysis)

An improvement in the functioning of a computer, or an improvement to other technology or technical field.

Applying or using a judicial exception to effect a particular treatment or prophylaxis for a disease or medical condition.

Applying or using the judicial exception in some other meaningful way beyond generally linking the use of the judicial exception to a particular technological environment, such that the claim as a whole is more than a drafting effort designed to monopolize the exception.

Applying the judicial exception with, or by use of, a particular machine, e.g., a Fourdrinier machine (which is understood in the art to have a specific structure comprising a headbox, a paper-making wire, and a series of rolls) that is arranged in a particular way to optimize the speed of the machine while maintaining quality of the formed paper web.)

Data encryption method for computer communication involving a several-step manipulation of data was patentable subject matter that did not recite mental processes because they cannot be practically performed in the human mind.

Detecting suspicious activity by using network monitors and analyzing network packets was patentable subject matter that did not recite mental processes because they cannot be practically performed in the human mind.

Effecting a transformation or reduction of a particular article to a different state or thing, e.g., a process that transforms raw, uncured synthetic rubber into precision-molded synthetic rubber products.

Implementing a judicial exception with, or using a judicial exception in conjunction with, a particular machine or manufacture that is integral to the invention.

Improvements to any other technology or technical field, e.g., a modification of conventional rubber-molding processes to utilize a thermocouple inside the mold to constantly monitor the temperature and thus reduce under-curing and over-curing problems common in the art.

Improvements to the functioning of a computer, e.g., a modification of conventional Internet hyperlink protocol to dynamically produce a dual-source hybrid webpage. *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1258-59, 113 USPQ2d 1097, 1106-07 (Fed. Cir. 2014); M.P.E.P. § 2106.05(a)).

Invention of a self-referential table for a computer database was directed to an improvement in computer capabilities and not directed to an abstract idea.

Invention of an enhanced computer memory system was directed to an improvement in computer capabilities and not an abstract idea.

Invention of automatic lip synchronization and facial expression animation was directed to an improvement in computer-related technology and not directed to an abstract idea.

Invention of detecting suspicious activity by using network monitors and analyzing network packets was found to be an improvement in computer network technology and not directed to an abstract idea.

Method for calculating an absolute position of a GPS receiver and an absolute time of reception of satellite signals, where the claimed GPS receiver calculated pseudoranges that estimated the distance from the GPS receiver to a plurality of satellites was patentable subject matter that did not recite mental processes because they cannot be practically performed in the human mind.

Method for rendering a halftone image of a digital image by comparing, pixel by pixel, the digital image against a blue noise mask, where the method required the manipulation of computer data structures (e.g., the pixels of a digital image and a two-dimensional array known as a mask) and the output of a modified computer data structure (a halftoned digital image), was patentable subject matter that did not recite mental processes because they cannot be practically performed in the human mind.

Other meaningful limitations beyond generally linking the use of the judicial exception to a particular technological environment, e.g., an immunization step that integrates an abstract idea of data comparison into a specific process of immunizing that lowers the risk that immunized patients will later develop chronic immune-mediated diseases.

Relationship between a patient's CYP2D6 metabolizer genotype and the risk that the patient will suffer QTc prolongation after administration of a medication called iloperidone are laws of nature, but administration of treatment is not.

Virus scanning an improvement in computer technology and not directed to an abstract idea.

Detecting suspicious activity by using network monitors and analyzing network packets, does not recite mental processes because they cannot be practically performed in the human mind and is patentable subject matter. *SRI Int'l, Inc. v. Cisco Systems, Inc.*, 930 F.3d 1295 (Fed. Cir. 2019). Claims to detecting suspicious activity by using network monitors and analyzing network packets were found to be an improvement in computer network technology and not directed to an abstract idea.

Genetically modified bacteria are patentable subject matter. *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980), applying analysis to entire claimed "bacterium from the genus *Pseudomonas* containing therein at least two stable energy-generating plasmids, each of said plasmids providing a separate hydrocarbon degradative pathway." *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." In *Chakrabarty*, the bacterium had a changed functional characteristic, i.e., it was able to degrade at least two different hydrocarbons as compared to naturally occurring *Pseudomonas* bacteria that can only degrade a single hydrocarbon. The claimed bacterium also had a different structural characteristic, i.e., it was genetically modified to include more plasmids than are found in a single naturally occurring *Pseudomonas* bacterium. *Diamond v. Chakrabarty*, 447 U.S. 303, 310, 206 USPQ 193, 197 (1980).

Method for calculating an absolute position of a GPS receiver and an absolute time of reception of satellite signals, where the claimed GPS receiver calculated pseudoranges that estimated the distance from the GPS receiver to a plurality of satellites, does not recite mental processes because they cannot be practically performed in the human mind and is patentable subject matter. *SiRF Tech.*, 601 F.3d at 1331-33, 94 USPQ2d at 1616-17;

Method for rendering a halftone image of a digital image by comparing, pixel by pixel, the digital image against a blue noise mask, where the method required the manipulation of computer data structures (e.g., the pixels of a digital image and a two-dimensional array known as a mask) and the output of a modified computer data structure (a halftoned digital image), does not recite mental processes because they cannot be practically performed in the human mind and is patentable subject matter. *Research Corp. Techs.*, 627 F.3d at 868, 97 USPQ2d at 1280.

Specific data encryption method for computer communication involving a several-step manipulation of data, does not recite mental processes because they cannot be practically performed in the human mind and is patentable subject matter. *Synopsis.*, 839 F.3d at 1148, 120 USPQ2d at 1481 (distinguishing the claims in *TQP Development, LLC v. Intuit Inc.*, 2014 WL 651935 (E.D. Tex. Feb. 19, 2014).

cDNA is patent eligible. In *Myriad*, the claimed cDNA had the same functional characteristics, i.e., it encoded the same protein, as the naturally occurring gene, but had a changed structural characteristic, i.e., a different nucleotide sequence containing only exons, as compared to the naturally occurring sequence containing both exons and introns. The Supreme Court concluded that the "cDNA retains the naturally occurring exons of DNA, but it is distinct from the DNA from which it was derived. As a result, this cDNA is not a 'product of nature'" and is eligible. *Myriad*, 569 U.S. at 595, 106 USPQ2d at 1981.

Non-patentable subject matter

Adding insignificant extra-solution activity to the judicial exception, e.g., mere data gathering in conjunction with a law of nature or abstract idea such as a step of obtaining information about credit card transactions so that the information can be analyzed by an abstract mental process.

Adding the words apply it (or an equivalent) with the judicial exception, or mere instructions to implement an abstract idea on a computer, e.g., a limitation indicating that a particular function such as creating and maintaining electronic records is performed by a computer.

Arbitration is an example of non-patentable subject matter where the commercial or legal interaction is a legal obligation. The routine addition of modern electronics to an otherwise unpatentable invention typically creates a prima facie case of obviousness.

Bacterial qualities such as their ability to create a state of inhibition or non-inhibition in other bacteria are natural phenomena and not patentable subject matter. The properties and functions of bacteria such as the ability to infect certain leguminous plants are not patentable subject matter.

Cell-free fetal DNA (cffDNA) in maternal blood are natural phenomena and not patentable subject matter.

Chemical principles underlying the union between fatty elements and water are natural phenomena and not patentable subject matter.

Claim limiting the use of a mathematical formula to the petrochemical and oil-refining fields.

Cloned farm animal such as a sheep is a natural phenomenon not patentable subject matter.

Collecting and comparing known information, which are steps that can be practically performed in the human mind, was non-patentable subject matter that recites a mental process containing limitations that can practically be performed in the human mind, including for example, observations, evaluations, judgments, and opinions.

Collecting information, analyzing it, and displaying certain results of the collection and analysis, where the data analysis steps are recited at a high level of generality such that they could practically be performed in the human mind, was non-patentable subject matter that recites a mental process containing limitations that can practically be performed in the human mind, including for example, observations, evaluations, judgments, and opinions.

Comparing BRCA sequences and determining the existence of alterations, where the claims cover any way of comparing BRCA sequences such that the comparison steps can practically be performed in the human mind, was non-patentable subject matter that recites a mental process containing limitations that can practically be performed in the human mind, including for example, observations, evaluations, judgments, and opinions.

Complementary nucleotide sequences to bind to each other is a biological function and not patentable patent matter.

Computer-readable storage media comprising computer instructions to implement a method for determining a price of a product offered to a purchasing organization was a non-patentable subject matter as a product reciting mental processes.

Computer-implemented system for enabling anonymous loan shopping was non-patentable subject matter as a product reciting mental processes.

Computer-readable medium containing program instructions for detecting fraud was non-patentable subject matter as a product reciting mental processes.

Considering historical usage information while inputting data is an example of non-patentable subject matter of managing personal behavior recited in a claim.

Correlation between the presence of myeloperoxidase in a bodily sample (such as blood or plasma) and cardiovascular disease risk is a law of nature not patentable subject matter.

Correlation between variations in non-coding regions of DNA and allele presence in coding regions of DNA is a law of nature not patentable subject matter.

Correlation that is the consequence of how a certain compound is metabolized by the body is a law of nature not patentable subject matter.

Electricity is not patentable subject matter.

Electromagnetism to transmit signals is not patentable subject matter.

Filtering content was non-patentable subject matter of managing personal behavior recited in a claim.

Generally linking the use of a judicial exception to a particular technological environment or field of use.

Generally linking the use of the judicial exception to a particular technological environment or field of use, e.g., a claim describing how the abstract idea of hedging could be used in the commodities and energy markets.

Hair designs to balance head shape with a final step of using a tool (scissors) to cut the hair was non-patentable subject matter of following instructions recited in a claim. The additional elements were insignificant instructions to apply an exception because they do no more than merely invoke machinery as a tool to perform an existing process.

Heat of the sun is not patentable subject matter.

Hedging is an example of non-patentable subject matter where the commercial or legal interaction is a legal obligation.

Isolated DNA is a natural phenomenon and not patentable subject matter.

Mathematical formula is not patentable subject matter.

Mental process that a neurologist should follow when testing a patient for nervous system malfunctions was non-patentable subject matter of managing personal behavior recited in a claim.

Metal qualities are natural phenomena and not patentable subject matter.

Mitigating settlement risk is an example of non-patentable subject matter where the commercial or legal interaction is a legal obligation.

New mineral discovered in the earth is not patentable subject matter.

New plant found in the wild is not patentable subject matter.

Offer-based price optimization, which pertains to marketing, is non-patentable subject matter where the commercial or legal interaction is advertising, marketing or sales activities or behaviors.

Post office for receiving and redistributing email messages on a computer network was non-patentable subject matter as a product reciting mental processes.

Process claims reciting mental process-type abstract ideas are not patentable subject matter.

Processing information through a clearing-house, where the business relation is the relationship between a party submitted a credit application, e.g., a car dealer, and funding sources, e.g., banks, when processing credit applications, was non-patentable subject matter where the commercial or legal interaction is business relations.

Protein-encoding information of a nucleic acid is a biological function and not patentable patent matter.

Reciting the words apply it (or an equivalent) with the judicial exception or including instructions to implement an abstract idea on a computer or merely using a computer as a tool to perform an abstract idea.

Self-verifying voting system was non-patentable subject matter as a product reciting mental processes.

Series of instructions of how to hedge risk was non-patentable subject matter of following rules or instructions recited in a claim.

Simply appending well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception, e.g., a claim to an abstract idea requiring no more than a generic computer to perform generic computer functions that are well-understood, routine and conventional activities previously known to the industry.

Single-stranded DNA fragments known as primers are natural phenomena and not patentable subject matter.

Steam power is not patentable subject matter.

Structuring a sales force or marketing company, which pertains to marketing or sales activities or behaviors, is non-patentable subject matter where the commercial or legal interaction is advertising, marketing or sales activities or behaviors.

Using an algorithm for determining the optimal number of visits by a business representative to a client, is non-patentable subject matter where the commercial or legal interaction is advertising, marketing or sales activities or behaviors.

Wide-area real-time performance monitoring system for monitoring and assessing dynamic stability of an electric power grid was non-patentable subject matter as a product reciting mental processes.

Recording a customer's order was activity that courts found to be well-understood, routine, conventional activity when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity. *Apple, Inc. v. Amaranth, Inc.*, 842 F.3d 1229, 1244, 120 USPQ2d 1844, 1856 (Fed. Cir. 2016).

Shuffling and dealing a standard deck of cards was activity that courts found to be well-understood, routine, conventional activity when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity. *In re Smith*, 815 F.3d 816, 819, 118 USPQ2d 1245, 1247 (Fed. Cir. 2016).

Restricting public access to media by requiring a consumer to view an advertisement was activity that courts found to be well-understood, routine, conventional activity when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity. *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716-17, 112 USPQ2d 1750, 1755-56 (Fed. Cir. 2014).

Presenting offers and gathering statistics was activity that courts found to be well-understood, routine, conventional activity when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity. *OIP Techs.*, 788 F.3d at 1362-63, 115 USPQ2d at 1092-93.

Determining an estimated outcome and setting a price was activity that courts found to be well-understood, routine, conventional activity when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity. *OIP Techs.*, 788 F.3d at 1362-63, 115 USPQ2d at 1092-93.

Arranging a hierarchy of groups, sorting information, eliminating less restrictive pricing information and determining the price was activity that courts found to be well-understood, routine, conventional activity when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity. *Versata Dev. Group, Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1331, 115 USPQ2d 1681, 1699 (Fed. Cir. 2015).

Determining the level of a biomarker in blood by any means, *Mayo*, 566 U.S. at 79, 101 USPQ2d at 1968; *Cleveland Clinic Foundation v. True Health Diagnostics, LLC*, 859 F.3d 1352, 1362, 123 USPQ2d 1081, 1088 (Fed. Cir. 2017). Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Using polymerase chain reaction to amplify and detect DNA, *Genetic Techs. v. Merial LLC*, 818 F.3d 1369, 1376, 118 USPQ2d 1541, 1546 (Fed. Cir. 2016); *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1377, 115 USPQ2d 1152, 1157 (Fed. Cir. 2015). Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Detecting DNA or enzymes in a sample, *Sequenom*, 788 F.3d at 1377-78, 115 USPQ2d at 1157); *Cleveland Clinic Foundation* 859 F.3d at 1362, 123 USPQ2d at 1088 (Fed. Cir. 2017). Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Immunizing a patient against a disease, *Classen Immunotherapies, Inc. v. Biogen IDEC*, 659 F.3d 1057, 1063, 100 USPQ2d 1492, 1497 (Fed. Cir. 2011). Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Analyzing DNA to provide sequence information or detect allelic variants, *Genetic Techs.*, 818 F.3d at 1377; 118 USPQ2d at 1546. Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Freezing and thawing cells, *Rapid Litig. Mgmt.* 827 F.3d at 1051, 119 USPQ2d at 1375. Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Amplifying and sequencing nucleic acid sequences, *University of Utah Research Foundation v. Ambry Genetics*, 774 F.3d 755, 764, 113 USPQ2d 1241, 1247 (Fed. Cir. 2014). Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Hybridizing a gene probe, *Ambry Genetics*, 774 F.3d at 764, 113 USPQ2d at 1247. Courts recognized these laboratory techniques as well-understood, routine, conventional activity in the life science arts when they are claimed in a merely generic manner, e.g., at a high level of generality, or as insignificant extra-solution activity.

Ability of complementary nucleotide sequences to bind to each other is a biological function that is not patentable subject matter. *University of Utah Research Foundation v. Ambry Genetics Corp.*, 774 F.3d 755, 113 USPQ2d 1241 (Fed. Cir. 2014). Although claimed as a pair, individual primer molecules were compared to corresponding segments of naturally occurring gene sequence. In *Ambry Genetics*, the court identified claimed DNA fragments known as "primers" as products of nature, because they lacked markedly different characteristics. The claimed primers were single-stranded pieces of DNA, each of which corresponded to a naturally occurring double-stranded DNA sequence in or near the BRCA genes. The patentee argued that these primers had markedly different structural characteristics from the natural DNA, because the primers were synthetically created and because "single-stranded DNA cannot be found in the human body". The court disagreed, concluding that the primers' structural characteristics were not markedly different than the corresponding strands of DNA in nature, because the primers and their counterparts had the same genetic structure and nucleotide sequence. 774 F.3d at 760, 113 USPQ2d at 1243-44. The patentee also argued that the primers had a different function than when they are part of the DNA strand because when isolated as a primer, a primer can be used as a starting material for a DNA polymerization process. The court disagreed, because this ability to serve as a starting material is innate to DNA itself and was not created or altered by the patentee.

Ability of vitamin C to prevent and treat scurvy is a biological functions that is not patentable subject matter. *In re King*, 107 F.2d 618, 27 CCPA 754, 756-57, 43 USPQ 400, 401-402 (CCPA 1939).

Ability to degrade certain hydrocarbons is a biological functions that is not patentable subject matter. *Diamond v. Chakrabarty*, 447 U.S. at 310, 206 USPQ2d at 195.

Alkalinity of a chemical compound is a chemical property that is not patentable subject matter. *Parke-Davis & Co. v. H.K. Mulford Co.*, 189 F. 95, 103-04 (S.D.N.Y. 1911).

Application program interface for extracting and processing information from a diversity of types of hard copy documents, is a product claims reciting mental processes that is not patentable subject matter. *Content Extraction*, 776 F.3d at 1345, 113 USPQ2d at 1356.

Arbitration, where the commercial interaction is a legal obligation, is not patentable subject matter. *In re Comiskey*, 554 F.3d 967, 981, 89 USPQ2d 1655, 1665 (Fed. Cir. 2009).

Assigning hair designs to balance head shape, where the commercial interaction is following rules or instructions is not patentable subject matter. *In re Brown*, 645 Fed. Appx. 1014, 1015-16 (Fed. Cir. 2016) (non-precedential).

Cell-free fetal DNA (cffDNA) in maternal blood is a natural phenomenon and not patentable subject matter. *Ariosa Diagnostics, Inc. v. Sequenom*, 788 F.3d 1371, 1373, 115 USPQ2d 1152, 1153 (Fed. Cir. 2015).

Chemical principle underlying the union between fatty elements and water is a natural phenomenon and not patentable subject matter. *Tilghman v. Proctor*, 102 U.S. 707, 729 (1880);

Chemical structure and form such as a chemical being a "nonsalt" and a "crystalline substance" are not patentable subject matter. *Parke-Davis*, 189 F. at 100, 103;

Cloned farm animal such as a sheep is a natural phenomenon and not patentable subject matter. In re *Roslin Institute (Edinburgh)*, 750 F.3d 1333, 1337, 110 USPQ2d 1668, 1671 (Fed. Cir. 2014). Claimed sheep produced by nuclear transfer into an oocyte and subsequent manipulation of natural embryonic development processes was compared to naturally occurring sheep such as the donor ewe from which the nuclear material was obtained. *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, 110 USPQ2d 1668 (Fed. Cir. 2014), quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980).

Collecting and comparing known information (claim 1), which are steps that can be practically performed in the human mind, is not patentable subject matter. *Classen Immunotherapies, Inc. v. Biogen IDEC*, 659 F.3d 1057, 1067, 100 USPQ2d 1492, 1500 (Fed. Cir. 2011). Claims recite a mental process when they contain limitations that can practically be performed in the human mind, including, observations, evaluations, judgments, and opinions.

Collecting information, analyzing it, and displaying certain results of the collection and analysis, where the data analysis steps are recited at a high level of generality such that they could practically be performed in the human mind, is not patentable subject matter. *Electric Power Group v. Alstom, S.A.*, 830 F.3d 1350, 1353-54, 119 USPQ2d 1739, 1741-42 (Fed. Cir. 2016). Claims recite a mental process when they contain limitations that can practically be performed in the human mind, including observations, evaluations, judgments, and opinions.

Comparing DNA sequences and determining the existence of alterations," where the claims cover any way of comparing DNA sequences such that the comparison steps can practically be performed in the human mind, is not patentable subject matter. *University of Utah Research Foundation v. Ambray Genetics*, 774 F.3d 755, 763, 113 USPQ2d 1241, 1246 (Fed. Cir. 2014), comparing single-stranded nucleic acid to the same strand found in nature, even though "single-stranded DNA cannot be found in the human body". Claims recite a mental process when they contain limitations that can practically be performed in the human mind, including observations, evaluations, judgments, and opinions.

Computer readable medium containing program instructions for detecting fraud, is a product claims reciting mental processes that is not patentable subject matter. *CyberSource*, 654 F.3d at 1368 n. 1, 99 USPQ2d at 1692 n.1;

Computer readable storage media comprising computer instructions to implement a method for determining a price of a product offered to a purchasing organization, is a product claims reciting mental processes that is not patentable subject matter. *Versata*, 793 F.3d at 1312-13, 115 USPQ2d at 1685.

Computer-implemented system for enabling anonymous loan shopping, is a product claims reciting mental processes that is not patentable subject matter. Mortgage Grader, 811 F.3d at 1318, 117 USPQ2d at 1695.

Considering historical usage information while inputting data, where the commercial interaction is managing personal behavior is not patentable subject matter. BSG Tech. LLC v. Buyseasons, Inc., 899 F.3d 1281, 1286, 127 USPQ2d 1688, 1691.

Correlation between the presence of myeloperoxidase in a bodily sample (such as blood or plasma) and cardiovascular disease risk is a natural phenomenon and not patentable subject matter. Cleveland Clinic Foundation v. True Health Diagnostics, LLC, 859 F.3d 1352, 1361, 123 USPQ2d 1081, 1087 (Fed. Cir. 2017).

Correlation between variations in non-coding regions of DNA and allele presence in coding regions of DNA is a natural phenomenon and not patentable subject matter. Genetic Techs. Ltd. v. Merial LLC, 818 F.3d 1369, 1375, 118 USPQ2d 1541, 1545 (Fed. Cir. 2016).

Correlation that is the consequence of how a certain compound is metabolized by the body is a natural phenomenon and not patentable subject matter. Mayo Collaborative Servs. v. Prometheus Labs., 566 U.S. 66, 75-77, 101 USPQ2d 1961, 1967-68 (2012).

DNA fragments known as "primers" are a natural phenomenon and not patentable subject matter. University of Utah Research Foundation v. Ambry Genetics Corp., 774 F.3d 755, 761, 113 USPQ2d 1241, 1244 (Fed. Cir. 2014), comparing single-stranded nucleic acid to the same strand found in nature, even though "single-stranded DNA cannot be found in the human body." See Roche Molecular System, Inc. v. CEPHEID, 905 F.3d 1363, 1371, 128 USPQ2d 1221, 1227 (Fed. Cir. 2018), comparing claimed primers to "their corresponding nucleotide sequences on the naturally occurring DNA."

Electricity is not patentable subject matter. Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 76 USPQ 280 (1948), see also Le Roy v. Tatham, 55 U.S. (14 How.) 156, 175 (1853).

Electromagnetism not patentable subject matter. O'Reilly v. Morse, 56 U.S. (15 How.) 62, 113-114 (1853).

Electromagnetism to transmit signals is a natural phenomenon and not patentable subject matter. O'Reilly v. Morse, 56 U.S. 62, 113 (1853).

Electronic recordkeeping is not patent eligible. Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 225, 110 USPQ2d 1984 (2014) (creating and maintaining "shadow accounts"); Ultramercial, 772 F.3d at 716, 112 USPQ2d at 1755 (updating an activity log).

Electronically scanning or extracting data from a physical document is not patent eligible. Content Extraction and Transmission, LLC v. Wells Fargo Bank, 776 F.3d 1343, 1348, 113 USPQ2d 1354, 1358 (Fed. Cir. 2014) (optical character recognition).

Filtering content, where the commercial interaction is managing personal behavior is not patentable subject matter. BASCOM Global Internet v. AT&T Mobility, LLC, 827 F.3d 1341, 1345-46, 119 USPQ2d 1236, 1239 (Fed. Cir. 2016), finding that filtering content was an abstract idea under step 2A, but reversing an invalidity judgment of ineligibility due to an inadequate step 2B analysis.

Functional and structural characteristics such as the shape, size, color, and behavior of an organism are a phenotypic characteristic that is not patentable subject matter. *Roslin*, 750 F.3d at 1338, 110 USPQ2d at 1672.

Genetic makeup (genotype) of a cell or organism are not patentable subject matter. *Roslin*, 750 F.3d at 1338-39, 110 USPQ2d at 1672-73.

Genetic structure such as the nucleotide sequence of DNA are not patentable subject matter. *Myriad*, 569 U.S. at 590, 594-95, 106 USPQ2d at 1979, 1981.

Heat of the sun is not patentable subject matter. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 76 USPQ 280 (1948), see also *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1853).

Hedging, where the commercial interaction is a legal obligation, is not patentable subject matter. *Bilski v. Kappos*, 561 U.S. 593, 595, 95 USPQ2d 1001, 1004 (2010).

Identifying head shape and applying hair designs, which is a process that can be practically performed in the human mind, is not patentable subject matter. *In re Brown*, 645 Fed. App'x 1014, 1016-17 (Fed. Cir. 2016) (non-precedential). Claims recite a mental process when they contain limitations that can practically be performed in the human mind, including observations, evaluations, judgments, and opinions.

Isolated DNA is a natural phenomenon and not patentable subject matter. *Association for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 106 USPQ2d 1972 (2013), comparing isolated BRCA1 genes and BRCA1 cDNA molecules to naturally occurring BRCA1 gene. The incidental changes resulting from isolation of a gene sequence are not enough to make the isolated gene markedly different. *Myriad*, 569 U.S. at 580, 106 USPQ2d at 1974-75. The patentee in *Myriad* had discovered the location of the BRCA1 and BRCA2 genes in the human genome, and isolated them, i.e., separated those specific genes from the rest of the chromosome on which they exist in nature. As a result of their isolation, the isolated genes had a different structural characteristic than the natural genes, i.e., the natural genes had covalent bonds on their ends that connected them to the rest of the chromosome, but the isolated genes lacked these bonds. However, the claimed genes were otherwise structurally identical to the natural genes, e.g., they had the same genetic structure and nucleotide sequence as the BRCA genes in nature. See, e.g., *Myriad*, 569 U.S. at 585, 106 USPQ2d at 1977 ("Myriad's patents would, if valid, give it the exclusive right to isolate an individual's BRCA1 and BRCA2 genes. But isolation is necessary to conduct genetic testing") and 569 U.S. at 593, 106 USPQ2d at 1980 (describing how would-be infringers could not avoid the scope of *Myriad's* claims).


Law of nature like $E=mc^2$ is not patentable subject matter under 35 U.S.C. § 101. *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980).

Law of nature like the law of gravity is not patentable subject matter under 35 U.S.C. § 101. *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980).

Mental process-type abstract ideas are not patentable subject matter. *Parker v. Flook*, 437 U.S. 584, 198 USPQ 193 (1978).

Mental process-type abstract ideas are not patentable subject matter. *Benson*, 409 U.S. 63, 175 USPQ 673.

Mental process-type abstract ideas are not patentable subject matter. *Berkheimer*, 881 F.3d 1360, 125 USPQ2d 1649.

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Mental process-type abstract ideas are not patentable subject matter. *Synopsys*, 839 F.3d 1138, 120 USPQ2d 1473.

Mental process-type abstract ideas are not patentable subject matter. *University of Utah Research Foundation v. Ambry Genetics Corp.*, 774 F.3d 755, 113 USPQ2d 1241 (Fed. Cir. 2014).

Mental processes that a neurologist should follow when testing a patient for nervous system malfunctions, where the commercial interaction is managing personal behavior is not patentable subject matter. *In re Meyer*, 688 F.2d 789, 791-93, 215 USPQ 193, 194-96 (CCPA 1982).

Mitigating settlement risk, where the commercial interaction is a legal obligation, is not patentable subject matter. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 218, 110 USPQ2d 1976, 1979 (2014).

New mineral discovered in the earth is not patentable subject matter under 35 U.S.C. § 101. *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980).

New plant found in the wild is not patentable subject matter under 35 U.S.C. § 101. *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980).

Novel and useful mathematical formula not patentable subject matter. *Parker v. Flook*, 437 U.S. 584, 198 USPQ 193 (1978).

Offer-based price optimization, which pertains to marketing, where the commercial interaction is an advertising, marketing or sales activities or behaviors, is not patentable subject matter. *OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1362-63, 115 USPQ2d 1090, 1092 (Fed. Cir. 2015).

Performing repetitive calculations is not patent eligible. *Bancorp Services v. Sun Life*, 687 F.3d 1266, 1278, 103 USPQ2d 1425, 1433 (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.");

Performing repetitive calculations is not patent eligible. *Flook*, 437 U.S. at 594, 198 USPQ2d at 199 (recomputing or readjusting alarm limit values).

Physical structure or form such as the physical presence of plasmids in a bacterial cell are not patentable subject matter. *Chakrabarty*, 447 U.S. at 305 and n.1, 206 USPQ2d at 195 and n.1;

Post office for receiving and redistributing email messages on a computer network, is a product claims reciting mental processes that is not patentable subject matter. *Symantec*, 838 F.3d at 1316, 120 USPQ2d at 1359;

Processing information through a clearing-house, where the business relation is the relationship between a party submitted a credit application and funding sources when processing credit applications, where the commercial interaction is a business relation, is not patentable subject matter. *Dealertrack v. Huber*, 674 F.3d 1315, 1331, 101 USPQ2d 1325, 1339 (Fed. Cir. 2012).

Properties of bacteria such as the ability to infect certain leguminous plants is a biological function that is not patentable subject matter. *Funk Bros.*, 333 U.S. at 130-31, 76 USPQ2d at 281-82, comparing claimed mixture of bacterial species to each species as it occurs in nature.

Protein-encoding information of a nucleic acid is a biological function that is not patentable subject matter. *Myriad*, 569 U.S. at 590-91, 106 USPQ2d at 1979;

Qualities of bacteria such as their ability to create a state of inhibition or non-inhibition in other bacteria is a natural phenomenon and not patentable subject matter. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 76 USPQ 280 (1948).

Qualities of metals are not patentable subject matter. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 76 USPQ 280 (1948), see also *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1853).

Qualities of unmodified bacteria are not patentable subject matter. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 76 USPQ 280 (1948), see also *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1853). Where the claim is to a nature-based product by itself, e.g., a claim to "a *Lactobacillus* bacterium", the markedly different characteristics analysis should be applied to the entire product. See, e.g., *Chakrabarty*, 447 U.S. at 305, 309-10, 206 USPQ at 195, 197-98.

Relationship between a patient's CYP2D6 metabolizer genotype and the risk that the patient will suffer QTc prolongation after administration of a medication called iloperidone is a natural phenomenon and not patentable subject matter. *Vanda Pharmaceuticals Inc. v. West-Ward Pharmaceuticals*, 887 F.3d 1117, 1135-36, 126 USPQ2d 1266, 1281 (Fed. Cir. 2018).

Self-verifying voting system is a product claims reciting mental processes that is not patentable subject matter. *Voter Verified*, 887 F.3d at 1384-85, 126 USPQ2d at 1504;

Series of instructions of how to hedge risk, where the commercial interaction is following rules or instructions is not patentable subject matter. *Bilski v. Kappos*, 561 U.S. 593, 595, 95 USPQ2d 1001, 1004 (2010).

Steam power is not patentable subject matter. *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 113-114 (1853).

Storing and retrieving information in memory is not patent eligible. *Versata Dev. Group, Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1334, 115 USPQ2d 1681, 1701 (Fed. Cir. 2015).

Storing and retrieving information in memory is not patent eligible. *OIP Techs.*, 788 F.3d at 1363, 115 USPQ2d at 1092-93;

Structuring a sales force or marketing company, which pertains to marketing or sales activities or behaviors, where the commercial interaction is an advertising, marketing or sales activities or behaviors, is not patentable subject matter. *In re Ferguson*, 558 F.3d 1359, 1364, 90 USPQ2d 1035, 1038 (Fed. Cir. 2009);

Ductility or malleability of metals is a physical property that is not patentable subject matter. *In re Marden*, 47 F.2d 958, 959, 18 CCPA 1057, 1059, 8 USPQ 347, 349 (CCPA 1931).

Using an algorithm for determining the optimal number of visits by a business representative to a client, where the commercial interaction is an advertising, marketing or sales activities or behaviors, is not patentable subject matter. *In re Maucorps*, 609 F.2d 481, 485, 203 USPQ 812, 816 (CCPA 1979).

Web browser's back and forward button functionality is not patent eligible. *Internet Patent Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1348, 115 USPQ2d 1414, 1418 (Fed. Cir. 2015).

Wide-area real-time performance monitoring system for monitoring and assessing dynamic stability of an electric power grid, is a product claims reciting mental processes that is not patentable subject matter. *Electric Power Group*, 830 F.3d at 1351 and n.1, 119 USPQ2d at 1740 and n.1.