The 10 academic papers from AAAI

|  |  |
| --- | --- |
| **Paper No.** | **The title of the papers from AAAI** |
| 1 | Discussion on Research and Development of Artificial Intelligence |
| 2 | Development and Application of Artificial Intelligence |
| 3 | Artificial intelligence-A personal view |
| 4 | Cognitive Science Artificial Intelligence: Simulating the Human Mind to Achieve Goals |
| 5 | Research of Modern Physical Education Technology Based on Artificial Intelligence |
| 6 | A Brief Introduction of Artificial Intelligence |
| 7 | Artificial Intelligence a key to the Future of Cybersecurity |

The experimental data of 100 pages from wikipedia

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Page title | No. | Page title | No. | Page title |
| P1 | Cybernetics | P35 | Open data | P69 | Financial technology |
| P2 | Neuroscience | P36 | Big data | P70 | Cognitive linguistics |
| P3 | Reasoning | P37 | DNA repair | P71 | Cognitive musicology |
| P4 | Robotics | P38 | Artificial immune systems | P72 | Music psychology |
| P5 | Infographics | P39 | Cognitive architecture | P73 | Social science |
| P6 | Mereology | P40 | Knowledge engineering | P74 | Molecular biology |
| P7 | Ontology | P41 | Knowledge representation | P75 | Gene expression |
| P8 | Musicology | P42 | Artificial intelligence | P76 | Regional science |
| P9 | Psychoacoustics | P43 | Cognitive science | P77 | Economic geography |
| P10 | Linguistics | P44 | Cognitive modeling | P78 | Social networks |
| P11 | Neurolinguistics | P45 | Scientific modeling | P79 | Genetic engineering |
| P12 | Sociology | P46 | Inductive reasoning | P80 | Biological engineering |
| P13 | Biochemistry | P47 | Scientific theory | P81 | Synthetic biology |
| P14 | Semantics | P48 | Natural language processing | P82 | Mathematical proof |
| P15 | Neurochemistry | P49 | Artificial neural network | P83 | Scientific terminology |
| P16 | Chemistry | P50 | Neural network software | P84 | Computer networks |
| P17 | Anthropology | P51 | Multi-agent system | P85 | Wireless networking |
| P18 | Transhumanism | P52 | Cluster analysis | P86 | Mobile technology |
| P19 | Neuropsychology | P53 | Information science | P87 | Remote control |
| P20 | Behaviorism | P54 | Information retrieval | P88 | Technical communication |
| P21 | Psychology | P55 | Library science | P89 | Computer science |
| P22 | Biotechnology | P56 | Computational statistics | P90 | Educational psychology |
| P23 | Bioinformatics | P57 | Numerical analysis | P91 | Behavioral science |
| P24 | Biostatistics | P58 | Mathematical physics | P92 | Political culture |
| P25 | Folksonomy | P59 | Computational science | P93 | Welfare economics |
| P26 | Egalitarianism | P60 | Control theory | P94 | Digital technology |
| P27 | Motivation | P61 | Bayesian networks | P95 | Cognitive neuroscience |
| P28 | Principles | P62 | Ensemble learning | P96 | Veterinary medicine |
| P29 | Fuzzy logic | P63 | Speech recognition | P97 | Natural science |
| P30 | Data mining | P64 | Logic programming | P98 | Natural language generation |
| P31 | Decision tree | P65 | Computational neuroscience | P99 | Data structure |
| P32 | Machine learning | P66 | Information technology | P100 | Data loss |
| P33 | Knowledge base | P67 | Business intelligence |  |  |
| P34 | Cloud computing | P68 | Information system |  |  |

The results of the experiment on recall of definition questions.

|  |  |
| --- | --- |
| Question: What is artificial intelligence? | Answer range: *T*1 |
| Manually selected answer sentences:   1. Artificial Intelligence is a new technological science, which researches and develops for simulating, extending and expanding human intelligence theory, methods, techniques and applications. 2. Artificial intelligence is a branch of computer science, it attempts to understand the substance of intelligence, and produce a new intelligent machine could make reactions similar to the human intelligence. 3. Artificial intelligence, by its essence, is the simulation of the information process of human thinking. 4. Artificial intelligence is not a human intelligence, and no more than human intelligence. 5. There is not creativity in artificial intelligence, but human has dynamic and motile consciousness.   Calculated answer sentences:  a. Artificial intelligence is not a human intelligence, and no more than human intelligence.  b. There is not sociality in the artificial intelligence.  c. There is not creativity in artificial intelligence, but human has dynamic and motile consciousness.  d. Artificial intelligence has been deep into the social life in all fields; it has been and will continue to be inevitably changing our lives.  e. Artificial intelligence, by its essence, is the simulation of the information process of human thinking. | |
| Question: What is machine learning？ | Answer range: *T*1 |
| Manually selected answer sentences:  a. Machine learning is not an extremely intelligent important symbol, but also very fundamental way to acquire knowledge.  b. Machine learning mainly researches how to make the computer simulating or realizing mankind's learning function.  c. Machine learning is a difficult research field, which is closely linked with cognitive science, neural psychology, logic, science and other disciplines, and plays an important role in promoting other branches of artificial intelligence.  Calculated answer sentences:  a. Artificial intelligence is not a human intelligence, and no more than human intelligence.  b. There is not sociality in the artificial intelligence.  c. Machine learning is not an extremely intelligent important symbol, but also very fundamental way to acquire knowledge.  d. There is not creativity in artificial intelligence, but human has dynamic and motile consciousness.  e. Artificial intelligence has been deep into the social life in all fields; it has been and will continue to be inevitably changing our lives. | |
| Question: What is Learning System? | Answer range: *T*2 |
| Manually selected answer sentences:  a. A learning system could obtain knowledge online and it can be working well for more than one year or longer if it is running on a stable computer.  b. Learning system is only a part of the machine learning.  c. The whole picture of the machine learning includes much more related to mathematics and logic, such as, Density Estimation, Optimization, and Conditional Densities.  Calculated answer sentences:  a. It is obviously unnecessary to worry about if the artificial intelligence could exceed human intelligence.  b. Learning system is only a part of the machine learning.  c. Initiating a robot that can go wherever human and animal go, the Boston Dynamics set up a program funded by Tactical Technology Office at DARPA and created a BigDog, the alpha male robots.  d. Classifying the successes gives a schema of autonomous agent, robotics, supercomputer and machine learning aspects.  e. Robotics shows people a wide range of amazing behaviors although it has insufficiency. | |
| Question: What is artificial intelligence? | Answer range: *T*3 |
| Manually selected answer sentences:  a. The goal of Artificial Intelligence is to identify and solve tractable information processing problems.  b. Artificial Intelligence is the study of complex information processing problems that often have their roots in some aspect of biological information processing.  c. The goal of Artificial Intelligence is to identify interesting and solvable information processing problems, and solve them.  d. Strictly speaking then, a result in Artificial Intelligence consists-of the isolation of a particular information processing problem, the formulation of a computational theory for it, the construction of an algorithm that implements it, and a practical demonstration that the algorithm is successful.  Calculated answer sentences:  a. The goal of Artificial Intelligence is to identify and solve tractable information processing problems.  b. Artificial Intelligence is the study of complex information processing problems that often have their roots in some aspect of biological information processing.  c. The goal of Artificial Intelligence is to identify interesting and solvable information processing problems, and solve them.  d. The solution to an information processing problem divides naturally into two parts.  e. The important point here, it is what makes progress possible, is that once a computational theory has been established for a particular problem, it never has to be done again, and in this respect a result in AI behaves like a result in mathematics or any of the hard natural sciences. | |
| Question: What is artificial intelligence? | Answer range: *T*4 |
| Manually selected answer sentences:  a. Artificial intelligence is the branch of computer science concerned with creating simulations that model human cognition.  b. Artificial intelligence also contains a scientific aspect, focusing on studying cognitive behavior of machines.  c. Artificial intelligence is a powerful approach that allows researchers in cognitive science to study behavior through computational modeling of the human mind.  d. Artificial intelligence is an extremely useful tool for cognitive science research of both fundamental and high level understanding of the human mind by simulating the human mind.  Calculated answer sentences:  a. Although no artificial intelligence has come close to achieving the goal of human-level intelligence, intelligent agents are consistently being re-evaluated and improved.  b. Cognitive science artificial intelligence refers to the interdisciplinary study that overlaps these areas in attempt to achieve both cognitive science and artificial intelligence goals.  c. Although there have been many breakthroughs in the cognitive science artificial intelligence field, researchers are continually working to improve intelligent agents.  d. Artificial intelligence is a powerful approach that allows researchers in cognitive science to study behavior through computational modeling of the human mind.  e. In turn, more accurate artificial intelligence provides better models of the human mind for cognitive science researchers to use. | |
| Question: What is cognitive science? | Answer range: *T*4 |
| Manually selected answer sentences:  a. The central principle of cognitive science is that a complete understanding of the mind cannot be obtained without analyzing the mind on multiple levels.  b. Developed to encapsulate the concept of both early cognitive science and intelligence simulated by machines, modern cognitive science artificial intelligence focuses on how humans, animals, and machines store information associated with perception, language, reasoning, and emotion.  c. Cognitive science emerged as an extension of psychology topics; it is concerned with how information is stored and transferred in the human mind.  d. Cognitive science theories provide useful insight on human cognition that can be encoded into artificial intelligence.  e. By observing which problems an intelligent agent can solve and how the computer program solves these problems, researchers in the cognitive science field aim to develop theories about how the brain learns and constructs logical rules, how intelligence arises within the brain, insights on which pieces of information humans will forget and remember, and the kinds of resources the human mind uses.  Calculated answer sentences:  a. The central principle of cognitive science is that a complete understanding of the mind cannot be obtained without analyzing the mind on multiple levels.  b. Achievements in cognitive science help improve artificial simulation of the human mind.  c. Cognitive science artificial intelligence refers to the interdisciplinary study that overlaps these areas in attempt to achieve both cognitive science and artificial intelligence goals.  d. Cognitive science theories provide useful insight on human cognition that can be encoded into artificial intelligence.  e. In turn, more accurate artificial intelligence provides better models of the human mind for cognitive science researchers to use. | |
| Question: What is artificial intelligence? | Answer range: *T*5 |
| Manually selected answer sentences:  a. AI is the abbreviation of artificial intelligence.  b. AI is accompanied by the development of modern computer and information technology to promote the commercialization and application has emerged as an emerging technology that will computer technology and human behavior patterns of thinking combined with an attempt to simulate human behavior as a reflection of the wisdom computer solutions.  c. Artificial Intelligence is the computer information technology in the forefront of technology, its promotion and application in modern education, especially for physical education technologies used to produce a deep and substantial impact.  d. Artificial intelligence, expert systems, whether from the theory, technology can be regarded as the most mature of a branch of artificial intelligence, artificial intelligence in practical applications is the most striking findings is the most active and fruitful research in artificial intelligence research the field.  Calculated answer sentences:  a. AI is the abbreviation of artificial intelligence.  b. Artificial intelligence, expert systems, whether from the theory, technology can be regarded as the most mature of a branch of artificial intelligence, artificial intelligence in practical applications is the most striking findings is the most active and fruitful research in artificial intelligence research the field.  c. In Chinese education which has four policy-oriented, of them modernization is an important element of both the modern ideas of modern education, including the modernization of educational technology, and artificial intelligence technology on modern means of modernization of education an important way.  d. Information technology courses in artificial intelligence, the emphasis is more of the students ' hands-on practice and collaborative learning.  e. In Chinese education which has four policy-oriented, of them modernization is an important element of both the modern ideas of modern education, including the modernization of educational technology, and artificial intelligence technology on modern means of modernization of education an important way. | |
| Question: What is physical education? | Answer range: *T*5 |
| Manually selected answer sentences:  a. Physical education as an important part of education, it is a discipline exists, but also to adapt to the requirements of this era of knowledge economy.  b. Physical education under the new situation facing the technological innovation and the basic trend in artificial intelligence applications in the physical education requirements on the objective status of modern physical education based on artificial intelligence technology.  c. Development of artificial intelligence greatly promoted the change in the way of traditional education, physical education as a traditional education activity can make use of artificial intelligence, creative exploration of new teaching models and solutions.  Calculated answer sentences:  a. Online teaching will help stimulate students ' enthusiasm, initiative, increase the level of participation.  b. Physical education as an important part of education, it is a discipline exists, but also to adapt to the requirements of this era of knowledge economy.  c. When the intelligent network, integrating with the modern teaching even more powerful, complement each other, function fantastic.  d. For the majority of physical education teachers, the strengthening of modern educational theory and artificial intelligence, modern educational technology, learning and training is very necessary.  e. Development of artificial intelligence greatly promoted the change in the way of traditional education, physical education as a traditional educational activities can make use of artificial intelligence, creative exploration of new teaching models and solutions. | |
| Question: What is Artificial intelligence? | Answer range: *T*6 |
| Manually selected answer sentences:  a. Artificial Intelligence is a multi-disciplinary field whose goal is to automate activities that presently require human intelligence.  b. The major problem areas addressed in AI can be summarized as Perception, Manipulation, Reasoning, Communication, and Learning.  c. The ultimate scientific goal of Artificial Intelligence is to construct a formal model of Mind that fully explains the activity of "thinking" as it is performed by humans.  d. AI is centrally concerned with building operational systems that exhibit behaviors that illustrate the systems' ability to "think".  e. Recent successes in AI include computerized medical diagnosticians and systems that automatically customize hardware to particular user requirements.  Calculated answer sentences:  a. The ultimate scientific goal of Artificial Intelligence is to construct a formal model of Mind that fully explains the activity of "thinking" as it is performed by humans.  b. Recent successes in AI include computerized medical diagnosticians and systems that automatically customize hardware to particular user requirements.  c. Finally, Learning treats the problem of automatically improving system performance over time based on the system's experience.  d. Many important technical concepts have arisen from AI that unify these diverse problem areas and that form the foundation of the scientific discipline.  e. The elements of a Knowledge Base consist of independently valid or at least plausible chunks of information. | |
| Question: What is expert system? | Answer range: *T*7 |
| Manually selected answer sentences:  a. Expert system is a sub area of artificial intelligence, and we can say it is system that it has performance and work like a human expert in some good matters so we can say it is systems that will use the human knowledge that already get it in a computer to solve problems that usually required human expertise.  b. The expert system content is: user interface, explanation mechanism, inference engine, knowledge base, and database of facts.  c. This expert system was created to determine reason behind a severe infections, like meningitis, bacteremia, and to recommend antibiotics.  d. This expert system was created to help scientists organic of chemistry in determine structure of unknown organic molecules, by analyzing their mass spectra and using experience of chemistry experts.  e. The expert system is: a system that will store and manipulate knowledge to analysis information in a very careful way.  Calculated answer sentences:  a. They are more used in artificial intelligence applications and research.  b. Expert system is a sub area of artificial intelligence, and we can say it is system that it has performance and work like a human expert in some good matters so we can say it is systems that will use the human knowledge that already get it in a computer to solve problems that usually required human expertise.  c. The expert system is: a system that will store and manipulate knowledge to analysis information in a very careful way.  d. The expert system content is: user interface, explanation mechanism, inference engine, knowledge base, and database of facts.  e. The expert systems are in ordinarily a very limited area. | |

**Question and answer list on definition question on Wikipedia page.**

Q1：What is cybernetics? Answer range: P1

A1：a. Cybernetics is a transdisciplinary approach for exploring regulatory systems—their structures, constraints, and possibilities.

b. More recently there is talk about a third-order cybernetics (doing in ways that embraces first and second-order).

c. Cybernetician Stuart Umpleby reports some notable definitions: Other notable definitions include: The term cybernetics stems from "steersman, governor, pilot, or rudder".

d. The word cybernetics was first used in the context of "the study of self-governance" by Plato in The Alcibiades to signify the governance of people.

e. Cybernetics as a discipline was firmly established by Norbert Wiener, McCulloch and others, such as W. Ross Ashby, mathematician Alan Turing, and W. Grey Walter (one of the first to build autonomous robots as an aid to the study of animal behavior).

Q2：What is neuroscience? Answer range: P2

A2：a. Recent theoretical advances in neuroscience have also been aided by the study of neural networks.

b. At the molecular level, the basic questions addressed in molecular neuroscience include the mechanisms by which neurons express and respond to molecular signals and how axons form complex connectivity patterns.

c. The fundamental questions addressed in cellular neuroscience include the mechanisms of how neurons process signals physiologically and electrochemically.

d. At the cognitive level, cognitive neuroscience addresses the questions of how psychological functions are produced by neural circuitry.

e. Neuroscience (or neurobiology) is the scientific study of the nervous system.

Q3：What is reasoning? Answer range: P3

A3：a. Reasoning may be subdivided into forms of logical reasoning ( forms associated with the strict sense): deductive reasoning, inductive reasoning, abductive reasoning; and other modes of reasoning considered more informal, such as intuitive reasoning and verbal reasoning.

b. Along these lines, a distinction is often drawn between discursive reason, reason proper, and intuitive reason, in which the reasoning process-however valid-tends toward the personal and the opaque.

c. The field of automated reasoning studies how reasoning may or may not be modeled computationally.

d. Some philosophers, Thomas Hobbes for example, also used the word ratiocination as a synonym for "reasoning''.

e. Kant was able therefore to re-formulate the basis of moral-practical, theoretical and aesthetic reasoning, on "universal'' laws.

Q4：What is robotics? Answer range: P4

A4：a. Today, robotics is a rapidly growing field, as technological advances continue; researching, designing, and building new robots serve various practical purposes, whether domestically, commercially, or militarily.

b. The word robotics was derived from the word robot, which was introduced to the public by Czech writer Karel Capek in his play R.U.R., which was published in 1920.

c. Various types of linear actuators move in and out instead of by spinning, and often have quicker direction changes, particularly when very large forces are needed such as with industrial robotics.

d. Robotic faces have been constructed by Hanson Robotics using their elastic polymer called Frubber, allowing a large number of facial expressions due to the elasticity of the rubber facial coating and embedded subsurface motors (servos).

e. Universities offer bachelors, masters, and doctoral degrees in the field of robotics.

Q5：What is infographics? Answer range: P5

A5：a. Infographics are widely used in the age of short attention span.

b. Public transportation maps, such as those for the Washington Metro and the London Underground, are well-known infographics.

c. Referred to by The New York Times as the "da Vinci of Data", Tufte began to give day-long lectures and workshops on the subject of infographics starting in 1993.

d. The infographics created by Peter Sullivan for The Sunday Times in the 1970s, 1980s, and 1990s were some of the key factors in encouraging newspapers to use more infographics.

e. Many businesses use infographics as a medium for communicating with and attracting potential customers.

Q6：What is mereology? Answer range: P6

A6：a. Whereas set theory is founded on the membership relation between a set and its elements, mereology emphasizes the meronomic relation between entities, which-from a set-theoretic perspective-is closer to the concept of inclusion between sets.

b. Each of these fields provides their own axiomatic definition of mereology.

c. Other students (and students of students) of Lesniewski elaborated this ''Polish mereology'' over the course of the 20th century.

d. For a survey of Polish mereology, see Simons (1987).

e. It is possible to formulate a ''naive mereology'' analogous to naive set theory.

Q7：What is ontology? Answer range: P7

A7：a. Principal questions of ontology include: Various philosophers have provided different answers to these questions.

b. Leibniz is the only one of the great philosophers of the 17th century to have used the term ontology.

c. Even the focus of traditional ontology on the ' whatness ' or ' quidditas ' of beings in their substantial, standing presence can be shifted to pose the question of the ' whoness ' of human being itself.

d. Such debate might be labeled ` microcosmic ontology '.

e. Ontology is the philosophical study of the nature of being, becoming, existence or reality as well as the basic categories of being and their relations.

Q8：What is musicology? Answer range: P8

A8：a. In the 2010s, historical musicology is one of several large musicology sub-disciplines.

b. There are also national differences in various definitions of historical musicology.

c. New musicology was a reaction against traditional historical musicology, which according to Susan McClary,'' fastidiously declares issues of musical signification off-limits to those engaged in legitimate scholarship. ''

d. Today, many musicologists no longer distinguish between musicology and new musicology, since many of the scholarly concerns once associated with new musicology have now become mainstream, and they feel the term '' new '' no longer applies.

e. Musicologists in tenure track professor positions typically hold a Ph.D in musicology.

Q9：What is psychoacoustics? Answer range: P9

A9：a. Psychoacoustics received its name from a field within psychology—i.e., recognition science—which deals with all kinds of human perceptions.

b. Theorists such as Benjamin Boretz consider some of the results of psychoacoustics to be meaningful only in a musical context.

c. The upper limit is more a question of the limit where the ear will be physically harmed or with the potential to cause noise-induced hearing loss.

d. By measuring this minimum intensity for testing tones of various frequencies, a frequency dependent absolute threshold of hearing (ATH) - curve may be derived.

e. To summarize, these limitations are: Given that the ear will not be at peak perceptive capacity when dealing with these limitations, a compression algorithm can assign a lower priority to sounds outside the range of human hearing.

Q10：What is linguistics? Answer range: P10

A10：a. In the early 20th century, Ferdinand de Saussure distinguished between the notions of langue and parole in his formulation of structural linguistics.

b. This is done through the collection of linguistic data, or through the formal discipline of corpus linguistics, which takes naturally occurring texts and studies the variation of grammatical and other features based on such corpora (or corpus data).

c. The emergence of cognitive linguistics in the 1980s also revived an interest in linguistic relativity.

d. Linguistics is primarily descriptive.

e. In the 18th century, the first use of the comparative method by William Jones sparked the rise of comparative linguistics.

Q11：What is neurolinguistics? Answer range: P11

A11：a. The coining of the term '' neurolinguistics '' is attributed to Edith Crowell Trager, Henri Hecaen and Alexandr Luria, in the late 1940s and 1950s; Luria's book '' Problems in Neurolinguistics '' is likely the first book with Neurolinguistics in the title.

b. Brain imaging methods used in neurolinguistics may be classified into hemodynamic methods, electrophysiological methods, and methods that stimulate the cortex directly.

c. In psycholinguistics and neurolinguistics, priming refers to the phenomenon whereby a subject can recognize a word more quickly if he or she has recently been presented with a word that is similar in meaning or morphological makeup (i.e., composed of similar parts).

d. Neurolinguistics is the study of the neural mechanisms in the human brain that control the comprehension, production, and acquisition of language.

e. Harry Whitaker popularized neurolinguistics in the United States in the 1970s, founding the journal '' Brain and Language '' in 1974.

Q12：What is sociology? Answer range: P12

A12：a. Sociology is distinguished from various general social studies courses, which bear little relation to sociological theory or to social-science research-methodology.

b. There is evidence of early sociology in medieval Arab writings.

c. For Isaiah Berlin, Marx may be regarded as the '' true father '' of modern sociology, '' in so far as anyone can claim the title. ''.

d. Sociology quickly evolved as an academic response to the perceived challenges of modernity, such as industrialization, urbanization, secularization, and the process of '' rationalization''.

e. Durkheim, Marx, and the German theorist Max Weber are typically cited as the three principal architects of sociology.

Q13：What is biochemistry? Answer range: P13

A13：a. However, biochemistry as a specific scientific discipline has its beginning sometime in the 19th century, or a little earlier, depending on which aspect of biochemistry is being focused on.

b. The four main classes of molecules in biochemistry (often called biomolecules) are carbohydrates, lipids, proteins, and nucleic acids.

c. Using various modifiers, the activity of the enzyme can be regulated, enabling control of the biochemistry of the cell as a whole.

d. The chemistry of the cell also depends on the reactions of smaller molecules and ions.

e. The term '' biochemistry '' itself is derived from a combination of biology and chemistry.

Q14：What is semantics? Answer range: P14

A14：a. The word semantics was first used by Michel Br¨|al, a French philologist.

b. Independently, semantics is also a well-defined field in its own right, often with synthetic properties.

c. The formal study of semantics can therefore be manifold and complex.

d. Semantics is primarily the linguistic, and also philosophical, study of meaning -- in language, programming languages, formal logics, and semiotics.

e. In international scientific vocabulary semantics is also called semasiology.

Q15：What is neurochemistry? Answer range: P15

A15：a. Neurochemistry is the study of neurochemicals, including neurotransmitters and other molecules such as psychopharmaceuticals and neuropeptides, that influence the function of neurons.

b. The founding of neurochemistry as a discipline traces it origins to a series of '' International Neurochemical Symposia'', of which the first symposium volume published in 1954 was titled Biochemistry of the Developing Nervous System.

c. Neurochemists analyze the biochemistry and molecular biology of organic compounds in the nervous system, and their roles in such neural processes as cortical plasticity, neurogenesis, and neural differentiation.

d. In the 1950s, neurochemistry became a recognized scientific research discipline.

e. Neurochemicals such as norepinephrine, dopamine, and serotonin were classified as '' putative neurotransmitters in certain neuronal tracts in the brain. ''

Q16：What is chemistry? Answer range: P16

A16：a. An alchemist was called a ' chemist ' in popular speech, and later the suffix '' - ry '' was added to this to describe the art of the chemist as '' chemistry ''.

b. Boyle in particular is regarded as the founding father of chemistry due to his most important work, the classic chemistry text The Sceptical Chymist where the differentiation is made between the claims of alchemy and the empirical scientific discoveries of the new chemistry.

c. The year 2011 was declared by the United Nations as the International Year of Chemistry.

d. Such behaviors are studied in a chemistry laboratory.

e. The chemistry laboratory stereotypically uses various forms of laboratory glassware.

Q17：What is anthropology? Answer range: P17

A17：a. Anthropology and many other current fields are the intellectual results of the comparative methods developed in the earlier 19th century.

b. The title was soon translated as '' The Anthropology of Primitive Peoples ''.

c. None of the 75 faculty members were under a department named anthropology.

d. Anthropology has diversified from a few major subdivisions to dozens more.

e. In the United States, anthropology has traditionally been divided into the four field approach developed by Franz Boas in the early 20th century: biological or physical anthropology; social, cultural, or sociocultural anthropology; and archaeology; plus anthropological linguistics.

Q18：What is transhumanism? Answer range: P18

A18：a. Transhumanism is an international and intellectual movement that aims to transform the human condition by developing and making widely available sophisticated technologies to greatly enhance human intellectual, physical, and psychological capacities.

b. The biologist Julian Huxley is generally regarded as the founder of transhumanism, after he used the term for the title of an influential 1957 article.

c. Nevertheless, the idea of creating intelligent artificial beings (proposed, for example, by roboticist Hans Moravec) has influenced transhumanism.

d. Dan Brown 's novel Inferno focuses on the theme of transhumanism.

e. Transhumanism and its presumed intellectual progenitors have also been described as neo-gnostic by non-Christian and secular commentators.

Q19：What is neuropsychology? Answer range: P19

A19：a. It was in the mid-17th century that another major contributor to the field of neuropsychology emerged.

b. His work is considered crucial to having laid a firm foundation in the field of neuropsychology, which would flourish over the next few decades.

c. Despite his racism, Lashley has done some important work in neuropsychology and influenced his students to reach even greater heights.

d. Neuropsychology is a relatively new discipline within the field of psychology.

e. However, Gall 's major contribution within the field of neuroscience is his invention of phrenology .

Q20：What is behaviorism? Answer range: P20

A20：a. Radical behaviorism overlaps considerably with other western philosophical positions such as American pragmatism.

b. Incorporating behaviorism into the classroom allowed educators to assist their students in excelling both academically and personally.

c. In the second half of the 20th century, behaviorism was largely eclipsed as a result of the cognitive revolution.

d. Behaviorism (or behaviourism) is a systematic approach to the understanding of human and animal behavior.

e. Behaviorism takes a functional view of behavior.

Q21：What is psychology? Answer range: P21

A21：a. Folk psychology refers to the understanding of ordinary people, as contrasted with that of psychology professionals.

b. Having consulted philosophers Hegel and Herbart, in 1825 the Prussian state established psychology as a mandatory discipline in its rapidly expanding and highly influential educational system.

c. In England, early psychology involved phrenology and the response to social problems including alcoholism, violence, and the country 's well-populated mental asylums.

d. G. Stanley Hall who studied with Wundt , formed a psychology lab at Johns Hopkins University in Maryland, which became internationally influential.

e. Another student of Wundt, Edward Titchener, created the psychology program at Cornell University and advanced a doctrine of '' structuralist '' psychology.

Q22：What is biotechnology? Answer range: P22

A22：a. By boosting farm productivity, biotechnology plays a crucial role in ensuring that biofuel production targets are met.

b. Biotechnology is also used to recycle, treat waste, clean up sites contaminated by industrial activities -LRB- bioremediation -RRB- , and also to produce biological weapons.

c. A series of derived terms have been coined to identify several branches of biotechnology; for example: The investment and economic output of all of these types of applied biotechnologies is termed as '' bioeconomy ''.

d. Biotechnology has contributed to the discovery and manufacturing of traditional small molecule pharmaceutical drugs as well as drugs that are the product of biotechnology -biopharmaceutics.

e. Modern biotechnology can be used to manufacture existing medicines relatively easily and cheaply.

Q23：What is bioinformatics? Answer range: P23

A23：a. Historically, the term bioinformatics did not mean what it means today.

b. Common activities in bioinformatics include mapping and analyzing DNA and protein sequences, aligning DNA and protein sequences to compare them, and creating and viewing 3-D models of protein structures.

c. Pan genomics is a concept introduced in 2005 by Tettelin and Medini which eventually took root in bioinformatics.

d. One of the key ideas in bioinformatics is the notion of homology.

e. NET Bio, Orange with its bioinformatics add-on, Apache Taverna, UGENE and GenoCAD.

Q24：What is biostatistics? Answer range: P24

A24：a. Recent developments have made a large impact on biostatistics.

b. Almost all educational programs in biostatistics are at postgraduate level.

c. Thus, departments carrying the name '' biostatistics '' may exist under quite different structures.

d. In the United States, where several universities have dedicated biostatistics departments, many other top-tier universities integrate biostatistics faculty into statistics or other departments, such as epidemiology.

e. Biostatistics is the application of statistics to a wide range of topics in biology.

Q25：What is folksonomy? Answer range: P25

A25：a. Some websites include tag clouds as a way to visualize tags in a folksonomy.

b. Folksonomy also includes a set of URLs that are used to identify resources that have been referred to by users of different websites.

c. Vander Wal identifies two types of folksonomy: broad and narrow.

d. A narrow folksonomy occurs when users, typically fewer in number and often including the item 's creator, tag an item with tags that can each be applied only once.

e. An example of a broad folksonomy is del.icio.us, a website where users can tag any online resource they find relevant with their own personal tags.

Q26：What is egalitarianism? Answer range: P26

A26：a. Some sources define egalitarianism as the point of view that equality reflects the natural state of humanity.

b. Some specifically focused egalitarian concerns include economic egalitarianism, legal egalitarianism, luck egalitarianism, political egalitarianism, gender egalitarianism, racial equality, asset-based egalitarianism, and Christian egalitarianism.

c. Common forms of egalitarianism include political and philosophical.

d. These ideas are considered by some to be contrary to the ideals of egalitarianism.

d. Military egalitarianism has been noted since ancient times, such as with Shakespeare 's St. Crispin 's Day Speech.

Q27：What is motivation? Answer range: P27

A27：a. Motivation is a theoretical construct used to explain behavior.

b. This type of motivation has neurobiological roots in the basal ganglia, and mesolimbic dopaminergic pathways.

c. Motivation can be conceived of as a cycle in which thoughts influence behaviors, behaviors drive performance, performance affects thoughts, and the cycle begins again.

d. Each stage of the cycle is composed of many dimensions including attitudes, beliefs, intentions, effort, and withdrawal which can all affect the motivation that an individual experiences.

e. Intrinsic motivation has been studied since the early 1970s.

Q28：What is principle? Answer range: P28

A28：a. Principles are absorbed in childhood through a process of socialization.

b. Exemplary principles include first, do no harm, the golden rule and the doctrine of the mean.

c. Freud also wrote on principles, especially the reality principle necessary to keep the id and pleasure principle in check.

d. Classically it is considered to be one of the most important fundamental principles or laws of thought (along with the principles of identity, no contradiction and sufficient reason).

e. The principles of such a system are understood by its users as the essential characteristics of the system, or reflecting system's designed purpose, and the effective operation or use of which would be impossible if any one of the principles was to be ignored.

Q29：What is fuzzy logic? Answer range: P29

A29：a. The term fuzzy logic was introduced with the 1965 proposal of fuzzy set theory by Lotfi Zadeh.

b. Fuzzy logic had however been studied since the 1920s, as infinite-valued logic-notably by Lukasiewicz and Tarski.

c. Thus, a fuzzy logic function can be given by a choice table where all the variants of ordering of arguments and their negations are listed.

d. For example, a row of a choice table of a two arguments function can look as follows: Many of the early successful applications of fuzzy logic were implemented in Japan.

e. The first notable application was on the high-speed train in Sendai, in which fuzzy logic was able to improve the economy, comfort, and precision of the ride.

Q30：What is data mining? Answer range: P30

A30：a. These methods can, however, be used in creating new hypotheses to test against the larger data populations.

b. In the 1960s, statisticians used terms like '' Data Fishing '' or '' Data Dredging '' to refer to what they considered the bad practice of analyzing data without an a-priori hypothesis.

c. The manual extraction of patterns from data has occurred for centuries.

d. The only other data mining standard named in these polls was SEMMA.

e. Several teams of researchers have published reviews of data mining process models, and Azevedo and Santos conducted a comparison of CRISP-DM and SEMMA in 2008.

Q31：What is decision tree? Answer range: P31

A31：a. Another use of decision trees is as a descriptive means for calculating conditional probabilities.

b. Several algorithms to generate such optimal trees have been devised, such as ID3/4/5, CLS, ASSISTANT , and CART.

c. Decision trees are commonly used in operations research, specifically in decision analysis, to help identify a strategy most likely to reach a goal, but are also a popular tool in machine learning.

d. Traditionally, decision trees have been created manually-as the aside example shows- although increasingly, specialized software is employed.

e. In decision analysis a decision tree and the closely related influence diagram are used as a visual and analytical decision support tool, where the expected values (or expected utility) of competing alternatives are calculated.

Q32：What is machine learning? Answer range: P32

A32：a. Machine learning, reorganized as a separate field, started to flourish in the 1990s.

b. Some statisticians have adopted methods from machine learning, leading to a combined field that they call statistical learning.

c. In machine learning, genetic algorithms found some uses in the 1980s and 1990s.

d. Association rule learning is a method for discovering interesting relations between variables in large databases.

e. Efficient algorithms exist that perform inference and learning.

Q33：What is knowledge base? Answer range: P33

A33：a. Even from the beginning the more astute researchers realized the potential benefits of being able to store, analyze, and reuse knowledge.

b. Once the solution to the problem was known there was not a critical demand to store large amounts of data back to a permanent memory store.

c. For example, see the discussion of Corporate Memory in the earliest work of the Knowledge-Based Software Assistant program by Cordell Green et al.

d. A knowledge base (KB) is a technology used to store complex structured and unstructured information used by a computer system.

e. A database typically could not represent this general knowledge but instead would need to store information about thousands of tables that represented information about specific humans.

Q34：What is cloud computing? Answer range: P34

A34：a. Advocates claim that cloud computing allows companies to avoid up-front infrastructure costs (e.g., purchasing servers).

b. The origin of the term cloud computing is unclear.

c. References to `` cloud computing '' in its modern sense appeared as early as 1996, with the earliest known mention in a Compaq internal document.

d. Since 2000 , cloud computing has come into existence.

e. Cloud computing provides all of its resources as services, and makes use of the well-established standards and best practices gained in the domain of SOA to allow global and easy access to cloud services in a standardized way.

Q35：What is open data? Answer range: P35

A35：a. Open data is the idea that some data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control.

b. Advocates of open data argue that these restrictions are against the communal good and that these data should be made available without restriction or fee.

c. At his presentation at the XML 2005 conference, Connolly displayed these two quotations regarding open data: Open data can come from any source .

d. The Human Genome Project was a major initiative that exemplified the power of open data.

e. More recent initiatives such as the Structural Genomics Consortium have illustrated that the open data approach can also be used productively within the context of industrial R&D.

Q36：What is big data? Answer range: P36

A36：a. Big data is a term for data sets that are so large or complex that traditional data processing application softwares are inadequate to deal with them.

b. What counts as `` big data '' varies depending on the capabilities of the users and their tools, and expanding capabilities make big data a moving target.

c. The use and adoption of big data within governmental processes allows efficiencies in terms of cost, productivity, and innovation, but does not come without its flaws.

d. '' Big data very often means ` dirty data ' and the fraction of data inaccuracies increases with data volume growth.''

e. To understand how the media utilises big data, it is first necessary to provide some context into the mechanism used for media process.

Q37：What is DNA repair? Answer range: P37

A37：a. Many of these lesions cause structural damage to the DNA molecule and can alter or eliminate the cell's ability to transcribe the gene that the affected DNA encodes.

b. When normal repair processes fail, and when cellular apoptosis does not occur, irreparable DNA damage may occur, including double-strand breaks and DNA crosslinkages (interstrand crosslinks or ICLs ).

c. DNA damage, due to environmental factors and normal metabolic processes inside the cell, occurs at a rate of 10,000 to 1,000,000 molecular lesions per cell per day.

d. DNA damage can be subdivided into two main types: The replication of damaged DNA before cell division can lead to the incorporation of wrong bases opposite damaged ones.

e. In human cells, and eukaryotic cells in general, DNA is found in two cellular locations -inside the nucleus and inside the mitochondria.

Q38：What is artificial immune systems? Answer range: P38

A38：a. Currently, new ideas along AIS lines, such as danger theory and algorithms inspired by the innate immune system, are also being explored.

b. AIS is distinct from computational immunology and theoretical biology that are concerned with simulating immunology using computational and mathematical models towards better understanding the immune system, although such models initiated the field of AIS and continue to provide a fertile ground for inspiration.

c. Finally, the field of AIS is not concerned with the investigation of the immune system as a substrate for computation, unlike other fields such as DNA computing.

d. Artificial Immune Systems -LRB- AIS -RRB- are adaptive systems, inspired by theoretical immunology and observed immune functions, principles and models, which are applied to problem solving.

e. The common techniques are inspired by specific immunological theories that explain the function and behavior of the mammalian adaptive immune system.

Q39：What is cognitive architecture? Answer range: P39

A39：a. The cognitive architecture implements the theory on computers.

b. Thus, a cognitive architecture can also refer to a blueprint for intelligent agents.

c. One of the main goals of a cognitive architecture is to summarize the various results of cognitive psychology in a comprehensive computer model.

d. A cognitive architecture can refer to a theory about the structure of the human mind.

e. He and his student used the term '' cognitive architecture '' in his lab to refer to the ACT theory as embodied in the collection of papers and designs since they didn't yet have any sort of complete implementation at the time.

Q40：What is Knowledge\_engineering? Answer range: P40

A40：a. In the MYCIN example, the domain experts were medical doctors and the knowledge represented was their expertise in diagnosis.

b. Knowledge engineering (KE) refers to all technical, scientific and social aspects involved in building, maintaining and using knowledge-based systems.

c. These issues led to the second approach to knowledge engineering: development of custom methodologies specifically designed to build expert systems.

d. The final issue with using conventional methods to develop expert systems was the need for knowledge acquisition.

e. One of the first and most popular of such methodologies custom designed for expert systems was the Knowledge Acquisition and Documentation Structuring (KADS) methodology developed in Europe.

Q41：What is knowledge representation? Answer range: P41

A41：a. The earliest work in computerized knowledge representation was focused on general problem solvers such as the General Problem Solver (GPS) system developed by Allen Newell and Herbert A. Simon in 1959.

b. It also had a complete frame based knowledge base with triggers, slots -LRB- data values -RRB- , inheritance, and message passing.

c. In this way the classifier can function as an inference engine, deducing new facts from an existing knowledge base.

d. However, FOL has two drawbacks as a knowledge representation formalism: ease of use and practicality of implementation.

e. Cyc was an attempt to build a huge encyclopedic knowledge base that would contain not just expert knowledge but common sense knowledge.

Q42：What is artificial intelligence? Answer range: P42

A42：a. Artificial intelligence (AI) is intelligence exhibited by machines.

b. Attempts to create artificial intelligence have experienced many setbacks, including the ALPAC report of 1966, the abandonment of perceptrons in 1970, the Lighthill Report of 1973, the second AI winter 1987-1993 and the collapse of the Lisp machine market in 1987.

c. Marvin Minsky agreed, writing, "within a generation ... the problem of creating 'artificial intelligence' will substantially be solved."

d. According to Bloomberg's Jack Clark, 2015 was a landmark year for artificial intelligence, with the number of software projects that use AI within Google increasing from a "sporadic usage" in 2012 to more than 2,700 projects.

e. This procedure allows almost all the major problems of artificial intelligence to be tested.

Q43：What is cognitive science? Answer range: P43

A43：a. A central tenet of cognitive science is that a complete understanding of the mind/brain cannot be attained by studying only a single level.

b. Below are some of the main topics that cognitive science is concerned with.

c. See List of cognitive science topics for a list of various aspects of the field.

d. Many different methodologies are used to study cognitive science.

e. Cognitive science is the interdisciplinary, scientific study of the mind and its processes.

Q44：What is cognitive modeling? Answer range: P44

A44：a. Some of the most popular architectures for cognitive modeling include ACT-R and Soar.

b. Cognition takes place by transforming static symbol structures in discrete, sequential steps.

c. Unlike previous models, "emories" can be formed and recalled by inputting a small portion of the entire memory.

d. Cognitive modeling historically developed within cognitive psychology/cognitive science (including human factors), and has received contributions from the fields of machine learning and artificial intelligence to name a few.

e. A number of key terms are used to describe the processes involved in the perception, storage, and production of speech.

Q45：What is scientific modeling? Answer range: P45

A45：a. Both activities, simplification and abstraction, are done purposefully.

b. Building a model requires abstraction.

c. Modelling is an essential and inseparable part of many scientific disciplines have their own ideas about specific types of modelling.

d. For the scientist, a model is also a way in which the human thought processes can be amplified.

e. Direct measurement of outcomes under controlled conditions (see Scientific method) will always be more reliable than modelled estimates of outcomes.

Q46：What is inductive reasoning? Answer range: P46

A46：a. The philosophical definition of inductive reasoning is more nuanced than simple progression from particular/individual instances to broader generalizations.

b. Inductive reasoning is inherently uncertain.

c. Inductive reasoning has been criticized by thinkers as diverse as Sextus Empiricus and Karl Popper.

d. Although the use of inductive reasoning demonstrates considerable success, its application has been questionable.

e. Hume further argued that it is impossible to justify inductive reasoning: specifically, that it cannot be justified deductively, so our only option is to justify it inductively.

Q47：What is scientific theory? Answer range: P47

A47：a. Many scientific theories are so well established that no new evidence is likely to alter them substantially.

b. Theories and laws are also distinct from hypotheses.

c. Note that the term theory would not be appropriate for describing untested but intricate hypotheses or even scientific models.

d. Theories do not have to be perfectly accurate to be scientifically useful.

e. As a result, theories may make predictions that have not yet been confirmed or proven incorrect; in this case, the predicted results may be described informally with the term '' theoretical ''.

Q48：What is natural language processing? Answer range: P48

A48：a. Natural language processing (NLP) is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human (natural) languages and, in particular, concerned with programming computers to fruitfully process large natural language corpora.

b. Starting in the late 1980s, however, there was a revolution in NLP with the introduction of machine learning algorithms for language processing.

c. In recent years, there has been a flurry of results showing deep learning techniques achieving state-of-the-art results in many natural language tasks, for example in language modeling , parsing , and many others.

d. Formerly, many language-processing tasks typically involved the direct hand coding of rules, which is not in general robust to natural language variation.

e. In 1950, Alan Turing published an article titled '' Computing Machinery and Intelligence '' which proposed what is now called the Turing test as a criterion of intelligence.

Q49：What is artificial neural network? Answer range: P49

A49：a. Artificial neural networks have also been used to diagnose several cancers.

b. Aside from their utility, a fundamental objection to artificial neural networks is that they fail to reflect how real neurons function.

c. This allows simple statistical association (the basic function of artificial neural networks) to be described as learning or recognition.

d. In the late 1940s psychologist Donald Hebb created a hypothesis of learning based on the mechanism of neural plasticity that is now known as Hebbian learning.

e. Hebbian learning is considered to be a ' typical ' unsupervised learning rule and its later variants were early models for long term potentiation.

Q50：What is neural network software? Answer range: P50

A50：a. Historically, the most common type of neural network software was intended for researching neural network structures and algorithms.

b. This was a return to the idea of providing a small, user-friendly, simulator that was designed with the novice in mind.

c. Neural network software is used to simulate, research, develop, and apply artificial neural networks, software concepts adapted from biological neural networks, and, in some cases, a wider array of adaptive systems such as artificial intelligence and machine learning.

d. Some simulators also visualize the physical structure of the neural network.

e. Unlike the research simulators, data analysis simulators are intended for practical applications of artificial neural networks.

Q51：What is Multi-agent system? Answer range: P51

A51：a. Multi-agent systems can be used to solve problems that are difficult or impossible for an individual agent or a monolithic system to solve.

b. The main feature which is achieved when developing multi-agent systems, is flexibility, since a multi-agent system can be added to, modified and reconstructed, without the need for detailed rewriting of the application.

c. Topics where multi-agent systems research may deliver an appropriate approach include online trading, disaster response, and modelling social structures.

d. Typically multi-agent systems research refers to software agents.

e. Multi-agent systems consist of agents and their environment.

Q52：What is cluster analysis? Answer range: P52

A52：a. Cluster analysis itself is not one specific algorithm, but the general task to be solved.

b. Cluster analysis as such is not an automatic task, but an iterative process of knowledge discovery or interactive multi-objective optimization that involves trial and failure.

c. It can be achieved by various algorithms that differ significantly in their notion of what constitutes a cluster and how to efficiently find them.

d. The notion of a '' cluster '' cannot be precisely defined, which is one of the reasons why there are so many clustering algorithms.

e. However, different researchers employ different cluster models, and for each of these cluster models again different algorithms can be given.

Q53：What is information science? Answer range: P53

A53：a. Information science should not be confused with information theory or library science.

b. Information theory is the study of a particular mathematical concept of information.

c. Information science as an academic discipline is often taught in combination with Library science as Library and Information Science.

d. Information science focuses on understanding problems from the perspective of the stakeholders involved and then applying information and other technologies as needed.

e. Several institutions have formed an I-School Caucus (see List of I-Schools), but numerous others besides these also have comprehensive information foci.

Q54：What is information retrieval? Answer range: P54

A54：a. Information retrieval (IR) is the activity of obtaining information resources relevant to an information need from a collection of information resources.

b. An information retrieval process begins when a user enters a query into the system.

c. In information retrieval a query does not uniquely identify a single object in the collection.

d. An object is an entity that is represented by information in a content collection or database.

e. User queries are matched against the database information.

Q55：What is library science? Answer range: P55

A55：a. Historically, library science has also included archival science.

b. In academic regalia in the United States, the color for library science is lemon.

c. With the mounting acceptance of Wikipedia as a valued and reliable reference source, many libraries, museums and archives have introduced the role of Wikipedian in residence.

d. There was a '' Women 's Meeting '' at the 1882 14th American Libraries Conference, where issues concerning the salaries of women librarians and what female patrons do in reading rooms were discussed.

e. The American Library Association and many libraries around the country realize the issue of diversity in the workplace and are addressing this problem.

Q56：What is computational statistics? Answer range: P56

A56：a. Computational statistics, or statistical computing , is the interface between statistics and computer science.

b. This area is also developing rapidly, leading to calls that a broader concept of computing should be taught as part of general statistical education.

c. The term 'Computational statistics' may also be used to refer to computationally intensive statistical methods.

d. The terms 'computational statistics' and 'statistical computing' are often used interchangeably.

e. It is the area of computational science (or scientific computing) specific to the mathematical science of statistics.

Q57：What is numerical analysis? Answer range: P57

A57：a. Much like the Babylonian approximation of the square root of 2, modern numerical analysis does not seek exact answers, because exact answers are often impossible to obtain in practice.

b. Instead, much of numerical analysis is concerned with obtaining approximate solutions while maintaining reasonable bounds on errors.

c. The field of numerical analysis predates the invention of modern computers by many centuries.

d. But the invention of the computer also influenced the field of numerical analysis, since now longer and more complicated calculations could be done.

e. The study of errors forms an important part of numerical analysis.

Q58：What is mathematical physics? Answer range: P58

A58：a. There are several distinct branches of mathematical physics, and these roughly correspond to particular historical periods.

b. The usage of the term `` mathematical physics '' is sometimes idiosyncratic.

c. The roots of mathematical physics can be traced back to the likes of Archimedes in Greece, Ptolemy in Egypt, Alhazen in Iraq , and Al-Biruni in Persia.

d. It is a branch of applied mathematics, but deals with physical problems.

e. Statistical mechanics forms a separate field, which includes the theory of phase transitions.

Q59：What is computational science? Answer range: P59

A59：a. Computational science is now commonly considered a third mode of science, complementing and adding to experimentation/observation and theory.

b. A collection of problems and solutions in computational science can be found in Steeb, Hardy, Hardy and Stoop, 2004.

c. However, there are increasingly many bachelor's and master's programs in computational science.

d. The essence of computational science is numerical algorithm and/or computational mathematics.

e. Computational science is a rapidly growing multidisciplinary field that uses advanced computing capabilities to understand and solve complex problems.

Q60：What is Control theory? Answer range: P60

A60：a. The theoretical basis of closed loop automation is control theory.

b. As the general theory of feedback systems, control theory is useful wherever feedback occurs.

c. Control theory is a theory that deals with influencing the behavior of dynamical systems.

d. Control systems may be thought of as having four functions: measure, compare, compute and correct.

e. Control theory is an interdisciplinary branch of engineering and mathematics that deals with the behavior of dynamical systems with inputs, and how their behavior is modified by feedback.

Q61：What is Bayesian network? Answer range: P61

A61：a. Generalizations of Bayesian networks that can represent and solve decision problems under uncertainty are called influence diagrams.

b. One advantage of Bayesian networks is that it is intuitively easier for a human to understand -LRB- a sparse set of -RRB- direct dependencies and local distributions than complete joint distributions.

c. There are three main inference tasks for Bayesian networks.

d. Although Bayesian networks are often used to represent causal relationships, this need not be the case: a directed edge from u to v does not require that Xv is causally dependent on Xu.

e. In 1990 while working at Stanford University on large bioinformatic applications, Greg Cooper proved that exact inference in Bayesian networks is NP-hard.

Q62：What is ensemble learning? Answer range: P62

A62：a. An ensemble is itself a supervised learning algorithm, because it can be trained and then used to make predictions.

b. Although perhaps non-intuitive, more random algorithms (like random decision trees) can be used to produce a stronger ensemble than very deliberate algorithms.

c. The Bayes Optimal Classifier is a classification technique.

d. As an example, the random forest algorithm combines random decision trees with bagging to achieve very high classification accuracy.

e. An interesting application of bagging in unsupervised learning is provided here.

Q63：What is speech recognition? Answer range: P63

A63：a. It is also known as '' automatic speech recognition '' (ASR), '' computer speech recognition '', or just ''speech to text '' (STT).

b. The system analyzes the person's specific voice and uses it to fine-tune the recognition of that person's speech, resulting in increased accuracy.

c. Gunnar Fant developed the source-filter model of speech production and published it in 1960 , which proved to be a useful model of speech production.

d. Raj Reddy was the first person to take on continuous speech recognition as a graduate student at Stanford University in the late 1960s.

e. The DTW algorithm processed the speech signal by dividing it into short frames, e.g. 10ms segments, and processing each frame as a single unit.

Q64：What is logic programming? Answer range: P64

A64：a. Logic programming is a type of programming paradigm which is largely based on formal logic.

b. In ASP and Datalog, logic programs have only a declarative reading, and their execution is performed by means of a proof procedure or model generator whose behavior is not meant to be under the control of the programmer.

c. As a clause in a logic program, it can be used both as a procedure to test whether X is fallible by testing whether X is human, and as a procedure to find an X that is fallible by finding an X that is human.

d. The declarative reading of logic programs can be used by a programmer to verify their correctness.

e. The use of mathematical logic to represent and execute computer programs is also a feature of the lambda calculus, developed by Alonzo Church in the 1930s.

Q65：What is computational neuroscience? Answer range: P65

A65：a. Scientists now believe that there are all kinds of voltage-sensitive currents, and the implications of the differing dynamics, modulations, and sensitivity of these currents is an important topic of computational neuroscience.

b. The proceedings of this definitional meeting were published in 1990 as the book Computational Neuroscience.

c. The first open international meeting focused on Computational Neuroscience was organized by James M. Bower and John Miller in San Francisco, California in 1989 and has continued each year since as the annual CNS meeting.

d. Integrative neuroscience attempts to consolidate these observations through unified descriptive models and databases of behavioral measures and recordings.

e. Computational neuroscience (also theoretical neuroscience) studies brain function in terms of the information processing properties of the structures that make up the nervous system.

Q66：What is information technology? Answer range: P66

A66：a. We shall call it information technology (IT ).

b. It has been estimated that the worldwide capacity to store information on electronic devices grew from less than 3 exabytes in 1986 to 295 exabytes in 2007, doubling roughly every 3 years.

c. It can be broadly categorized as broadcasting, in which information is transmitted unidirectionally downstream, or telecommunications, with bidirectional upstream and downstream channels.

d. The terms '' data '' and '' information '' are not synonymous.

e. Anything stored is data, but it only becomes information when it is organized and presented meaningfully.

Q67：What is business intelligence? Answer range: P67

A67：a. BI technologies provide historical, current and predictive views of business operations.

b. Business intelligence can be used to support a wide range of business decisions ranging from operational to strategic.

c. Strategic business decisions include priorities, goals and directions at the broadest level.

d. In all cases, BI is most effective when it combines data derived from the market in which a company operates (external data) with data from company sources internal to the business such as financial and operations data (internal data).

e. In a 1958 article, IBM researcher Hans Peter Luhn used the term business intelligence.

Q68：What is information system? Answer range: P68

A68：a. An information system (IS) is a group of components that interact to produce information.

b. Alter argues for advantages of viewing an information system as a special type of work system.

c. An information system is a work system whose activities are devoted to capturing, transmitting, storing, retrieving, manipulating and displaying information.

d. An information system (IS) is any organized system for the collection, organization, storage and communication of information.

e. An emphasis is placed on an information system having a definitive boundary, users, processors, storage, inputs, outputs and the aforementioned communication networks.

Q69：What is financial technology? Answer range: P69

A69：a. Global investment in financial technology increased more than twelvefold from $ 930 million in 2008 to more than $ 12 billion in 2014.

b. There is already a number of strong financial technology players like Tyro Payments and Stockspot in the market and the new hub will help further accelerate the growth of the sector.

c. A financial technology innovation lab is also being launched in Hong Kong to help foster innovation in financial services using technology.

d. The nascent financial technology industry has seen rapid growth over the last few years, according to the office of the Mayor of London.

e. Financial magazine Forbes created a list of the leading disrupters in financial technology for its Forbes 2016 global Fintech 50.

Q70：What is cognitive linguistics? Answer range: P70

A70：a. Insights and developments from cognitive linguistics are becoming accepted ways of analyzing literary texts, too.

b. Cognitive linguistics takes an opposing position to the historically prominent position of Noam Chomsky and others in the field of generative grammar.

c. Cognitive linguistics is closely associated with semantics.

d. Cognitive linguistics broadly breaks down into three main areas of study: cognitive semantics, cognitive approaches to grammar and cognitive phonology.

e. There is significant peer review and debate within the field of linguistics regarding cognitive linguistics.

Q71：What is cognitive musicology? Answer range: P71

A71：a. Otto Laske was a champion of cognitive musicology.

b. For the German-speaking area, Laske's conception of cognitive musicology has been advanced by Uwe Seifert in his book Systematische Musiktheorie und Kognitionswissenschaft.

c. The polymath Christopher Longuet-Higgins, who coined the term ''cognitive science'', is one of the pioneers of cognitive musicology.

d. A collection of papers that he co-edited served to heighten the visibility of cognitive musicology and to strengthen its association with AI and music.

e. David Temperley, whose early work within the field of cognitive musicology applied dynamic programming to aspects of music cognition, has suggested a number of refinements to the Krumhansl-Schmuckler Key-Finding Algorithm.

Q72：What is music psychology? Answer range: P72

A72：a. Music psychology in the second half of the 20th century has expanded to cover a wide array of theoretical and applied areas.

b. Music has been shown to consistently elicit emotional responses in its listeners, and this relationship between human affect and music has been studied in depth.

c. These behaviors include music listening, performing, composing, reading, writing, and ancillary activities.

d. This view has been directly countered by numerous music researchers.

e. Relationships with music preference have also been found with mood and nostalgic association.

Q73：What is social science? Answer range: P73

A73：a. The social sciences developed from the sciences (experimental and applied), or the systematic knowledge-bases or prescriptive practices, relating to the social improvement of a group of interacting entities.

b. The beginnings of the social sciences in the 18th century are reflected in the grand encyclopedia of Diderot, with articles from Jean-Jacques Rousseau and other pioneers.

c. The growth of the social sciences is also reflected in other specialized encyclopedias.

d. In the contemporary period, Karl Popper and Talcott Parsons influenced the furtherance of the social sciences.

e. One useful way to describe the discipline is as a cluster of sub-fields that examine different dimensions of society.

Q74：What is molecular biology? Answer range: P74

A74：a. Gel electrophoresis is one of the principal tools of molecular biology.

b. The terms northern, western and eastern blotting are derived from what initially was a molecular biology joke that played on the term Southern blotting, after the technique described by Edwin Southern for the hybridisation of blotted DNA.

c. While molecular biology was established in the 1930s, the term was coined by Warren Weaver in 1938.

d. Researchers in molecular biology use specific techniques native to molecular biology but increasingly combine these with techniques and ideas from genetics and biochemistry.

e. The figure to the right is a schematic that depicts one possible view of the relationships between the fields: One of the most basic techniques of molecular biology to study protein function is molecular cloning.

Q75：What is gene expression? Answer range: P75

A75：a. Several steps in the gene expression process may be modulated, including the transcription, RNA splicing, translation, and post-translational modification of a protein.

b. In genetics, gene expression is the most fundamental level at which the genotype gives rise to the phenotype, i.e. observable trait.

c. The genetic code stored in DNA is '' interpreted '' by gene expression, and the properties of the expression give rise to the organism's phenotype.

d. With respect to a gene, the two strands may be labeled the '' template strand,'' which serves as a blueprint for the production of an RNA transcript, and the '' coding strand,'' which includes the DNA version of the transcript sequence.

e. This so-called alternative splicing creates series of different transcripts originating from a single gene.

Q76：What is regional science? Answer range: P76

A76：a. Regional science is a field of the social sciences concerned with analytical approaches to problems that are specifically urban, rural, or regional.

b. Trevor J. Barnes suggests the decline of regional science practice among planners and geographers in North America could have been avoided.

c. Walter Isard 's efforts culminated in the creation of a few academic departments and several university-wide programs in regional science.

d. Regional science has enjoyed mixed fortunes since the 1980s.

e. Attacks on regional science's practitioners by radical critics began as early as the 1970s, notably David Harvey who believed it lacked social and political commitment.

Q77：What is economic geography? Answer range: P77

A77：a. Economists such as Paul Krugman and Jeffrey Sachs have also analyzed many traits related to economic geography.

b. Krugman called his application of spatial thinking to international trade theory the '' new economic geography'', which directly competes with an approach within the discipline of geography that is also called '' new economic geography''.

c. Economic geography is the study of the location, distribution and spatial organization of economic activities across the world.

d. It represents a traditional subfield of the discipline of geography.

e. The latter approach of agricultural geography is often applied within regional geography.

Q78：What is social network? Answer range: P78

A78：a. One group consisted of sociologist Harrison White and his students at the Harvard University Department of Social Relations.

b. In general, social networks are self-organizing, emergent, and complex, such that a globally coherent pattern appears from the local interaction of the elements that make up the system.

c. Thus, social networks are analyzed at the scale relevant to the researcher's theoretical question.

d. The dynamics of social friendships in society has been modeled by balancing triads.

e. Social networks have also been used to examine how organizations interact with each other, characterizing the many informal connections that link executives together, as well as associations and connections between individual employees at different organizations.

Q79：What is genetic engineering? Answer range: P79

A79：a. An organism that is generated through genetic engineering is considered to be a genetically modified organism (GMO).

b. However the European Commission has also defined genetic engineering broadly as including selective breeding and other means of artificial selection.

c. Genetic engineering can also be used to remove genetic material from the target organism, creating a gene knockout organism.

d. In 1976 Genentech, the first genetic engineering company, was founded by Herbert Boyer and Robert Swanson and a year later the company produced a human protein (somatostatin) in E.coli.

e. Cells fused together to create monoclonal antibodies, have been humanized through genetic engineering to create human monoclonal antibodies.

Q80：What is biological engineering? Answer range: P80

A80：a. The differentiation between biological engineering and biomedical engineering can be unclear, as many universities loosely use the terms'' bioengineering'' and '' biomedical engineering'' interchangeably.

b. Biological engineering uses both approaches in concert, relying on reductionist approaches to identify, understand, and organize the fundamental units, which are then integrated to generate something new.

c. The first biological engineering program was created at Mississippi State University in 1967, making it the first biological engineering curriculum in the United States.

d. Biological engineering is also called bioengineering by some colleges, and biomedical engineering is called bioengineering by others, and is a rapidly developing field with fluid categorization.

e. In the non-medical aspects of bio-engineering, it is closely related to biotechnology, nanotechnology and 3D printing.

Q81：What is synthetic biology? Answer range: P81

A81：a. Descriptions of synthetic biology depend on how the user approaches it, as a biologist or as an engineer.

b. Several key enabling technologies are critical to the growth of synthetic biology.

c. In addition to numerous scientific and technical challenges, synthetic biology raises ethical issues and biosecurity issues.

d. The European Union funded project SYNBIOSAFE has issued several reports on how to manage the risks of synthetic biology.

e. The groups specifically call for an outright ban on the use of synthetic biology on the human genome or human microbiome.

Q82：What is Mathematical proofs? Answer range: P82

A82：a. In mathematics, a proof is a deductive argument for a mathematical statement.

b. In fact, the vast majority of proofs in written mathematics can be considered as applications of rigorous informal logic.

c. In the argument, other previously established statements, such as theorems, can be use.

d. The philosophy of mathematics is concerned with the role of language and logic in proofs, and mathematics as a language.

e. Proofs employ logic but usually include some amount of natural language which usually admits some ambiguity.

Q83：What is scientific terminology? Answer range: P83

A83：a. Several categories of scientific terminology can be distinguished.

b. During the last two centuries there has been an increasing tendency to modernize the terminology, though how beneficial that might be is subject to discussion.

c. Scientific terminology is the part of the language that is used by scientists in the context of their professional activities.

d. However, due to popularization of science, they gradually become part of common languages.

e. Branches of science that are based, however tenuously, on fields of study known to the ancients, or that were established by more recent workers familiar with Greek and Latin, often use terminology that is fairly correct descriptive Latin, or occasionally Greek.

Q84：What is computer network? Answer range: P84

A84：a. It is a global system of interconnected governmental, academic, corporate, public, and private computer networks.

b. Whilst the use of protocol layering is today ubiquitous across the field of computer networking, it has been historically criticized by many researchers for two principal reasons.

c. In computer networks, networked computing devices exchange data with each other using a data link.

d. A network allows sharing of network and computing resources.

e. Distributed computing uses computing resources across a network to accomplish tasks.

Q85：What is wireless networking? Answer range: P85

A85：a. Wireless personal area networks (WPANs) interconnect devices within a relatively small area, which is generally within a person's reach.

b. Wireless metropolitan area networks are a type of wireless network that connects several wireless LANs.

c. Wireless wide area networks are wireless networks that typically cover large areas, such as between neighboring towns and cities, or city and suburb.

d. Wireless networks offer many advantages when it comes to difficult-to-wire areas trying to communicate such as across a street or river, a warehouse on the other side of the premises or buildings that are physically separated but operate as one.

e. Wireless networks are simple and require as few as one single wireless access point connected directly to the Internet via a router.

Q86：What is mobile technology? Answer range: P86

A86：a. Mobile technology is the technology used for cellular communication.

b. Mobile code division multiple access (CDMA) technology has evolved rapidly over the past few years.

c. Mobile computing by way of tablet computers is becoming more popular.

d. One of the main features applying to this is that the phones will start keeping track of your personal data, but adapt to anticipate the information you will need based on your intentions.

e. There will be all-new applications coming out with the new phones, one of which is an X-Ray device that reveals information about any location at which you point your phone.

Q87：What is remote control? Answer range: P87

A87：a. A remote control is primarily a convenience feature for the user, and can allow operation of devices that are out of convenient reach for direct operation of controls.

b. For many devices, the remote control contains all the function controls while the controlled device itself has only a handful of essential primary controls.

c. The remote control code, and thus the required remote control device, is usually specific to a product line, but there are universal remotes, which emulate the remote control made for most major brand devices.

d. Remote control has continually evolved and advanced in the 2000s to include Bluetooth connectivity, motion sensor-enabled capabilities and voice control.

e. Using pulse-count modulation, this also was the first digital wireless remote control.

Q88：What is technical communication? Answer range: P88

A88：a. Technical communication is a task performed by specialized employees or consultants.

b. Some companies give considerable technical communication responsibility to other technical professionals, such as programmers, engineers, and scientists.

c. This process, known as the 'Writing Process', has been a central focus of writing theory since the 1970s, and some contemporary textbook authors apply it to technical communication.

d. This is the basic definition of technical communication.

e. Whatever the definition of technical communication, the overarching goal of the practice is to create easily accessible information for a specific audience.

Q89：What is computer science? Answer range: P89

A89：a. An alternate, more succinct definition of computer science is the study of automating algorithmic processes that scale.

b. The earliest foundations of what would become computer science predate the invention of the modern digital computer.

c. Computer science began to be established as a distinct academic discipline in the 1950s and early 1960s.

d. The first computer science degree program in the United States was formed at Purdue University in 1962.

e. During the late 1950s, the computer science discipline was very much in its developmental stages, and such issues were commonplace.

Q90：What is educational psychology? Answer range: P90

A90：a. Educational psychology is a fairly new and growing field of study.

b. Johann Herbart is considered the father of educational psychology.

c. Alfred Binet published Mental Fatigue in 1898, in which he attempted to apply the experimental method to educational psychology.

d. Jerome Bruner is notable for integrating Piaget's cognitive approaches into educational psychology.

e. In recent decades the participation of women as professional researchers in North American educational psychology has risen dramatically.

Q91：What is behavioral science? Answer range: P91

A91：a. The term behavioral science is often confused with the term social sciences.

b. Examples of behavioral sciences include psychology, psychobiology, and cognitive science.

c. Behavioral science includes two broad categories: neural-Information sciences and social-Relational sciences.

d. In contrast, social sciences provide a perceptive framework to study the processes of a social system through impacts of social organization on structural adjustment of the individual and of groups.

e. For example, political psychology and behavioral economics use behavioral approaches, despite the predominant focus on systemic and institutional factors in the broader fields of political science and economics.

Q92：What is political culture? Answer range: P92

A92：a. In 1963, two Americans, Gabriel Almond and Sidney Verba, outlined three pure types of political culture that can combine to create civic culture.

b. The third feature of British political culture is '' homogeneity''.

c. Different typologies of political culture have been proposed.

d. Political culture is thus the manifestation of the psychological and subjective dimensions of politics.

e. The concept was used by Gabriel Almond in the late 50s , and outlined in The Civic Culture, but was soon opposed by two European political scientists.

Q93：What is welfare economics? Answer range: P93

A93：a. Such functions typically include measures of economic efficiency and equity, though more recent attempts to quantify social welfare have included a broader range of measures including economic freedom (as in the capability approach).

b. The field of welfare economics is associated with two fundamental theorems.

c. Because of welfare economics' close ties to social choice theory, Arrow's impossibility theorem is sometimes listed as a third fundamental theorem.

d. It assumes the following: With these assumptions, it is possible to construct a social welfare function simply by summing all the individual utility functions.

e. According to this measure of social welfare, a situation is optimal only if no individuals can be made better off without making someone else worse off.

Q94：What is digital technology? Answer range: P94

A94：a. Often this can be done outside of the factory by updating the product's software.

b. However, a base station has grid power and can use power-hungry, but very flexible software radios.

c. These are usually programmed by software engineers.

d. It is common for the function tables of such computer-generated state-machines to be optimized with logic-minimization software such as Minilog.

e. Improvements in this technology have driven all subsequent improvements in cost.

Q95：What is cognitive neuroscience? Answer range: P95

A95：a. The term 'cognitive neuroscience' was coined by George Miller and Michael Gazzaniga toward the end of the 1970s.

b. Earlier methods used in cognitive neuroscience include EEG and MEG.

c. Cognitive neuroscience is the scientific field that is concerned with the study of the biological processes and aspects that underlie cognition, with a specific focus on the neural connections in the brain which are involved in mental processes.

d. Studies of patients with cognitive deficits due to brain lesions constitute an important aspect of cognitive neuroscience.

e. Before the 1980s, interaction between neuroscience and cognitive science was scarce.

Q96：What is veterinary medicine? Answer range: P96

A96：a. Veterinary medicine is widely practiced, both with and without professional supervision.

b. A number of professions exist within the scope of veterinary medicine, but which may not necessarily be performed by vets or veterinary nurses.

c. In 1879, Iowa Agricultural College became the first land grant college to establish a school of veterinary medicine.

d. Where there were no healing herbs for people and animals, he ordered that they be bought and planted.

e. The first attempts to organize and regulate the practice of treating animals tended to focus on horses because of their economic significance.

Q97：What is natural science? Answer range: P97

A97：a. Later philosophers made their own classifications of the natural sciences.

b. Modern biology is divided into sub-disciplines by the type of organism and by the scale being studied.

c. Likewise chemistry is represented by such fields as biochemistry, chemical biology, geochemistry and astrochemistry.

d. A particular example of a scientific discipline that draws upon multiple natural sciences is environmental science.

e. There are also a sub-set of cross-disciplinary fields which, by the nature of the problems that they address, have strong currents that run counter to specialization.

Q98：What is Natural language generation? Answer range: P98

A98：a. It could be said an NLG system is like a translator that converts data into a natural language representation.

b. As in other areas of natural language processing, this can be done using either explicit models of language (e.g., grammars) and the domain, or using statistical models derived by analyzing human-written texts.

c. However, the methods to produce the final language are different from those of a compiler due to the inherent expressivity of natural languages.

d. The typical stages of natural language generation, as proposed by Dale and Reiter, are: Content determination: Deciding what information to mention in the text.

e. The process to generate text can be as simple as keeping a list of canned text that is copied and pasted, possibly linked with some glue text.

Q99：What is Data structure? Answer range: P99

A99：a. Different kinds of data structures are suited to different kinds of applications, and some are highly specialized to specific tasks.

b. Data structures provide a means to manage large amounts of data efficiently for uses such as large databases and internet indexing services.

c. Usually, efficient data structures are keys to designing efficient algorithms.

d. Some provide opaque data types that allow clients to hide implementation details.

e. Many known data structures have concurrent versions which allow multiple computing threads to access a single concrete instance of a data structure simultaneously.

Q100：What is data loss? Answer range: P100

A100：a. Data loss is distinguished from data unavailability, which may arise from a network outage.

b. Although the two have substantially similar consequences for users, data unavailability is temporary, while data loss may be permanent.

c. Data loss is also distinct from data breach, an incident where data falls into the wrong hands, although the term data loss has been used in those incidents.

d. The frequency of data loss and the impact can be greatly mitigated by taking proper precautions, those of which necessary can vary depending on the type of data loss.

e. Regular data backups are an important asset to have when trying to recover after a data loss event, but they do not prevent user errors or system failures.

The partial questions in the experiment on other kinds of questions.

|  |  |  |
| --- | --- | --- |
| **No.** | Answer range | **Questions** |
| 1 | *T*1 | what is the English abbreviation of artificial intelligence? |
| 2 | *T*1 | what are the research areas of artificial intelligence? |
| 3 | *T*1 | when was artificial intelligence first considered? |
| 4 | *T*1 | who consider the concept of artificial intelligence? |
| 5 | *T*1 | when was International Joint Conferences on Artificial Intelligence(IJCAJ) established? |
| 6 | *T*1 | when was artificial intelligence introduced into the market? |
| 7 | *T*1 | where did the first international conference on neural networks? |
| 8 | *T*1 | what is the most active and productive research field in artificial intelligence? |
| 9 | *T*1 | what is the definition of machine learning? |
| 10 | *T*1 | why the artificial intelligence slides into the low ebb? |
| 11 | *T*2 | what are the subfields of artificial intelligence research? |
| 12 | *T*2 | what are the central problems of artificial intelligence? |
| 13 | *T*2 | when was the field of artificial intelligence research born? |
| 14 | *T*2 | who are the founders of leaders of artificial intelligence research? |
| 15 | *T*2 | when did artificial intelligence begin to be used for logistics and other area? |
| 16 | *T*2 | who thinks the 2015 was a landmark year for artificial intelligence? |
| 17 | *T*2 | what are the center of artificial intelligence research? |
| 18 | *T*2 | when was the Turing tests proposed? |
| 19 | *T*2 | what is the definition of natural language processing? |
| 20 | *T*2 | what does supervised learning include? |
| 21 | *T*3 | when did cognitive science begin as an intellectual movement? |
| 22 | *T*3 | who gives a famous description of three levels of analysis? |
| 23 | *T*3 | what is the goal of artificial intelligence? |
| 24 | *T*3 | why cognitive science is considered as an interdisciplinary field? |
| 25 | *T*3 | what are the main topics that cognitive science is concerned with? |
| 26 | *T*3 | what does computational modeling can help us? |
| 27 | *T*3 | who seeks to understand the organizing principles of the mind? |
| 28 | *T*3 | when did Verbal Behavior is published? |
| 29 | *T*3 | where did the founding meeting of the Cognitive Science Society be held? |
| 30 | *T*3 | When did Vassar College become the first institution? |
| 31 | *T*4 | who designed and constructed the working mechanical calculators? |
| 32 | *T*4 | what is an alternate, more succinct definition of computer science? |
| 33 | *T*4 | when did Thomas de Colmar launch the mechanical calculators industry? |
| 34 | *T*4 | who demonstrated the digital mechanical calculators? |
| 35 | *T*4 | why the term computer came to refer to the machines rather than their human predecessors during the 1940s? |
| 36 | *T*4 | when did computer science begin to be established as a distinct academic discipline? |
| 37 | *T*4 | where was the first computer science degree program in the United States formed? |
| 38 | *T*4 | why less human assistance was needed for common usage? |
| 39 | *T*4 | what is the aim of theoretical computer science? |
| 40 | *T*4 | when is that Gottfried Leibniz demonstrated a digital mechanical calculator? |
| 41 | *T*5 | why the term of data mining is a misnomer? |
| 42 | *T*5 | when did data mining appear? |
| 43 | *T*5 | what is the overall goal of the data mining? |
| 44 | *T*5 | where is the First International Conference on Data Mining and Knowledge Discovery? |
| 45 | *T*5 | why did the KDD International conference become the primary highest conference in Data mining? |
| 46 | *T*5 | why a target data set must be assembled before data mining algorithm can be used? |
| 47 | *T*5 | when did the government amend its copyright law? |
| 48 | *T*5 | when did the European Commission facilitate stakeholder discussion on text and data mining? |
| 49 | *T*5 | what is the actual data mining task? |
| 50 | *T*5 | where did copyright law have the flexible nature? |

The 705 original questions on Wikipedia pages, the questions that have no answer are removed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | The pages in wiki | Question type | Question type（SMU） | Question |
| T100 | Data loss | How+discription | Manner | How can information systems prevent data loss or restore lost data? |
| Data loss | What+term | Definition | What is data loss? |
| Data loss | How+discription | Reason | How is data loss distinguished from data unavailability? |
| Data loss | What+discription | Definition | What is the cost of a data loss event directly related to? |
| Data loss | What+discription | Definition | What is the definition of regular data backups? |
| Data loss | What+discription | Manner | What can the frequency of data loss and the impact be greatly mitigated? |
| Data loss | What+discription | Money | What are service costs at data recovery labs usually dependent on? |
| Data loss | What+discription | Definition | What would a highly effective backup system have? |
| Data loss | Who+discription | Person | Who can file system corruption frequently be repaired by? |
| T99 | Data structure | What+term | Definition | What is a data structure in computer science? |
| Data structure | What+discription | Name | What do relational databases commonly use for data retrieval? |
| Data structure | What+discription | Definition | What does compiler implementations usually use to look up identifiers? |
| Data structure | Where+discription | Location | Where are data structures generally based on the ability of a computer to fetch and store data at? |
| Data structure | Where+discription | Location | Where does each node point to the next node in? |
| Data structure | What+discription | Name | What can a record also be called? |
| T98 | Natural language generation | What+discription | Name | What is the abbreviation of natural language generation? |
| Natural language generation | What+term | Definition | What is an NLG system? |
| Natural language generation | When+discription | Time | When did commercial NLG technology become widely available? |
| Natural language generation | What+discription | Number | What is the value of pollen levels in Northern areas? |
| Natural language generation | What+discription | Number | What level is pollen counts expected to remain at over most of Scotland? |
| Natural language generation | What+discription | Definition | What stages should a sophisticated NLG system needs to include? |
| Natural language generation | Who+discription | Person | Who proposed the typical stages of natural language generation? |
| Natural language generation | When+discription | Time | When did FactSet discussed with Forbes about how they use NLG to automatically write thousands of reports? |
| T97 | Natural science | What+discription | Definition | What are sometimes called "hard science"? |
| Natural science | How+discription | Number | How many main branches can natural science be divided into? |
| Natural science | Who+discription | Person | Who debated the benefits of using approaches which were more mathematical and more experimental in a methodical way? |
| Natural science | Whose+discription | Name | Whose controversial falsifiability criterion helps differentiate scientific endeavors? |
| Natural science | When+discription | Time | When was microbiology introduced with the invention of the microscope? |
| Natural science | When+discription | Time | When did biology became a unified science? |
| Natural science | What+term | Name | What is often called "the central science" ? |
| Natural science | Who+discription | Person | Who is the discoverer of gas? |
| Natural science | Why+discription | Reason | Why is physics regarded as the fundamental science? |
| Natural science | Who+discription | Person | Who developed the theory of the Conservation of mass |
| T96 | Veterinary medicine | What+discription | Definition | What is the scope of veterinary medicine? |
| Veterinary medicine | Why+discription | Reason | Why the first attempts to organize and regulate the practice of treating animals tended to focus on horses? |
| Veterinary medicine | Why+discription | Reason | Why veterinarians usually obliged to look after animal welfare? |
| Veterinary medicine | When+discription | Time | When is the Egyptian Papyrus of Kahun? |
| Veterinary medicine | Who+discription | Name | Who is the first Buddhist Emperor of India? |
| Veterinary medicine | When+discription | Time | When did farriers combined their work in horseshoeing with "horse doctoring"? |
| Veterinary medicine | When+discription | Time | When is the establishment of the Worshipful Company of Farriers? |
| Veterinary medicine | What+discription | Name | What is the name of the first comprehensive treatise on the anatomy of a nonhuman species? |
| Veterinary medicine | Where+discription | Location | Where was the first veterinary college founded? |
| T95 | Cognitive neuroscience | What+discription | Definition | What scientific field is cognitive neuroscience about? |
| Cognitive neuroscience | Why+discription | Reason | Why neurons play the most vital role? |
| Cognitive neuroscience | Why+discription | Reason | Why may cognitive neuroscientists have various backgrounds? |
| Cognitive neuroscience | What+discription | Manner | What methods employed in cognitive neuroscience? |
| Cognitive neuroscience | What+term | Name | What is the abbreviation of positron emission tomography? |
| Cognitive neuroscience | When+discription | Time | When did the the works of Galileo, Descartes, and Boyle happen? |
| Cognitive neuroscience | Who+discription | Person | Who declared that the brain was the source of mental activity? |
| Cognitive neuroscience | Who+discription | Person | Who believed that personality and emotion were not generated by the brain? |
| Cognitive neuroscience | How+discription | Number | How many different sections was the human brain localized into approximately in the early 19th century? |
| Cognitive neuroscience | Who+discription | Name | Who studied patients with brain damage? |
| T94 | Digital electronics | What+discription | Definition | What signals do digital electronics handle? |
| Digital electronics | What+discription | Number | What is the number of the states in most cases? |
| Digital electronics | What+discription | Definition | What are digital electronic circuits usually made from? |
| Digital electronics | Who+term | Person | Who refined the binary number system? |
| Digital electronics | When+discription | Time | When did the Lee De Forest’s Fleming valve can be used as an AND logic gate? |
| Digital electronics | Who+discription | Person | Who introduced a version of the 16-row truth table? |
| Digital electronics | What+discription | Manner | What is mechanical analog computers were used for in World War II? |
| Digital electronics | What+discription | Name | What is the abbreviation of personal computers? |
| Digital electronics | Why+discription | Reason | Why it comes the "second generation" of computers? |
| T93 | Welfare economics | What+term | Definition | What is welfare economics a branch of ? |
| Welfare economics | How+discription | Number | How many fundamental theorems is the field of welfare economics associated with? |
| Welfare economics | Why+discription | Reason | Why could a social planner use a social welfare function to pick the most equitable efficient outcome? |
| Welfare economics | Who+discription | Person | Who developed the early Neoclassical approach? |
| Welfare economics | Whose+discription | Person | Whose work is the New Welfare Economics approach based of? |
| Welfare economics | What+discription | Definition | What will many economists use as their efficiency goal? |
| Welfare economics | What+discription | Reason | is referred to as Kaldor–Hicks efficiency or the Scitovsky criterion? |
| T92 | Political culture | What+discription | Definition | What is the definition of political culture by the International Encyclopedia of the Social Sciences ? |
| Political culture | When+discription | Time | When did two Americans outlined three pure types of political culture? |
| Political culture | Why+discription | Reason | Why is a political culture rooted equally in public events and private experience? |
| Political culture | Who+discription | Person | Who opposed the concept that the term political culture was brought into political science? |
| Political culture | When+discription | Time | When did two Americans outlined three pure types of political culture? |
| Political culture | How+discription | Number | How many pure types of political culture did Gabriel Almond and Sidney Verba outlined? |
| Political culture | Who+discription | Person | Who wrote that there are different classifications of political culture? |
| Political culture | What+discription | Definition | What does María Eugenia Vázquez Semadeni defines political culture as? |
| T91 | Behavioral science | What+discription | Definition | What does the term behavioral sciences encompasses? |
| Behavioral science | What+discription | Name | What term is the term behavioral sciences often confused with? |
| Behavioral science | What+discription | Manner | What may behavioral sciences abstract do to investigate the decision processes? |
| Behavioral science | How+discription | Number | How many broad categories does behavioural sciences includes? |
| Behavioral science | Where+discription | Location | Where does the information processing of stimuli that information processing sciences deals with from? |
| Behavioral science | What+discription | Definition | What does the subject that applied discipline of behavioural science include? |
| T90 | Educational psychology | What+discription | Definition | What is the branch of educational psychology from? |
| Educational psychology | What+discription | Manner | What does the field of educational psychology relies heavily on quantitative methods include? |
| Educational psychology | What+discription | Location | What does educational psychology both draws from and contributes to? |
| Educational psychology | When+discription | Time | When did they could not follow the regular classroom curriculum? |
| Educational psychology | Who+discription | Person | Who researched individual differences in the field of education? |
| Educational psychology | Who+discription | Person | Who observed the phenomenon of “association”? |
| Educational psychology | When+discription | Time | When did John Locke advanced the hypothesis that people learn primarily from external forces? |
| Educational psychology | How+discription | Number | How many steps are that teachers should use? |
| Educational psychology | How+discription | Number | How many people immigrated to the United States from 1840 to 1920? |
| T89 | Computer science | What+term | Definition | What is the computer science study of? |
| Computer science | Who+discription | Person | Who designed and constructed the first working mechanical calculator? |
| Computer science | When+discription | Time | When did Gottfried Leibniz demonstrate a digital mechanical calculator? |
| Computer science | Who+discription | Person | Who launched the mechanical calculator industry in 1820? |
| Computer science | What+discription | Reason | What gave Charles Babbage the idea of the first programmable mechanical calculator? |
| Computer science | What+discription | Definition | What is considered to be the first computer program? |
| Computer science | When+discription | Time | When did Herman Hollerith invented the tabulator? |
| Computer science | When+discription | Time | When did computer science began to be established as a distinct academic discipline? |
| Computer science | What+discription | Name | What is the short for International Business Machines? |
| T88 | Technical communication | What+discription | Definition | What mean is technical communication belongs to? |
| Technical communication | Where+discription | Location | Where may technical communicators put the information they capture into? |
| Technical communication | What+discription | Definition | What is the the overarching goal of the practice? |
| Technical communication | What+term | Name | What is the abbreviation of Subject-matter experts? |
| Technical communication | What+discription | Manner | What do the technical communication jobs include? |
| Technical communication | When+discription | Time | When did the EATC publish a competence framework for the professional field of technical communication? |
| Technical communication | How+discription | Number | How many broad steps can the technical writing process be divided into? |
| Technical communication | What+term | Name | What is the ABC? |
| Technical communication | Who+discription | Person | Who suggested that four tasks transform the early draft into its final form? |
| Technical communication | Where+discription | Location | Where do many consider the Chicago Manual of Style the bible for general technical communication? |
| T87 | Remote control | What+discription | Definition | What is a remote control mean in electronics? |
| Remote control | What+discription | Manner | What are the features of present-day remote controls? |
| Remote control | When+term | Time | When was the first example of wirelessly controlling? |
| Remote control | Who+term | Person | Who display the first example of wirelessly controlling? |
| Remote control | When+discription | Date | When did Guglielmo Marconi and William Preece'S demonstration took place on? |
| Remote control | Where+discription | Location | Where did Tesla publicly demonstrated by radio-controlling a boat during an electrical exhibition at? |
| Remote control | How+discription | Number | How many functions did commercial remote controls had in 1973? |
| Remote control | How+discription | Money | How much was the product sold through Philips in 1980? |
| Remote control | What+discription | Name | What is the short for the Controller Of Remote Equipment? |
| T86 | Mobile technology | What+discription | Definition | What is the mobile technology used for? |
| Mobile technology | What+discription | Name | What is the abbreviation of the mobile code division multiple access? |
| Mobile technology | What+discription | Name | What is the abbreviation of the Open Systems Interconnection? |
| Mobile technology | What+discription | Manner | What types of mobile OS are available for smartphones? |
| Mobile technology | Why+discription | Reason | Why users will be unable to do huge file transfers? |
| Mobile technology | Where+discription | Location | Where was Omnitouch developed at? |
| T85 | Wireless networking | What+term | Definition | What is the definition of a wireless network? |
| Wireless networking | Where+discription | Location | Where does wireless telecommunications networks'simplement and administration in the OSI? |
| Wireless networking | What+term | Name | What is the short for wireless local area networks? |
| Wireless networking | When+discription | Time | When was the first professional wireless network developed? |
| Wireless networking | How+discription | Distance | How far are terrestrial microwave's relay stations spaced apart? |
| Wireless networking | What+discription | Name | What defines a common flavor of open-standards wireless radio-wave technology known as Wifi? |
| Wireless networking | How+discription | Number | How many major systems is the GSM network divided into? |
| T84 | Computer networks | What+discription | Definition | What can be called a computer network? |
| Computer networks | What+discription | Name | What is the abbreviation of Semi-Automatic Ground Environment? |
| Computer networks | Who+discription | Person | Who developed the "Intergalactic Computer Network"? |
| Computer networks | When+discription | Time | When did Thomas Marill and Lawrence G. Roberts created the first WAN? |
| Computer networks | Why+discription | Reason | Why is Ethernet continued use? |
| Computer networks | How+discription | Number | How many kinds of data do packets consist of? |
| Computer networks | How+discription | Distance | How far are the communications satellites stationed in geosynchronous orbit above the equator? |
| Computer networks | What+discription | Manner | What basic types do bridges come in? |
| T83 | Scientific terminology | What+discription | Definition | What is called scientific terminology? |
| Scientific terminology | What+discription | Location | What fields does recent scientific activity often creates? |
| Scientific terminology | What+discription | Reason | What has resulted in discoveries of new elementary particles and atoms? |
| Scientific terminology | Where+discription | Location | Where can most relevant terminology be found? |
| Scientific terminology | Who+discription | Person | Who used Plasmon Biscuits in his Antarctic Expedition? |
| Scientific terminology | When+discription | Time | When were Plasmon Biscuits used as a popular snack? |
| Scientific terminology | When+discription | Time | When was the peak of the dominance of Latin? |
| Scientific terminology | What+discription | Name | What is the abbreviation of Laser-ASsisted in Situ Keratomileusis? |
| T82 | Mathematical proof | What+discription | Definition | What is a proof in mathematics? |
| Mathematical proof | Where+discription | Location | Where does the word "proof" comes from? |
| Mathematical proof | What+discription | Name | What is primarily the product of ancient Greek mathematics? |
| Mathematical proof | Who+discription | Person | Who said definitions should describe the concept being defined in terms of other concepts already known? |
| Mathematical proof | When+discription | Time | When did Islamic mathematics's further advances took place? |
| Mathematical proof | What+discription | Reason | What is the definition of a formal proof intended to? |
| Mathematical proof | What+discription | Definition | What is a variant of mathematical induction? |
| Mathematical proof | Who+discription | Person | Who proved the existence of transcendental numbers by constructing an explicit example? |
| Mathematical proof | How+discription | Number | How many cases was a proof by exhaustion with about the first proof of the four color theorem? |
| T81 | Synthetic biology | What+discription | Definition | What branch is synthetic biology from? |
| Synthetic biology | Who+discription | Person | Who portrayed synthetic biology as a new emerging scientific field where ICT? |
| Synthetic biology | What+discription | Reason | What is the purpose of synthetic biology? |
| Synthetic biology | When+discription | Time | When did Nathans and Smith won the Nobel Prize in Physiology or Medicine? |
| Synthetic biology | What+discription | Name | What is the short for computer-aided-design? |
| Synthetic biology | What+discription | Money | What is the price of the synthesis of genetic sequences up to 2000 bp long |
| Synthetic biology | When+discription | Time | When did George M. Church encoded one of his books about synthetic biology in DNA? |
| Synthetic biology | How+discription | Number | How many times were able to exchange the bacteria in the culture media? |
| T80 | Biological engineering | What+discription | Definition | What does biological engineering use to study and advance applications of organisms and to create biotechnology? |
| Biological engineering | Who+discription | Person | Who theorized about the idea of a medical use for these biological machines? |
| Biological engineering | When+discription | Time | When did Feynman's essay There's Plenty of Room at the Bottom publish? |
| Biological engineering | Why+discription | Reason | Why is the differentiation between biological engineering and biomedical engineering can be unclear? |
| Biological engineering | Who+discription | Person | Who are specifically focused on applying biological and other sciences toward medical innovations? |
| Biological engineering | Who+discription | Person | Who uses classical design perspectives? |
| Biological engineering | What+discription | Name | What is the ABET? |
| Biological engineering | Where+discription | Location | Where was the first biological engineering program created? |
| Biological engineering | Why+discription | Reason | Why can the term biological engineering be applied more broadly to include agricultural engineering and biotechnology? |
| Biological engineering | What+discription | Name | What is biological engineering also called? |
| T79 | Genetic engineering | What+discription | Name | What is Genetic engineering also called? |
| Genetic engineering | What+discription | Manner | What is new DNA obtained by? |
| Genetic engineering | When+discription | Time | When were the first GMOs bacteria generated? |
| Genetic engineering | Who+discription | Name | Who was the first GMO designed as a pet? |
| Genetic engineering | Where+discription | Location | Where agree that genetic modification is synonymous with genetic engineering? |
| Genetic engineering | Who+discription | Person | Who was the term "genetic engineering” first coined by? |
| Genetic engineering | When+discription | Time | When did Herbert Boyer and Stanley Cohen create the first transgenic organism? |
| Genetic engineering | When+discription | Time | When did Genentech announce the production of genetically engineered human insulin? |
| Genetic engineering | What+discription | Manner | What is another transformation method for plant and animal cells ? |
| Genetic engineering | How+discription | Number | How many families of engineered nucleases are there currently? |
| T78 | Social networks | What+term | Definition | What is a social network? |
| Social networks | Who+discription | Person | Who authored early structural theories in sociology emphasizing the dynamics of triads and "web of group affiliations”? |
| Social networks | When+discription | Time | When is Jacob Moreno credited with developing the first sociograms which studies interpersonal relationships? |
| Social networks | Why+discription | Reason | Why one common criticism of social network theory is that individual agency is often ignored? |
| Social networks | Who+discription | Person | Who gave a non-individualistic explanation of social facts? |
| Social networks | When+discription | Time | When did Jacob L. Moreno began systematic recording and analysis of social interaction in small groups? |
| Social networks | What+discription | Name | What is the abbreviation of triad significance profile? |
| T77 | Economic geography | What+discription | Definition | What is the study of the economic geography? |
| Economic geography | Whose+discription | Person | Whose tradition tend to focus on industrial location and use quantitative methods? |
| Economic geography | When+discription | Time | When have two broad reactions against neoclassical approaches significantly changed the discipline? |
| Economic geography | What+discription | Name | What political economy grows out of the work of David Harvey? |
| Economic geography | Who+discription | Person | Who have also analyzed many traits related to economic geography? |
| Economic geography | What+discription | Name | What does Krugman called his application of spatial thinking to? |
| Economic geography | Whose+discription | Person | Whose article is Exceptionalism in geography? |
| Economic geography | What+discription | Manner | What does spatiotemporal systems of analysis include? |
| Economic geography | How+discription | Number | How many distinct types does the New Economy consists of in Anglo-American literature? |
| Economic geography | What+discription | Name | What is the abbreviation of New Economic Geography 1? |
| T76 | Regional science | What+discription | Definition | What is embraced by regional scientists in the broadest sense? |
| Regional science | When+discription | Time | When was regional science founded? |
| Regional science | What+term | Name | What is the abbreviation of the Regional Science Association International? |
| Regional science | What+discription | Reason | What is a reason for meeting independently? |
| Regional science | Whose+discription | Person | Whose efforts culminated in the creation of a few academic departments and several university-wide programs in regional science? |
| Regional science | Which+discription | Location | Which university started the Regional Science Department in 1956? |
| Regional science | Where+discription | Location | Where local economic areas do not coincide with political boundaries? |
| Regional science | When+discription | Time | When has regional science enjoyed mixed fortunes? |
| Regional science | Whose+discription | Person | Whose Prize Lecture has references both to work in regional science's location theory as well as economic's trade theory? |
| Regional science | When+discription | Time | When did attacks on regional science's practitioners by radical critics began? |
| T75 | Gene expression | What+discription | Definition | What process is the gene expression? |
| Gene expression | How+discription | Number | How many antiparallel and reverse complementary strands does genomic DNA consists of? |
| Gene expression | What+discription | Name | What is the production of the RNA copy of the DNA called? |
| Gene expression | How+discription | Number | How many types of RNA polymerases transcription is performed by in eukaryotes? |
| Gene expression | What+discription | Definition | What is a very important modification of eukaryotic pre-mRNA? |
| Gene expression | Why+discription | Reason | Why splicing extends the complexity of eukaryotic gene expression? |
| Gene expression | Where+discription | Location | Where does most mature RNA must be exported to the cytoplasm from the nucleus? |
| Gene expression | What+discription | Definition | What is known as polycistronic? |
| Gene expression | How+discription | Number | How many parts does every mRNA consists of? |
| T74 | Molecular biology | What+discription | Definition | What does molecular biology concerns? |
| Molecular biology | When+discription | Time | When did William Astbury described molecular biology in Nature? |
| Molecular biology | When+discription | Time | When has the study of gene structure and function, molecular genetics been among the most prominent sub-fields of molecular biology? |
| Molecular biology | What+discription | Manner | What is one of the most basic techniques of molecular biology to study protein function? |
| Molecular biology | How+discription | Number | How many distinctive features does a vector have? |
| Molecular biology | What+discription | Definition | What is called transient transfection? |
| Molecular biology | Where+discription | Location | Where is DNA coding for a protein of interest now? |
| Molecular biology | What+discription | Name | What described by for the hybridisation of blotted DNA after the technique? |
| Molecular biology | Who+discription | Person | Who is the developer of the RNA? |
| Molecular biology | What+discription | Manner | What is a method for probing for the presence of a specific DNA sequence within a DNA sample? |
| T73 | Social science | Which+discription | Definition | Which is considered a "social science”? |
| Social science | When+discription | Time | When did the original 'science of society’ established? |
| Social science | What+discription | Definition | What can be found at Outline of social science? |
| Social science | Why+discription | Reason | Why the term social research has also acquired a degree of autonomy? |
| Social science | When+discription | Time | When did the history of the social sciences begins? |
| Social science | Who+discription | Person | Who used the term "science sociale" to describe the field? |
| Social science | What+discription | Manner | What are being integrated in the study of human action and its implications and consequences? |
| Social science | When+discription | When | When did statistics became a free-standing discipline of applied mathematics? |
| Social science | What+discription | Definition | What is a science of the totality of human existence? |
| Social science | How+discription | Number | How many broad domains did academic disciplines have often been institutionally divided into in the twentieth century? |
| T72 | Music psychology | What+discription | Definition | What may be regarded as a branch of both psychology and musicology? |
| Music psychology | Whose+discription | Person | Whose establishment of the simple string length ratios that formed the consonances of the octave? |
| Music psychology | Where+discription | Location | Where did the focus shifted to that of music education and the training and development of musical skill? |
| Music psychology | When+discription | Time | When has music psychology expanded to cover a wide array of theoretical and applied areas? |
| Music psychology | What+discription | Name | What is the abbreviation of functional magnetic resonance imaging? |
| Music psychology | What+discription | Reason | What leads to impressive sensorimotor interplay? |
| Music psychology | What+discription | Definition | What is defined as the ability to identify the pitch of a musical tone or to produce a musical tone at a given pitch? |
| Music psychology | How+discription | Number | How did researchers estimate the occurrence of AP to be? |
| Music psychology | Who+discription | Person | Who have been shown to have anatomical adaptations that correlate with their training? |
| Music psychology | Who+discription | Person | Who speculated that music may have held an adaptive advantage and functioned as a protolanguage? |
| T71 | Cognitive musicology | What+discription | Definition | What is the goal of cognitive musicology? |
| Cognitive musicology | How+discription | Manner | How can cognitive musicology be differentiated from other branches? |
| Cognitive musicology | Where+discription | Location | Where does brain functioning differs amongst the analysis of different aspects of music? |
| Cognitive musicology | What+discription | Name | What is the rhythm processed and regulated by? |
| Cognitive musicology | Who+discription | Person | Who coined the term "cognitive science"? |
| Cognitive musicology | Who+discription | Person | Who proposed an empirically grounded key-finding algorithm? |
| Cognitive musicology | What+discription | Manner | What programming does Tim Rowe explores "machine musicianship"? |
| Cognitive musicology | What+term | Name | What is the abbreviation of the Generative Theory of Tonal Music? |
| Cognitive musicology | Why+discription | Reason | Why people in favor of the Suzuki music education? |
| T70 | Cognitive linguistics | What+term | NNP | What is the abbreviation of cognitive linguistics? |
| Cognitive linguistics | What+discription | Undefined | What is the definition of cognitive linguistics? |
| Cognitive linguistics | How+discription | Number | How many main areas of study is cognitive linguistics divided into? |
| Cognitive linguistics | What+term | Organization | What is Conceptual organization? |
| Cognitive linguistics | Who+discription | Person | Who were Conceptual semantics pursued by? |
| Cognitive linguistics | Why+discription | Reason | Why does a further complication arises? |
| Cognitive linguistics | What+discription | Definition | What has become an important part of modern stylistics? |
| Cognitive linguistics | Who+discription | Person | Who have argued that most of the evidence from the cognitive view comes from the research in pragmatics and semantics? |
| T69 | Financial technology | What+discription | Name | What is financial technology also known as? |
| Financial technology | What+discription | Organization | What do financial technology companies consist of? |
| Financial technology | What+discription | Undefined | What is the definition of “FinTech"? |
| Financial technology | What+discription | Location | What has Fintech been used to? |
| Financial technology | How+discription | Money | How much is the global investment in financial technology in 2008? |
| Financial technology | How+discription | Number | How many percent of the City of London's workforce is employed in financial and technology services? |
| Financial technology | How+discription | Money | How much was invested in financial technology companies in 2014? |
| Financial technology | Which+discription | Organization | Which is the second highest funded city in the EU in the past 10 years after London? |
| Financial technology | When+discription | Time | When was a financial technology innovation lab launched in Hong Kong? |
| Financial technology | What+discription | Organization | What launched an initiative named Fintech and Information Group to draw in start-ups from around the world? |
| T68 | Information system | What+discription | NNP | What is the abbreviation of an information system? |
| Information system | What+discription | Definition | What is an information system an organized system for ? |
| Information system | What+discription | Undefined | What is the definition of a computer information system? |
| Information system | Who+discription | Person | Who argues for advantages of viewing an information system as a special type of work system? |
| Information system | Who+discription | Person | Who provided another system view of information system? |
| Information system | How+discription | Number | How many components that must come together in order to produce an information system? |
| Information system | What+discription | Definition | What is the bridge between hardware and people? |
| Information system | Who+discription | Person | Who is the executive that is in charge of the IS function? |
| Information system | Who+discription | Person | Who proposed a framework for researching different aspects of Information Technology? |
| Information system | How+discription | Number | How many years has Information Systems as a discipline been evolving for? |
| T67 | Business intelligence | What+discription | NNP | What is the short for Business Intelligence? |
| Business intelligence | What+discription | Definition | What can Business intelligence be used by enterprises to? |
| Business intelligence | When+discription | Time | When is the earliest known use of the term "Business Intelligence”? |
| Business intelligence | Who+discription | Person | Who used the term to describe how the banker? |
| Business intelligence | Where+discription | Location | Where did he maintained a complete and perfect train of business intelligence? |
| Business intelligence | Who+discription | Name | Who used the term business intelligence in a 1958 article? |
| Business intelligence | When+discription | Time | When did Howard Dresner proposed "business intelligence”? |
| Business intelligence | What+term | NNP | What is Data discovery in BI? |
| Business intelligence | How+discription | Number | How many ways does Forrester Research defines business intelligence in? |
| Business intelligence | Why+discription | Reason | Why another critical thing that must be assessed before the project begins is whether or not there is a business need? |
| T66 | Information technology | What+discription | NNP | What is the abbreviation of Information technology? |
| Information technology | Who+discription | Person | Who proposed an ICT hierarchy where each hierarchy level? |
| Information technology | What+discription | Undefined | What is the definition of the computer hardware? |
| Information technology | How+discription | Number | How many categories are their definition consists of? |
| Information technology | When+discription | Time | When was the first mechanical calculator capable of performing the four basic arithmetical operations developed? |
| Information technology | What+term | Name | What was the world's first programmable computer? |
| Information technology | When+discription | Date | When did SSEM ran its first program on? |
| Information technology | How+discription | Number | How many valves did the first commercially available stored-program computer contained? |
| Information technology | Where+discription | Location | Where did the first transistorised computer developed? |
| Information technology | When+discription | Time | When did IBM introduced the first hard disk drive? |
| T65 | Computational neuroscience | What+term | Undefined | What is the definition of Computational neuroscience? |
| Computational neuroscience | Who+discription | Person | Who introduced the term "computational neuroscience”? |
| Computational neuroscience | When+discription | Time | When did Lapicque introduced the integrate and fire model of the neuron in a seminal article published? |
| Computational neuroscience | Who+discription | Person | Who developed the voltage clamp and created the first biophysical model of the action potential? |
| Computational neuroscience | How+discription | Number | How many voltage-sensitive currents did Hodgkin and Huxley's original model only employed? |
| Computational neuroscience | How+discription | Definition | How do synapses form? |
| Computational neuroscience | Which+discription | Definition | Which gives rise to the population model of neural networks? |
| Computational neuroscience | What+discription | Name | What is the abbreviation of the Computational Representational Understanding of Mind? |
| Computational neuroscience | Who+discription | Person | Who is the professor of computer science and artificial intelligence at the English University of Sussex? |
| T64 | Logic programming | What+discription | Definition | What is Logic programming largely based on? |
| Logic programming | What+discription | Definition | What are called definite clauses or Horn clauses? |
| Logic programming | What+term | Undefined | [What is a non-monotonic logic?](https://en.wikipedia.org/wiki/Non-monotonic_logic) |
| Logic programming | Where+discription | Location | Where does logic programs also have a procedural interpretation as goal-reduction procedures? |
| Logic programming | Who+discription | Person | Who can also use the known problem-solving behaviour of the execution mechanism to improve the efficiency of programs? |
| Logic programming | Who+discription | Name | Who was the first proposal to use the clausal form of logic for representing computer programs? |
| Logic programming | Where+discription | Location | Where were advocates of declarative representations notably working at? |
| Logic programming | Why+discription | Reason | Why Planner used a backtracking control structure? |
| Logic programming | When+discription | Time | When was the Association for Logic Programming founded to promote Logic Programming? |
| Logic programming | What+discription | Name | What is the root of the tree? |
| T63 | Speech recognition | What+discription | NNP | What is the abbreviation of Speech recognition? |
| Speech recognition | What+discription | Name | What is Speech recognition also known as? |
| Speech recognition | What+discription | Definition | What are called "speaker independent"systems? |
| Speech recognition | What+term | Undefined | What is voice recognition? |
| Speech recognition | When+discription | Time | When did three Bell Labs researchers built a system for single-speaker digit recognition? |
| Speech recognition | How+discription | Number | How many words was the 1950s era technology limited to single-speaker systems with vocabularies of? |
| Speech recognition | Who+discription | Person | Who developed the source-filter model of speech production? |
| Speech recognition | Whose+discription | Name | Whose system was designed to issue spoken commands for the game of chess? |
| Speech recognition | Which+discription | Manner | Which algorithm processed the speech signal by dividing it into short frames? |
| Speech recognition | Where+discription | Location | Where did Leonard Baum developed the mathematics of Markov chains? |
| T62 | Ensemble learning | What+term | Undefined | What is Ensemble learning? |
| Ensemble learning | What+discription | Definition | What are most commonly described as performing the task of searching through a hypothesis space? |
| Ensemble learning | Why+discription | Reason | Why ensembles may be thought of as a way to compensate for poor learning algorithms by performing a lot of extra computation? |
| Ensemble learning | Why+discription | Reason | Why an ensemble is itself a supervised learning algorithm? |
| Ensemble learning | What+discription | Manner | What has been shown to be more effective than using techniques? |
| Ensemble learning | What+discription | Definition | What is called "the law of diminishing returns in ensemble construction”? |
| Ensemble learning | What+discription | NNP | What does Bootstrap aggregating often abbreviated as? |
| Ensemble learning | What+discription | Name | What is the most common implementation of Boosting ? |
| Ensemble learning | What+discription | Name | What is an algorithmic correction to Bayesian model averaging (BMA)? |
| T61 | Bayesian networks | What+term | Undefined | What is a Bayesian network? |
| Bayesian networks | What+discription | Definition | What represent conditional dependencies? |
| Bayesian networks | What+discription | NNP | What are called dynamic Bayesian networks? |
| Bayesian networks | What+discription | Definition | What is one advantage of Bayesian networks ? |
| Bayesian networks | How+discription | Number | How many main inference tasks are there for Bayesian networks? |
| Bayesian networks | Why+discription | Reason | Why a Bayesian network can be used to answer probabilistic queries about them? |
| Bayesian networks | What+discription | Manner | What are the most common exact inference methods? |
| Bayesian networks | Who+discription | Person | Who is the basic idea goes back to a recovery algorithm developed by? |
| Bayesian networks | When+discription | Time | When was the term "Bayesian networks" coined by Judea Pearl? |
| T60 | Control theory | What+discription | Definition | What interdisciplinary branch is Control theory of? |
| Control theory | Which+discription | Name | Which monitors the output and compares it with the reference? |
| Control theory | What+term | Undefined | What is the transfer function? |
| Control theory | How+discription | Number | How many types of control loops are there? |
| Control theory | Where+discription | Location | Where is the control action from the controller independent of the "process output" ? |
| Control theory | Why+discription | Reason | Why closed loop controllers are also called feedback controllers? |
| Control theory | What+discription | NNP | What is the abbreviation of a single-input-single-output? |
| Control theory | How+discription | Number | How many branches can the field of control theory be divided into? |
| Control theory | What+discription | Definition | What is called linear time invariant (LTI) systems? |
| Control theory | How+discription | Number | How many different categories do Mathematical techniques for analyzing and designing control systems fall into? |
| T59 | Computational science | What+discription | NNP | What is computational science? |
| Computational science | Who+discription | Person | Who defined the linked open science? |
| Computational science | What+discription | Location | What is the application of computational science? |
| Computational science | Why+discription | Reason | Why do most scientific journals do not accept software papers? |
| Computational science | When+discription | Time | When was Open research compution announced? |
| Computational science | What+discription | Manner | What is scientific computation most ofen studied by? |
| Computational science | When+discription | Time | When was the Journal of Open Research Software launched? |
| T58 | Mathematical physics | What+discription | Definition | What does mathematical physics refer to? |
| Mathematical physics | Who+discription | Person | Who developed new mathematics? |
| Mathematical physics | How+discription | Manner | How did Rene Descartes develop a complete system of heliocentric cosmology? |
| Mathematical physics | Who+discription | Person | Who has contributed to fluid dynamics? |
| Mathematical physics | When+discription | Time | When was the wave theory of light published? |
| Mathematical physics | Who+discription | Person | Who proposed heliocentrism? |
| Mathematical physics | What+term | Undefined | What is the definition of Mathematical physics? |
| Mathematical physics | What+discription | Name | What are perhaps most closely associated with mathematical physics? |
| T57 | Numerical analysis | What+term | NNP | What is Numerical analysis? |
| Numerical analysis | Who+discription | Person | Who is one of the earliest mathematical writings a Babylonian tablet from? |
| Numerical analysis | What+discription | Location | What are the applications of numerical analysis? |
| Numerical analysis | When+discription | Time | When the life sciences and even the arts have adopted elements of scientific computations? |
| Numerical analysis | What+discription | Manner | What is the popular way determine the unknown function? |
| Numerical analysis | What+discription | Location | What problems can Interpolation solve? |
| Numerical analysis | Where+discription | Location | Where can spreadsheet software be used? |
| Numerical analysis | How+discription | Manner | How was algorithms implemented in the late twentieth centry? |
| T56 | Computational statistics | What+discription | NNP | What is the definition of Computational statistics? |
| Computational statistics | What+discription | Definition | What is the interface between statistics and computer science? |
| Computational statistics | What+discription | Reason | What leads to calls that a broader concept of computing should be taught as part of general statistical education? |
| Computational statistics | Who+discription | Person | Who defines ‘statistical computing' as "the application of computer science to statistics”? |
| Computational statistics | What+discription | Name | What may also be used to refer to computationally intensive statistical methods? |
| Computational statistics | What+discription | Manner | What computationally intensive statistical methods may the term 'Computational statistics' also be used to? |
| T55 | Library science | What+term | NNP | What is Library science? |
| Library science | Who+discription | Person | Who coined the discipline within his work ? |
| Library science | When+discription | Time | When was the first American school for library science founded? |
| Library science | What+discription | Undefined | What is the definition of librarianship? |
| Library science | What+discription | Name | What is the abbreviation of the term library and information science? |
| Library science | When+discription | Time | When did Martin Schrettinger wrote the second textbook? |
| Library science | Who+discription | Person | Who devised a classification system inspired by the Baconian method? |
| Library science | What+discription | Title | What was the term used in the title of S. R. Ranganathan’s? |
| Library science | What+discription | Title | What is the title of Lee Pierce Butler's 1933 book? |
| Library science | What+discription | Title | What was the first textbook on library science published in English anywhere in the world? |
| T54 | Information retrieval | What+term | Definition | What is Information retrieval? |
| information retrieval | What+discription | Location | What are the most visible IR applications? |
| Information retrieval | When+discription | Time | When was the TREC held? |
| Information retrieval | What+term | Definition | What is the abbreviation for Information retrieval? |
| Information retrieval | Who+discription | Person | Who founded the first large information retrieval research group? |
| Information retrieval | What+discription | Manner | What are the models categorized according to? |
| Information retrieval | What+term | Definition | What is an object? |
| T53 | Information science | What+term | Definition | What is Information science? |
| Information science | Why+discription | Reason | Why are there different roles in information technology and computer science? |
| Information science | When+discription | Time | When was the American Philosophy Society founded? |
| Information science | What+term | Definition | What is the abbreviation of Philosophy of information? |
| Information science | Who+discription | Person | Who established the Library Company of Philadelphia? |
| Information science | What+discription | Manner | What are the objectives of the information access research? |
| Information science | What+term | Definition | What is information society? |
| T52 | Cluster analysis | What+term | Definition | What is the Cluster analysis? |
| Cluster analysis | When+discription | Time | When did cluster anaylsis originate? |
| Cluster analysis | What+discription | Manner | How to implement clustering algorithm? |
| Cluster analysis | Why+discription | Reason | Why are there so many clustering algorithm? |
| Cluster analysis | Who+discription | Person | Who introduced to psychology to cluster analysis? |
| Cluster analysis | What+discription | Manner | What categorize can clustering algorithm be based on? |
| Cluster analysis | Where+discription | Location | Where fields does Cluster analysis use in? |
| T51 | Multi-agent system | What+term | Definition | What is the Multi-agent system? |
| Multi-agent system | What+term | Definition | What is the study of Multi-agent system? |
| Multi-agent system | What+term | Definition | What is the abbreviation for a proxy-based model? |
| Multi-agent system | Where+discription | Location | Where Multi-agent system is applied in the real world? |
| Multi-agent system | How+discription | Manner | How is the M.A system implemented in computer simulations? |
| Multi-agent system | What+discription | Manner | What does the MAS component usually use to communicate? |
| T50 | Neural network software | What+discription | Definition | What is Neural network software used to? |
| Neural network software | What+discription | Undefined | What is the definition of artificial intelligence? |
| Neural network software | What+discription | Manner | What is commonly used artificial neural network simulators? |
| Neural network software | When+discription | Time | When were the Parallel Distributed Processing volumes released? |
| Neural network software | Which+discription | Reason | Which led to its adoption by a wide variety of researchers in diverse fields? |
| Neural network software | When+discription | Time | When was the tLearn software released to accompany a book? |
| Neural network software | Why+discription | Reason | Why a common language is necessary? |
| Neural network software | What+discription | NNP | What is the abbreviation of the Predictive Model Markup Language? |
| T49 | Artificial neural network | What+discription | Name | What is the abbreviation of Artificial neural networks? |
| Artificial neural network | What+discription | Definition | What is an ANN based on? |
| Artificial neural network | Who+discription | Person | Who created a learning hypothesis based on the mechanism of neural plasticity? |
| Artificial neural network | Who+discription | Person | Who created the perceptron? |
| Artificial neural network | When+discription | Time | When did Artificial intelligence shifted from high-level to low-level? |
| Artificial neural network | When+discription | Time | When did parallel distributed processing became popular under the name connectionism? |
| Artificial neural network | Who+discription | Person | Who described the use of connectionism to simulate neural processes? |
| Artificial neural network | How+discription | Number | How many types of parameters is an ANN typically defined by? |
| Artificial neural network | What+discription | NNP | What is the term 'artificial neural network' refers to? |
| Artificial neural network | When+discription | Time | When did Dreyfus published a simpler derivation based only on the chain rule? |
| T48 | Natural language processing | What+discription | Name | What is the abbreviation of Natural language processing? |
| Natural language processing | When+discription | Time | When did the history of NLP generally started? |
| Natural language processing | What+discription | Title | What is Alan Turing published an article titled? |
| Natural language processing | How+discription | Number | How many Russian sentences the Georgetown experiment involved fully automatic translation of into English? |
| Natural language processing | What+discription | Name | What were some notably successful NLP systems developed in the 1960s? |
| Natural language processing | What+discription | Undefined | What is statistical revolution? |
| Natural language processing | What+discription | Definition | What is the goal of terminology extraction? |
| Natural language processing | What+discription | Name | What is the computational meaning of individual words in context? |
| Natural language processing | Where+discription | Location | Where capitalizes all nouns? |
| T47 | Scientific theory | What+term | NNP | What is a scientific theory? |
| Scientific theory | What+discription | Definition | What is the definition of a "scientific theory”? |
| Scientific theory | What+discription | Name | What is related to the diversity of phenomena? |
| Scientific theory | Why+discription | Reason | Why a scientific theory may be rejected or modified? |
| Scientific theory | Who+discription | Person | Who use theories as a foundation to gain further scientific knowledge? |
| Scientific theory | Who+discription | Person | Who said“…facts and theories are different things, not rungs in a hierarchy of increasing certainty”? |
| Scientific theory | How+discription | Number | How many types of scientific theories did Albert Einstein described? |
| Scientific theory | What+term | NNP | What is the term “theory"? |
| Scientific theory | When+discription | Time | When was it known that the observed perihelion precession of Mercury violated Newtonian mechanics? |
| Scientific theory | What+discription | Definition | What is an approximation of quantum mechanics? |
| T46 | Inductive reasoning | What+discription | NNP | What is Inductive reasoning? |
| Inductive reasoning | What+discription | Definition | What does many dictionaries define inductive reasoning as? |
| Inductive reasoning | What+discription | Name | What has inductive reasoning been criticized by thinkers as? |
| Inductive reasoning | Who+discription | Person | Who propose the classic philosophical treatment of the problem of induction? |
| Inductive reasoning | Who+discription | Person | Who stated that even if induction were proved unreliable? |
| Inductive reasoning | Why+discription | Reason | Why inductive reasoning is also known as hypothesis construction? |
| T45 | Scientific modeling | What+discription | Definition | What is the aim of Scientific modelling? |
| Scientific modeling | What+discription | Definition | What is fundamental to the scientific enterprise? |
| Scientific modeling | What+discription | NNP | What is a simulation? |
| Scientific modeling | What+discription | Undefined | What is the definition of a steady state simulation ? |
| Scientific modeling | How+discription | Number | How many types of system models are there? |
| Scientific modeling | Why+discription | Reason | Why older theories are succeeded by new ones? |
| Scientific modeling | What+discription | Manner | What is one way to modify the model? |
| Scientific modeling | What+discription | Definition | What does space mapping refers to? |
| Scientific modeling | Which+discription | Name | Which is generally referred to as “M&S"? |
| T44 | Cognitive model | What+discription | NNP | What is a cognitive model? |
| Cognitive model | How+discription | Definition | How can cognitive models be developed? |
| Cognitive model | What+discription | Undefined | What is the definition of cognitive architectures? |
| Cognitive model | What+discription | Name | What do some of the most popular architectures for cognitive modeling include? |
| Cognitive model | Where+discription | Location | Where does the input signal usually assumed to come from? |
| Cognitive model | What+discription | Definition | What are referred to as input processes? |
| Cognitive model | Why+discription | Reason | Why require a share of the attentional resources dedicated to the speech task? |
| Cognitive model | What+discription | Definition | What is missing from this traditional view? |
| Cognitive model | How+discription | Number | How many neurons modeling systems of which can be in either an on or off state? |
| Cognitive model | Who+discription | Person | Who proposed that language and cognition should be treated as a dynamical system rather than a digital symbol processor? |
| T43 | Cognitive science | What+term | NNP | What is cognitive science? |
| Cognitive science | Who+discription | Person | Who study intelligence and behavior? |
| Cognitive science | What+discription | Definition | What is the fundamental concept of cognitive science? |
| Cognitive science | When+discription | Time | When did the cognitive sciences began as an intellectual movement? |
| Cognitive science | Why+discription | Reason | Why an understanding of how these two levels relate to each other is imperative? |
| Cognitive science | Who+discription | Person | Who gave a famous description of three levels of analysis? |
| Cognitive science | What+term | Undefined | What is the term “cognitive"? |
| Cognitive science | What+discription | NNP | What is the abbreviation of Artificial intelligence? |
| Cognitive science | How+discription | Undefined | How are humans able to understand novel sentences? |
| Cognitive science | Why+discription | Reason | Why linguists must resort to indirect methods to determine what those rules might be? |
| T42 | Artificial intelligence | What+discription | NNP | What is the abbreviation of Artificial intelligence? |
| Artificial intelligence | What+discription | Definition | What does the field of AI research defines itself as? |
| Artificial intelligence | When+term | Time | When is the ALPAC report? |
| Artificial intelligence | When+discription | Time | When is the collapse of the Lisp machine market? |
| Artificial intelligence | Who+discription | Person | Who extended the concept of the calculating machine? |
| Artificial intelligence | What+discription | Reason | What led directly to Alan Turing's theory of computation? |
| Artificial intelligence | What+term | Undefined | What is artificial neurons? |
| Artificial intelligence | When+discription | Time | When was research in the U.S. heavily funded by the Department of Defense? |
| Artificial intelligence | Who+discription | Person | Who agreed that “within a generation ... the problem of creating 'artificial intelligence' will substantially be solved”? |
| Artificial intelligence | How+discription | Price | How much the market for AI had reached by 1985? |
| T41 | Knowledge representation | What+discription | NNP | What is Knowledge representation and reasoning (KR) the field of? |
| Knowledge representation | Who+discription | Person | Who is the General Problem Solver (GPS) system developed by? |
| Knowledge representation | What+discription | Name | What was one of the most powerful and well known? |
| Knowledge representation | What+term | Undefined | What is the classifier? |
| Knowledge representation | Why+discription | Reason | Why is it essential to represent this kind of knowledge? |
| Knowledge representation | When+discription | Time | When was the starting point for knowledge representation? |
| Knowledge representation | What+discription | Organization | What is recent projects funded primarily by which have integrated frame languages and classifiers with markup languages based on XML? |
| Knowledge representation | What+discription | NNP | What is the abbreviation of the Resource Description Framework? |
| Knowledge representation | Why+discription | Reason | Why knowledge representation goes hand in hand with automated reasoning ? |
| Knowledge representation | How+discription | Number | How many drawbacks does FOL has as a knowledge representation formalism? |
| T40 | Knowledge engineering | What+discription | Definition | What does Knowledge engineering refers to? |
| Knowledge engineering | What+discription | NNP | What is the abbreviation of Knowledge engineering? |
| Knowledge engineering | What+discription | Name | What is the name of one of the first examples of an expert system? |
| Knowledge engineering | Where+discription | Location | Where were expert systems first developed in? |
| Knowledge engineering | When+discription | Time | When was the technology adopted by the US business community? |
| Knowledge engineering | Who+discription | Person | Who was one of the leaders in defining and developing the first expert systems? |
| Knowledge engineering | How+discription | Number | How many approaches that were attempted were there essentially? |
| Knowledge engineering | What+discription | Organization | What were many of the early expert systems developed by? |
| Knowledge engineering | What+discription | Definition | What was the final issue with using conventional methods to develop expert systems? |
| Knowledge engineering | What+term | Undefined | What is knowledge acquisition? |
| T39 | Cognitive architecture | What+discription | Definition | What can a cognitive architecture refer to? |
| Cognitive architecture | Why+discription | Reason | Why the results need to be in a formalized form? |
| Cognitive architecture | What+discription | Manner | What does successful cognitive architectures include? |
| Cognitive architecture | What+discription | Definition | What does the Institute of Creative Technologies defines cognitive architecture as? |
| Cognitive architecture | Who+discription | Person | Who is one of the founders of the field of artificial intelligence? |
| Cognitive architecture | When+discription | Time | When did EPAM provided a possible "architecture for cognition”? |
| Cognitive architecture | Who+discription | Person | Who started research on human memory in the early 1970s? |
| Cognitive architecture | What+discription | Undefined | What is called ACT? |
| Cognitive architecture | What+discription | Title | What does John R. Anderson published the seminal work in this area in 1983 entitled? |
| Cognitive architecture | Why+discription | Reason | Why a cognitive architecture can also refer to a blueprint for intelligent agents? |
| T38 | Artificial immune systems | What+discription | Definition | What are artificial immune systems in artificial intelligence? |
| Artificial immune systems | What+discription | Name | What is the short for artificial intelligence? |
| Artificial immune systems | What+discription | Undefined | What is the definition of Artificial Immune Systems? |
| Artificial immune systems | Why+discription | Reason | Why is AIS distinct from computational immunology and theoretical biology? |
| Artificial immune systems | When+discription | Time | When did AIS emerged? |
| Artificial immune systems | When+discription | Time | When did AIS became a field in its own right? |
| Artificial immune systems | Who+discription | Person | Who published their first papers on AIS in 1994? |
| Artificial immune systems | When+discription | Time | When did Dasgupta and Nino published a textbook on Immunological Computation? |
| T37 | DNA repair | What+term | Definition | What is DNA repair? |
| DNA repair | What+discription | Reason | What can cause DNA damage? |
| DNA repair | How+discription | Number | How many individual molecular lesions per cell per day? |
| DNA repair | What+discription | Undefined | What is the definition of DNA molecule? |
| DNA repair | Why+discription | Reason | Why the DNA repair process is constantly active as it responds to damage in the DNA structure? |
| DNA repair | When+discription | Time | When may irreparable DNA damage occur? |
| DNA repair | What+discription | Name | What is known as apoptosis or programmed cell death? |
| DNA repair | What+discription | Definition | What is vital to the integrity of its genome and thus to the normal functionality of that organism? |
| DNA repair | How+discription | Number | How many main types can DNA damage be subdivided into? |
| DNA repair | Where+discription | Location | Where is DNA in human cells and eukaryotic cells in general? |
| T36 | Big data | What+discription | NNP | What is Big data a term for? |
| Big data | Why+discription | Reason | Why data sets grow rapidly ? |
| Big data | How+discription | Number | How many data are generated as of 2012? |
| Big data | Who+discription | Organization | Who defined data growth challenges and opportunities as being three-dimensional? |
| Big data | When+discription | Time | When did commercial vendors historically offered parallel database management systems for big data beginning? |
| Big data | Who+discription | Organization | Who marketed the parallel processing DBC 1012 system in 1984? |
| Big data | How+discription | Number | How much were hard disk drives in 1991? |
| Big data | Why+discription | Reason | Why the definition of big data continuously evolves according to Kyders Law? |
| Big data | When+discription | Time | When did Teradata installed the first petabyte class RDBMS based system? |
| Big data | What+discription | Name | What is the abbreviation of massively parallel-processing? |
| T35 | Open data | What+discription | NNP | What idea is open data? |
| Open data | What+discription | Definition | What is the goals of the open data movement |
| Open data | Why+discription | Reason | Why problems often arise? |
| Open data | Who+discription | Person | Who often do not consider the need to state the conditions of ownership, licensing and re-use? |
| Open data | What+discription | Name | What is the short for the issue of indigenous knowledge? |
| Open data | Who+discription | Person | Who displayed these two quotations regarding open data at his presentation at the XML 2005 conference? |
| Open data | Who+discription | Organization | Who established several World Data Centers to minimize the risk of data loss and to maximize data accessibility? |
| Open data | Why+discription | Reason | Why ubiquitous networking has significantly changed the context of Open science data? |
| Open data | When+discription | Time | When did the Open Government Partnership launched the International Open Data Charter? |
| Open data | What+term | Undefined | What is factual data? |
| T34 | Cloud | What+term | NNP | What is a cloud in meteorology? |
| Cloud | How+discription | Number | How many systems of naming clouds in their respective layers of the atmosphere? |
| Cloud | When+discription | Time | When it became the basis of a modern international system that classifies clouds into five physical forms and three altitude levels? |
| Cloud | Why+discription | Reason | Why they are often composed of other substances such as methane, ammonia, and sulfuric acid as well as water? |
| Cloud | Where+discription | Location | Where can the origin of the term cloud be found in? |
| Cloud | When+discription | Time | When did the Greek philosopher Aristotle wrote Meteorologica? |
| Cloud | How+discription | Number | How many categories of clouds did Lamarck’s system of nomenclature included? |
| Cloud | Who+discription | Person | Who composed four poems about clouds, dedicating them to Howard? |
| Cloud | Who+discription | Organization | Who was an elaboration of Howard's system eventually formally adopted by in 1891? |
| Cloud | What+discription | Definition | What is tropospheric classification based on? |
| T33 | Knowledge base | What+term | Definition | What is a knowledge base ? |
| Knowledge base | What+discription | NNP | What is the definition of a knowledge base? |
| Knowledge base | Which+discription | Name | Which were the first knowledge-based systems? |
| Knowledge base | What+discription | Definition | What was to describe one of the two sub-systems of a knowledge-based system? |
| Knowledge base | What+term | Undefined | What is the term “knowledge-base"? |
| Knowledge base | When+discription | Time | When did all large Management Information Systems stored their data in some type of hierarchical or relational database? |
| Knowledge base | What+discription | Definition | What are the so-called ACID properties? |
| Knowledge base | What+discription | Name | What was the next evolution for the term knowledge-base? |
| T32 | Machine | What+term | Definition | What is a machine? |
| Machine | What+discription | Reason | What has led to the development of power tools without moving parts that are considered machines? |
| Machine | What+discription | Undefined | What is meaning of "fabric, structure”? |
| Machine | When+discription | Time | When is the meaning adopted from the French into English? |
| Machine | What+discription | Name | What is a simple machine that transforms lateral force and movement of the tool into a transverse splitting force and movement of the workpiece? |
| Machine | Who+discription | Person | Who studied the Archimedean simple machines? |
| Machine | How+discription | Number | How many mechanisms does Heron of Alexandria in his work Mechanics lists? |
| Machine | Who+discription | Person | Who was the first to understand that simple machines do not create energy? |
| Machine | What+discription | Definition | What does the word mechanical refers to? |
| Machine | What+discription | Reason | What led Archimedes to define the lever, pulley and screw as simple machines? |
| T31 | Decision tree | What+term | NNP | What is a decision tree? |
| Decision tree | Where+discription | Location | Where are decision trees commonly used? |
| Decision tree | What+term | Undefined | What is a “test"? |
| Decision tree | How+discription | Number | How many types of nodes does a decision tree consists of? |
| Decision tree | Which+discription | Name | Which is typically represented by triangles? |
| Decision tree | What+discription | Manner | What algorithms to generate such optimal trees have been devised? |
| T30 | Data mining | What+term | NNP | What is Data mining? |
| Data mining | What+discription | Definition | What is the overall goal of the data mining process? |
| Data mining | What+discription | Name | What is the short for "knowledge discovery in databases" ? |
| Data mining | Why+discription | Reason | Why the term is a misnomer? |
| Data mining | When+discription | Time | When did the term data mining appeared in the database community? |
| Data mining | Who+discription | Organization | Who sponsor the First International Conference on Data Mining and Knowledge Discovery (KDD-95) that was started in Montreal? |
| Data mining | Who+discription | Person | Who launched the journal by Kluwer called Data Mining and Knowledge Discovery as its founding editor-in-chief? |
| Data mining | What+discription | Title | What is the primary research journal of the field? |
| Data mining | What+discription | Manner | What are early methods of identifying patterns in data? |
| Data mining | How+discription | Number | How many times as many people reported using CRISP-DM? |
| T29 | Fuzzy logic | What+discription | NNP | What form is Fuzzy logic of? |
| Fuzzy logic | What+discription | Number | What values may the truth values of variables only be the integer in Boolean logic? |
| Fuzzy logic | Who+discription | Person | Who was the term fuzzy logic introduced with the 1965 proposal of fuzzy set theory? |
| Fuzzy logic | What+discription | Undefined | What are the concepts of "empty" and “full"? |
| Fuzzy logic | Why+discription | Reason | Why this temperature may be interpreted as "not hot”? |
| Fuzzy logic | Where+discription | Location | Where were many of the early successful applications of fuzzy logic implemented? |
| Fuzzy logic | Who+discription | Person | Who argues that fuzzy logic is different in character from probability? |
| Fuzzy logic | How+discription | Number | How many continuous operators does Compensatory Fuzzy Logic consists of? |
| T28 | Principles | What+term | Definition | What is a concept? |
| Principles | What+discription | Name | What is a substantive and collective term referring to rule governance? |
| Principles | What+discription | Definition | What is the one that produces the necessary effect? |
| Principles | Why+discription | Reason | Why the principle of cause is considered to be a determining factor in the production of facts? |
| Principles | Whose+discription | Person | Whose theory states that: "Everything that moves is moved by another”? |
| Principles | What+discription | Name | What relates buoyancy to the weight of displaced water? |
| Principles | What+term | Undefined | What is "the being is the being”? |
| Principles | What+discription | Definition | What is a principle of the traditional logic formulated canonically by Leibniz? |
| T27 | Motivation | What+discription | Definition | What theoretical construct is motivation used to explain? |
| Motivation | Who+discription | Person | Who said that "Motivation is a word that is part of the popular culture as few other psychological concepts are”? |
| Motivation | How+discription | Number | How many parts is motivation as a desire to perform an action usually defined? |
| Motivation | Why+discription | Reason | Why dopamine is further implicated in motivation? |
| Motivation | Which+discription | Name | Which field is particularly concerned with the limits of rationality in economic agents? |
| Motivation | How+discription | Number | How many different theories can motivation be divided into? |
| Motivation | When+discription | Time | When has intrinsic motivation been studied? |
| Motivation | Where+discription | Location | Where was the phenomenon of intrinsic motivation first acknowledged? |
| Motivation | What+discription | Definition | What is an example of intrinsic motivation in the domain of art? |
| Motivation | Why+discription | Reason | Why a variety of approaches may be needed to motivate different students? |
| T26 | Egalitarianism | What+term | Definition | What is Egalitarianism? |
| Egalitarianism | What+discription | Name | What provides democratic societies with the means to carry out civic reform? |
| Egalitarianism | What+discription | Title | What is as the rest of the Constitution? |
| Egalitarianism | Which+discription | Title | Which provides that "men and women shall be equal in their rights and duties” |
| Egalitarianism | Who+discription | Person | Who is sometimes considered the founder of this form? |
| Egalitarianism | Who+discription | Person | Who refused to sign the Declaration of Independence? |
| Egalitarianism | What+term | Undefined | What is antiegalitarianism? |
| Egalitarianism | Who+discription | Person | Who has put forth a new perspective of equality and its relationship to socialism? |
| Egalitarianism | Why+discription | Reason | Why many criticize egalitarianism? |
| T25 | Folksonomy | What+discription | Name | What system is a folksonomy? |
| Folksonomy | When+discription | Time | When does a folksonomy emerges? |
| Folksonomy | What+discription | Definition | What does the term “tagging” refers to ? |
| Folksonomy | How+discription | Number | How many basic entities does folksonomies consist of? |
| Folksonomy | Who+discription | Person | Who identifies two types of folksonomy? |
| Folksonomy | When+discription | Time | When does a broad folksonomy arises? |
| Folksonomy | What+discription | Definition | What is an oft-cited example of a narrow folksonomy? |
| Folksonomy | What+discription | Manner | What does 'Taxonomy' refers to? |
| Folksonomy | Why+discription | Reason | Why supporters of folksonomies claim that they are often preferable to taxonomies? |
| Folksonomy | What+discription | NNP | What is termed folksontology? |
| T24 | Biostatistics | What+term | NNP | What is Biostatistics? |
| Biostatistics | Which+discription | Definition | Which is exclusively concerned with medicine and health? |
| Biostatistics | What+discription | Undefined | What is called Biostatistical modeling? |
| Biostatistics | When+discription | Time | When did statisticians and models built on statistical reasoning had helped to resolve these differences? |
| Biostatistics | Who+discription | Person | Who developed F-statistics and methods of computing them? |
| Biostatistics | Which+discription | Title | Which book reestablished natural selection as the premier mechanism of evolution? |
| Biostatistics | How+discription | Number | How many important changes have been the ability to collect data on a high-throughput scale? |
| Biostatistics | Where+discription | Location | Where does Multicollinearity often occurs? |
| Biostatistics | Why+discription | Reason | Why the information of one predictor might be contained in another one? |
| Biostatistics | How+discription | Number | How much of the predictors are responsible for 90% of the variability of the response? |
| T23 | Bioinformatics | What+discription | Name | What is an interdisciplinary field that develops methods and software tools for understanding biological data? |
| Bioinformatics | What+discription | Undefined | What is called proteomics? |
| Bioinformatics | Who+discription | Person | Who coined it in 1970 to refer to the study of information processes in biotic systems? |
| Bioinformatics | When+discription | Time | When did computers became essential in molecular biology? |
| Bioinformatics | Who+discription | Person | Who has been hailed by David Lipman as the "mother and father of bioinformatics”? |
| Bioinformatics | Who+discription | Person | Who pioneered biological sequence analysis in 1970 with his comprehensive volumes of antibody sequences released with Tai Te Wu between 1980 and 1991? |
| Bioinformatics | Why+discription | Reason | Why the biological data must be combined to form a comprehensive picture of these activities? |
| Bioinformatics | What+discription | Definition | What is the primary goal of bioinformatics? |
| Bioinformatics | What+discription | Name | What is a science field that is similar to but distinct from biological computation? |
| T22 | Biotechnology | What+term | Definition | What is the definition of biotechnology? |
| Biotechnology | Who+discription | Person | Who discovered the mold Penicillium? |
| Biotechnology | What+term | Definition | What is the genetically modified crop? |
| Biotechnology | What+discription | Location | What are the applications of biotechnology in industrial areas? |
| Biotechnology | When+discription | Time | When was the birth of the field of morden biotechnology? |
| Biotechnology | Who+discription | Person | Who first used pure microbiological culture in an industrial process? |
| Biotechnology | When+discription | Time | When was penicillin used to treat human bacterial infections? |
| Biotechnology | What+term | Definition | What is pharmacogenomics? |
| T21 | Psychology | What+term | NNP | What is psychology? |
| Psychology | Who+discription | Person | Who defined the psychology as "the science of mental life"? |
| Psychology | What+discription | Location | What is the application of psychology? |
| Psychology | Who+discription | Person | Who applied principles of calculus to the mind? |
| Psychology | When+discription | Time | When did James write the principles of psychology? |
| Psychology | Who+discription | Person | Who created the psychology course at Cornell University? |
| Psychology | When+discription | Time | When was the first meeting of the International Congress of Psychology took place? |
| Psychology | Whose+discription | Person | Whose philosophical works make chinese people understand psychology? |