



Université Mohammed V
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Cellule de Langues et Terminologie

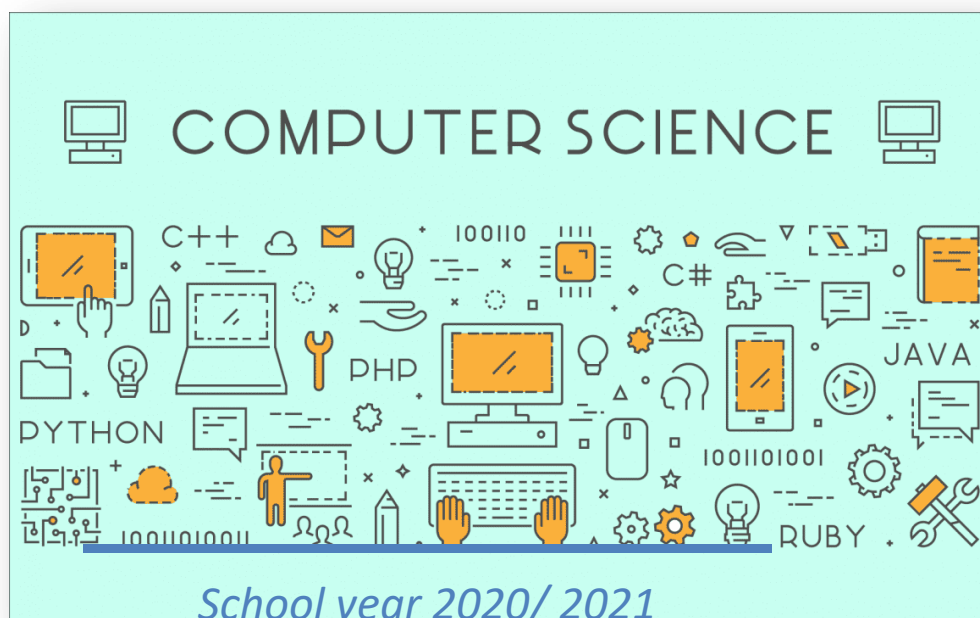


COMPUTER SCIENCE READING COMPREHENSION WORKSHEETS

Master Informatique Appliquée Offshoring

By

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English for University Computer Science Students is a specialized language course designed for students of computer science who are non-native English speakers. The course is intended to provide students with the language skills necessary to effectively communicate in the academic and professional contexts of computer science.

The course curriculum is tailored to the specific needs of computer science students and covers a wide range of topics, including programming languages, algorithms, data structures, software engineering, and computer architecture. Through the course, students will develop the ability to read, write, listen, and speak in English about these topics with confidence and accuracy.

The course is delivered through a combination of lectures, discussions, and interactive activities. Students will engage in various language tasks, such as summarizing technical information, giving presentations, and writing academic papers. Additionally, students will have the opportunity to practice their language skills through group work and individual assignments.

The course will also cover important academic skills, such as critical thinking, research, and referencing, which are essential for success in university-level computer science courses. Students will learn how to effectively search for and evaluate sources, use academic language, and avoid plagiarism.

Overall, English for University Computer Science Students is an intensive language course designed to equip students with the language and academic skills necessary to succeed in their computer science studies and future careers. By the end of the course, students should be able to communicate in English about technical concepts, produce written assignments with clarity and accuracy, and engage in academic discourse with confidence.

THE HISTORY OF COMPUTER SCIENCE

Computer Science is a relatively new field that has rapidly evolved over the past century. It encompasses the study of computers and computational systems, including their design, development, and use.

The first computer-like device was created in 1822 by **Charles Babbage**, an English mathematician and inventor. Babbage's machine, known as the "Difference Engine," was designed to calculate mathematical tables automatically. Although the device was never completed, it laid the foundation for the development of future computing machines.

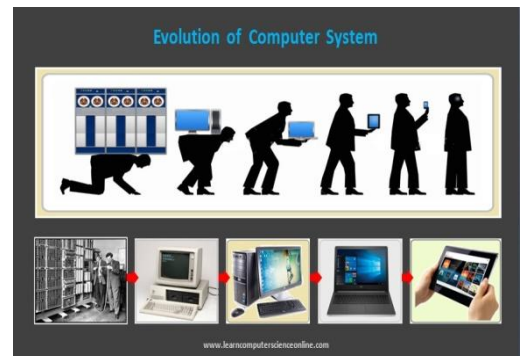
In 1937, **Alan Turing**, a British mathematician, created the concept of a universal machine that could carry out any mathematical computation. This idea was the basis for the development of the first modern computer, the Electronic Numerical Integrator and Computer (ENIAC), which was built in 1946. The ENIAC was massive, occupying an entire room, and it used vacuum tubes to perform calculations.

The field of Computer Science emerged in the 1950s with the development of programming languages such as Fortran and COBOL. These languages allowed users to write programs in a more structured and efficient way. In 1956, **John McCarthy**, an American computer scientist, coined the term "Artificial Intelligence" (AI) and organized the Dartmouth Conference, which is considered the birthplace of AI.

In the 1960s, computer networking began to emerge, and the first computer networks were developed. The development of the internet in the 1980s revolutionized the way people communicated and shared information. This led to the development of new applications, such as email and the World Wide Web.

In the past few decades, Computer Science has seen significant advancements in areas such as Artificial Intelligence, Machine Learning, and Data Science. These advancements have led to the development of new technologies, such as self-driving cars and voice-activated assistants like Siri and Alexa.

Computer Science has also had a significant impact on other fields, such as medicine and finance. The use of computers and algorithms has enabled researchers to analyze large datasets and develop new treatments for diseases. In finance, computers have enabled traders to analyze market data and make more informed investment decisions.



<https://www.learncomputerscienceonline.com/introduction-to-computer-science/>

COMPREHENSION QUESTIONS

1. Define the term "computational systems."
2. What was the name of the first computer-like device, and who created it?
3. What was the basis for the development of the first modern computer, the ENIAC?
4. Who coined the term "Artificial Intelligence," and what was the significance of the Dartmouth Conference?
5. What was the impact of the development of the internet on Computer Science?
6. In what decade did the field of Computer Science emerge?
8. How has Computer Science impacted other fields, such as medicine and finance?

Vocabulary exercises

Match the words with their definitions:

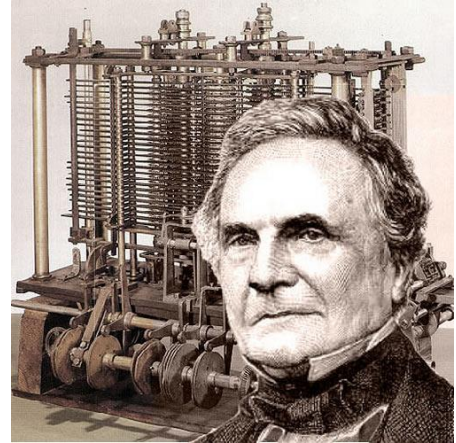
1. Computer Science –
2. Algorithm -
3. Data Science -
4. Artificial Intelligence -
5. Machine Learning -
6. Programming Language -
7. Computer Networking -
8. Self-Driving Cars -
9. Virtual Reality -
10. Augmented Reality -
11. Quantum Computing -
12. Biocomputing –

- a. a field that seeks to use biological systems to perform computation and solve problems
- b. the development of computer systems that can perform tasks that would typically require human intelligence
- c. the study of computers and computing technologies
- d. a subset of Artificial Intelligence that involves the use of algorithms to learn from data and improve performance on a specific task
- e. the practice of connecting multiple computers together to enable communication and resource sharing
- f. the study of how to extract knowledge and insights from data
- g. a set of instructions or steps to accomplish a task or solve a problem
- h. a technology that overlays digital information onto the real world
- i. vehicles that are capable of driving themselves without human intervention
- j. a type of computing that uses quantum-mechanical phenomena to perform operations on data

- k.** an artificial environment created with software and presented to the user in a way that simulates reality
- l.** a language used to write computer programs

THE FATHER OF COMPUTER SCIENCE

"Charles Babbage was an English mathematician, inventor, and philosopher who is best known for designing the first mechanical computer, called the **Analytical Engine**, in the early 19th century. Born in 1791 in London, Babbage was the son of a wealthy banker and attended Cambridge University, where he became interested in mathematics and the emerging field of computing.



<https://www.daviddarling.info/encyclopedia/B/Babbage.html>

Babbage's interest in computing began when he observed the shortcomings of mathematical tables, which were used by scientists and engineers to perform calculations. These tables were often riddled with errors, which could have serious consequences in fields such as navigation and engineering. He believed that a machine could perform calculations more accurately and efficiently than humans, and he began designing a mechanical device to do just that.

In 1822, Babbage unveiled his design for the **Difference Engine**, a machine that could perform complex calculations using a series of gears and cranks. The machine was designed to be automated, with input data stored on punched cards, and it was capable of producing printed results. Despite attracting funding from the British government, the project was ultimately unsuccessful due to a variety of technical and financial challenges.

Undeterred by this setback, Babbage began designing an even more ambitious machine, the Analytical Engine. This machine was based on the same principles as the Difference Engine but was capable of performing more complex calculations using a system of gears, levers, and punched cards. The Analytical Engine was designed to be programmable, with instructions stored on punched cards, and it could have been used to solve a wide range of mathematical problems.

Unfortunately, Babbage was never able to complete the Analytical Engine due to lack of funding and technical challenges. However, his work laid the foundations for modern computing, and he is often referred to as the "father of the computer."

Comprehension exercises:

Who was Charles Babbage?

What inspired Babbage to design the Difference Engine?

What was the Difference Engine, and how was it supposed to work?

Why was the Difference Engine ultimately unsuccessful?

What was the Analytical Engine, and how did it differ from the Difference Engine?

Why was Babbage never able to complete the Analytical Engine?

Vocabulary exercises:

Define the following words as they are used in the text:

Emergence
Shortcomings
Consequences
Ambitious
Foundations

Find synonyms for the following words as they are used in the text:

Designing
Capable
Unsuccessful
Laid
Completing

Find antonyms for the following words as they are used in the text:

Wealthy
Human
Automate
Successful
Beginning"

Hackers and cyber security

In today's world, technology is everywhere. It's in our homes, our workplaces, and even our pockets. But with the rise of technology comes the rise of hackers, people who use their skills to break into computer systems, steal data, and cause chaos.

The act of hacking has been around for as long as computers have existed. In fact, the word "hacker" was originally used to describe programmers who were able to write code quickly and efficiently. It wasn't until the 1970s that the term began to be associated with illegal activities.

In the early days of computing, hacking was largely a harmless hobby. People would break into computer systems just to see if they could do it, or to explore the limits of the technology. It wasn't until the 1980s that hacking began to become more malicious.

One of the most famous early hackers was Kevin Mitnick. He was a skilled computer programmer who used his skills to gain access to some of the most secure computer systems in the world. He was eventually caught and spent several years in prison.

Hackers come in all shapes and sizes. Some are teenagers working out of their bedrooms, while others are organized crime syndicates with millions of dollars at their disposal. They use a variety of techniques to gain access to computer systems, including phishing, malware, and brute force attacks.

Once a hacker gains access to a system, they can do a lot of damage. They can steal personal information like credit card numbers and passwords, and they can even use your computer as a part of a larger attack on other systems. In some cases, hackers have been known to hold computer systems ransom, demanding payment in exchange for access to the system.

But not all hackers are bad. Some hackers use their skills for good, working to expose vulnerabilities in computer systems and help companies improve their security. These so-called "ethical hackers" are often employed by companies to test their security measures and find weaknesses before the bad guys do.

Despite the efforts of ethical hackers and cybersecurity experts, the threat of hacking remains. As our world becomes more and more connected, the risk of a cyber-attack grows. It's up to each of us to do our part to protect our personal information and prevent hackers from gaining access to our systems.

Comprehension Exercises:

1. What is a hacker?
2. What are some techniques used by hackers to gain access to computer systems?



<https://time.com/6167383/axie-cryptocurrency-north-korea-hackers/>

3. What damage can hackers do once they gain access to a system?
4. What are ethical hackers?
5. What can we do to protect ourselves from hackers?

Vocabulary Exercises:

A. Choose the best word to complete each sentence:

Hackers are people who use their skills to _____ into computer systems.

- a) break
- b) fix
- c) create
- d) manage

Some hackers are part of _____ with millions of dollars at their disposal.

- a) corporations
- b) charities
- c) universities
- d) governments

Hackers use a variety of techniques to gain access to computer systems, including phishing, malware, and _____ force attacks.

- a) blunt
- b) brute
- c) aggressive
- d) violent

Ethical hackers are often employed by companies to test their security measures and find _____ before the bad guys do.

- a) weaknesses
- b) strengths
- c) advantages
- d) opportunities

As our world becomes more and more connected, the risk of a cyber attack _____.

- a) falls
- b) rises
- c) stays the same
- d) fluctuates

B. Match the words with their definitions:

- | | |
|------------------------|--|
| 1. phishing | A. a type of cyber-attack |
| 2. malware | B. people who use their skills for good |
| 3. brute force attacks | C. a method of gaining unauthorized access to a system |
| 4. ethical hackers | D. a program designed to harm a computer system |
| 5. cyber-attack | E. a type of social engineering scam |

Deep Web

Deep Web refers to parts of the internet that are not indexed by standard search engines. Unlike the surface web, which is easily accessible and contains billions of pages of information, the Deep Web is not readily available to the general public. It is estimated that the Deep Web is several times larger than the surface web, containing vast amounts of data that cannot be accessed through standard search engines.

The origins of the Deep Web can be traced back to the early days of the internet, when the US Department of Defense created the ARPANET, a precursor to the internet that was designed for military communications. As the internet grew in popularity, it became a platform for a wide range of activities, including research, commerce, and communication. However, with the rise of search engines such as Google, much of the internet became easily accessible to anyone with an internet connection. This led to the development of the Deep Web as a way to keep information hidden from search engines and other online tools.

One of the most well-known parts of the Deep Web is the dark web, which is a network of websites that can only be accessed using special software. The dark web has gained notoriety for its association with illegal activities, such as the sale of drugs, weapons, and other illicit goods. However, not all parts of the Deep Web are associated with criminal activity. Many academic and research databases, for example, are not indexed by search engines and can only be accessed through specialized channels.

While the Deep Web can be a valuable resource for researchers and other professionals, it is important to exercise caution when accessing it. Due to the lack of regulation and oversight, the Deep Web can be a dangerous place, with hackers, scammers, and other criminals operating with impunity. As such, it is essential to use strong security measures and to be mindful of the risks associated with accessing the Deep Web.

Comprehension Questions:

What is the Deep Web?

How did the Deep Web come into existence?

What is the dark web, and why is it notorious?

What are some non-criminal uses of the Deep Web?

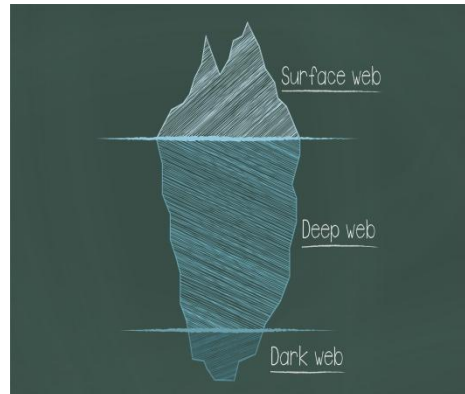
Why is it important to exercise caution when accessing the Deep Web?

Vocabulary Exercises:

A. Choose the correct word that fits the context:

The _____ of the Deep Web can be traced back to the early days of the internet.

- a) origin
- b) reputation
- c) influence



<https://www.avira.com/fr/blog/vol-de-donnees-sur-le-darknet-comment-savoir-si-quelquun-vend-mes-donnees>

d) proficiency

The dark web has gained notoriety for its association with _____ activities.

- a) legal
- b) illegal
- c) moral
- d) ethical

Many academic and research databases are not indexed by search engines and can only be accessed through _____ channels.

- a) traditional
- b) specialized
- c) superficial
- d) exhaustive

B. Match the following words with their definitions:

- Caution a) a computer criminal
- Illicit b) the act of overseeing or supervising something
- Oversight c) to be well-informed and knowledgeable
- Impunity d) carefulness or careful attention to detail
- Hacker e) forbidden by law or morality.

C. Fill in the blanks with the appropriate words from the list below:

specialized, easily, regulation, vast, association

The Deep Web is not _____ accessible to the general public.

The Deep Web contains _____ amounts of data that cannot be accessed through standard search engines.

Due to the lack of _____ and oversight, the Deep Web can be a dangerous place.

Many academic and research databases can only be accessed through _____ channels.

The dark web has gained notoriety for its _____ with illegal activities.

Answers:

Compreh

Artificial Intelligence and Its Impact on Society

Artificial Intelligence (AI) is a rapidly growing field that is transforming the way we live, work, and communicate. AI is the development of computer systems that can perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation. AI has the potential to revolutionize many industries, from healthcare to transportation to finance, and its impact on society is already being felt.



<https://towardsai.net/p/artificial-intelligence/understanding-artificial-intelligence>

As AI technology continues to develop, it is expected to play an increasingly important role in many industries. Here are a few examples of how AI may be used in the future:

Healthcare: AI has the potential to revolutionize healthcare by assisting doctors in diagnosing and treating diseases, analyzing patient data to predict health outcomes, and even creating personalized treatment plans.

Transportation: Self-driving cars are just one example of how AI can transform transportation. In the future, AI may also be used to optimize traffic patterns and improve public transportation.

Education: AI can help personalize learning by analyzing student data and creating customized lesson plans that are tailored to individual students' needs.

Business: AI can help businesses make better decisions by analyzing data and providing insights that humans may not have noticed. AI can also be used to automate tasks such as customer service and inventory management. AI can also help businesses save money by reducing labor costs, as fewer human workers are needed to perform certain tasks.

Another advantage of AI is its ability to work around the clock without tiring. This can be especially beneficial in industries such as manufacturing, where AI can perform repetitive tasks without getting fatigued.

While the potential benefits of AI are immense, there are also some potential risks and challenges that must be addressed. One of the biggest concerns is the possibility of bias in AI algorithms, which could lead to discriminatory outcomes. Additionally, there are concerns about the potential for job loss and economic instability as AI takes over more tasks that were previously performed by humans. Additionally, there are concerns about the ethical implications of AI, such as privacy and security issues.

While there are many advantages to AI, it is important to carefully consider the potential drawbacks as well. As AI continues to develop and become more prevalent in our lives, it is important to address these concerns and ensure that AI is being used in a responsible and ethical manner.

Comprehension Questions:

1. What is Artificial Intelligence?
2. What are some tasks that AI can perform?
3. Which industries can AI revolutionize?
4. Is AI impacting society yet?
5. What is one advantage of AI in the healthcare industry?
6. What is one potential disadvantage of AI?
7. What are some ethical concerns about AI?

Vocabulary Exercises:

A. Choose the best word to complete the sentence:

Artificial Intelligence is the development of computer systems that can perform tasks that typically require human _____.

- a. kindness b. intelligence c. creativity d. strength

AI has the potential to _____ many industries.

- a. revolutionize b. destroy c. ignore d. create

The impact of AI on society is already being _____.

- a. ignored b. felt c. loved d. forgotten

B. Match the words with their definitions:

Perception

Recognition

Decision-making

Translation

- a. The ability to understand something
- b. The process of identifying or verifying someone or something
- c. The process of making choices or reaching conclusions
- d. The process of converting one language to another

Moroccan PropTech: A Booming Industry

Moroccan proptech is a rapidly growing sector that has emerged in recent years, fueled by the increasing demand for real estate services and the need for technological innovation in the industry. Proptech, or property technology, refers to the use of technology to facilitate and enhance real estate transactions and property management processes. In Morocco, this industry has gained significant momentum, with the country's proptech startups raising millions of dollars in investment and introducing innovative solutions to the market.



<https://www.comakeit.com/blog/proptech-a-new-kid-on-the-disruption-block/>

One of the key drivers of the Moroccan proptech industry is the country's growing population, which is expected to reach 50 million by 2050. As more people move into urban areas, the demand for affordable and efficient housing solutions increases, creating opportunities for proptech companies to introduce new products and services. Additionally, the rise of the middle class in Morocco has led to a greater demand for luxury and high-end real estate, further fueling the growth of the proptech industry.

Moroccan proptech companies are leveraging technology to address a range of challenges in the real estate market. For example, some startups are using artificial intelligence (AI) and machine learning to analyze real estate data and provide investors with insights on market trends and investment opportunities. Others are developing virtual reality (VR) platforms that allow buyers to tour properties remotely, saving time and money while reducing the need for physical visits.

In addition to facilitating transactions, proptech startups are also introducing innovative solutions for property management. For instance, some companies are using sensors and IoT (Internet of Things) devices to monitor building systems and detect maintenance issues before they become major problems. Others are developing platforms that connect landlords with tenants, streamlining the rental process and improving communication between parties.

The Moroccan government has recognized the potential of the proptech industry and is taking steps to support its growth. In 2019, the Ministry of Economy and Finance launched the "Digital Morocco 2020" strategy, which aims to promote the use of digital technology in all sectors of the economy, including real estate. The government has also established startup incubators and accelerators to support proptech entrepreneurs and provide them with the resources and mentoring they need to succeed.

Overall, the Moroccan proptech industry is a promising and exciting sector that is poised for significant growth in the coming years. With its innovative solutions and entrepreneurial spirit, the industry has the potential to transform the way we buy, sell, and manage property in Morocco and beyond.

Comprehension Questions:

1. What is proptech?
2. What are some factors driving the growth of the proptech industry in Morocco?
3. How are Moroccan proptech companies using technology to address challenges in the real estate market?
4. What steps is the Moroccan government taking to support the growth of the proptech industry?
5. What is the potential of the Moroccan proptech industry?

Vocabulary Exercises:

A. Match the following words with their definitions:

PropeTch

innovation

momentum

artificial intelligence (AI)

virtual reality (VR)

Internet of Things (IoT)

sensors

incubators

accelerators

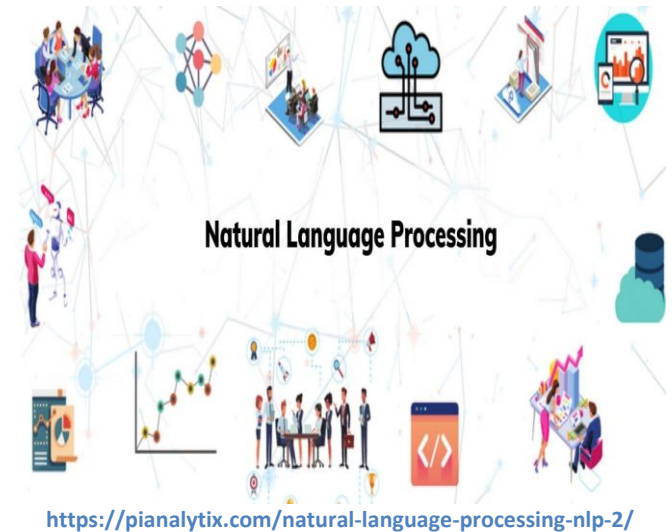
mentoring

- a. the use of technology to facilitate and enhance real estate transactions and property management processes
- b. the ability to introduce new ideas or methods
- c. the force or speed of movement
- d. the simulation of a three-dimensional environment that can be interacted with
- e. the interconnection of devices via the internet, enabling them to send and receive data
- f. devices that detect and respond to physical stimuli
- g. programs or machines that can perform tasks that normally require human intelligence
- h. organizations that provide resources and support"

Natural Language Recognition

Natural language recognition is a subfield of artificial intelligence that focuses on enabling machines to understand and interpret human language. This technology has become increasingly important as more and more businesses and organizations seek to leverage the power of machine learning to automate tasks and improve decision-making processes.

At its core, natural language recognition involves training machine learning algorithms to recognize patterns in language and use those patterns to infer meaning. This can involve analyzing the syntax and grammar of a sentence, as well as identifying keywords and other semantic cues that provide context for the words being used.



One key challenge in natural language recognition is dealing with the many different ways that humans can express the same concept. For example, consider the following three sentences:

I need to book a flight to New York for next Friday.

Can you help me make a reservation for a trip to NYC next week?

I want to travel to the Big Apple on the Friday after next.

All three of these sentences express essentially the same idea, but they use different words, phrasing, and grammatical structures to do so. Natural language recognition algorithms must be able to recognize the common thread that runs through all of these sentences, and use that understanding to correctly interpret the speaker's intent.

To achieve this level of sophistication, natural language recognition systems typically incorporate a wide range of machine learning techniques, including deep learning, neural networks, and natural language processing (NLP) algorithms. These techniques enable the system to learn from vast amounts of data and continually refine its understanding of human language.

In addition to natural language recognition, there are also a number of related fields that focus on helping machines understand and work with human language. These include natural language generation (NLG), which involves generating human-like language based on data inputs, and natural language understanding (NLU), which focuses on understanding the meaning behind human language.

Overall, the field of natural language recognition is rapidly evolving, and holds great promise for a wide range of applications, from customer service chatbots to automated language translation systems.

Vocabulary Exercises:

What is the definition of natural language recognition?

- a) The ability for a machine to understand and interpret human language.
- b) The ability for a human to understand and interpret machine language.
- c) The ability for a machine to generate human-like language based on data inputs.

What are some of the machine learning techniques used in natural language recognition?

- a) Deep learning, neural networks, and natural language processing.
- b) Decision trees, regression analysis, and clustering.
- c) K-nearest neighbors, random forests, and support vector machines.

What is the challenge in dealing with different ways that humans express the same concept?

- a) The challenge is to identify which sentence is correct.
- b) The challenge is to recognize the common thread that runs through different sentences and use that understanding to interpret the speaker's intent.
- c) The challenge is to identify the keywords used in each sentence.

Comprehension Exercises:

What is the main goal of natural language recognition?

- a) To automate tasks and improve decision-making processes.
- b) To help machines understand and interpret human language.
- c) To generate human-like language based on data inputs.

What are some of the related fields to natural language recognition?

- a) Natural language generation and natural language understanding.
- b) Natural language processing and computer vision.
- c) Deep learning and neural networks.

What are some of the challenges in natural language recognition?

- a) Dealing with different ways that humans express the same concept.
- b) Identifying the syntax and grammar of a sentence.
- c) Learning from vast amounts of data to continually refine the system's understanding of human language.

Algorithms

Algorithms are sets of instructions that a computer or any other machine can follow to perform a specific task. They are the building blocks of computer programs and play a crucial role in modern technology. An algorithm can be thought of as a recipe, where each step is a specific instruction that must be followed in order to achieve a desired outcome.

Algorithms are used in a wide range of applications, from basic calculations to complex data processing and artificial intelligence. They are used to solve problems, optimize processes, and automate tasks. For example, algorithms are used by search engines to determine the relevance of web pages to a particular search query, and by online retailers to recommend products to customers based on their purchase history.

When designing an algorithm, it is important to consider factors such as efficiency, scalability, and accuracy. An algorithm that is efficient will complete a task in a reasonable amount of time, while a scalable algorithm will continue to perform well even as the amount of data or complexity of the task increases. Accuracy is also important, as an algorithm that produces inaccurate results can have serious consequences in many applications.

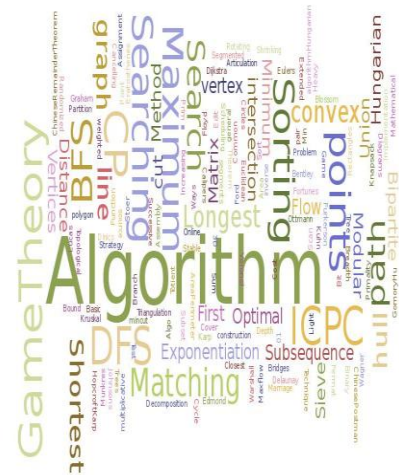
To create an algorithm, a programmer will typically use a programming language and write code that describes the specific steps that the machine should follow. Once the code is written, it must be tested and optimized to ensure that it is efficient, accurate, and scalable.

Algorithms can be classified into different categories based on their characteristics and applications. One common classification is based on the type of problem they solve. For example, sorting algorithms are used to arrange data in a specific order, while searching algorithms are used to find a specific item within a dataset.

Another way to classify algorithms is based on their complexity. Some algorithms are simple and can be executed quickly, while others are complex and may take a long time to complete. One way to measure the complexity of an algorithm is to calculate its time complexity, which is the amount of time it takes to complete as the size of the input data increases.

Algorithms can also be classified based on their approach to problem-solving. For example, brute-force algorithms solve problems by trying every possible solution, while divide-and-conquer algorithms break a problem down into smaller sub-problems that are easier to solve.

Machine learning algorithms are a specific type of algorithm that use statistical models to identify patterns in data and make predictions based on those patterns. They are commonly used in applications such as image and speech recognition, natural language processing, and recommendation systems.



<https://www.geeksforgeeks.org/top-algorithms-and-data-structures-for-competitive-programming/>

In recent years, there has been growing interest in developing algorithms that are more ethical and fair. This has led to the emergence of a new field called "algorithmic fairness," which aims to develop algorithms that do not discriminate against individuals based on factors such as race, gender, or socio-economic status.

Comprehension questions:

1. What are algorithms?
2. What role do algorithms play in modern technology?
3. Give an example of an application of algorithms.
4. What factors should be considered when designing an algorithm?
5. How do programmers create algorithms?
6. How can algorithms be classified based on the type of problem they solve?
7. What is time complexity?
8. What is the difference between brute-force and divide-and-conquer algorithms?
9. What are machine learning algorithms?
10. What is algorithmic fairness?

Vocabulary questions:

11. Define algorithm.
12. Give a synonym for the word 'crucial'.
13. What does the term 'optimize' mean?
14. What is meant by the term 'scalable'?
15. Define 'programmer'.
16. Define time complexity.
17. Give a synonym for the word 'execute'.
18. What does the term 'brute-force' mean?
19. Define 'machine learning'.
20. What is the meaning of the term 'algorithmic fairness'?

Quantum Computing: Unlocking the Power of the Quantum World

Quantum computing is a rapidly advancing field of computing that leverages the principles of quantum mechanics to perform calculations that are beyond the capabilities of classical computers. While classical computers use bits, which can exist in either a 0 or 1 state, quantum computers use quantum bits, or qubits, which can exist in a superposition of states, allowing them to perform many calculations simultaneously.



<https://gmo-research.com/news-events/articles/future-quantum-computing>

Superposition is a key principle in quantum computing. It allows qubits to exist in multiple states at once, which can exponentially increase the number of possible outcomes for a calculation. However, maintaining superposition is challenging due to decoherence, which occurs when qubits interact with their environment and lose their quantum state. Error correction techniques are used to protect quantum information from decoherence.

Another principle of quantum computing is entanglement, which occurs when two or more qubits become correlated and share a quantum state. Entangled qubits can be used to perform certain calculations exponentially faster than classical computers, leading to the concept of quantum supremacy.

Quantum gates are the basic operations that are used to manipulate the quantum state of qubits. There are many different types of quantum gates, each with its own specific purpose. Quantum algorithms are designed to take advantage of these gates and the properties of qubits to solve complex problems, such as optimization and cryptography.

Quantum computing has the potential to revolutionize fields such as medicine, finance, and energy, and is already being used to develop new drugs and materials. However, building and maintaining quantum computers is still a significant challenge, and many fundamental questions about the nature of quantum computing remain unanswered.

Comprehension Questions:

1. What is quantum computing?
2. What is a qubit?
3. What is superposition?
4. What is decoherence?
5. What is entanglement?
6. What are quantum gates?

7. What are quantum algorithms?
8. What is quantum supremacy?

Vocabulary:

Match the words with their definitions

1. Quantum computing
 2. Qubit -
 3. Superposition states at once
 4. Decoherence
 5. Entanglement
 6. Quantum gate
 7. Error correction
 8. Quantum algorithm -
 9. Optimization
 10. Cryptography
-
- a) type of computing that uses quantum bits or qubits to perform calculations
 - b) an algorithm designed to be run on a quantum computer
 - c) process by which quantum systems lose their coherence and become classical
 - d) the process of finding the best solution to a problem
 - e) a phenomenon in which two or more quantum systems become correlated and share a quantum state
 - f) a basic operation that can be applied to qubits to manipulate their quantum state
 - g) a technique used to protect quantum information from errors caused by decoherence and other noise sources
 - h) the practice of secure communication in the presence of third parties
 - i) a unit of quantum information that can exist in a superposition of states
 - j) a property of quantum systems in which they can exist in multiple

Blockchain and cryptocurrency

Blockchain and cryptocurrency are two of the most innovative technologies that have emerged in recent years. These technologies have the potential to revolutionize industries ranging from finance to supply chain management. In this text, we will explore what blockchain and cryptocurrency are, how they work, and their potential applications.

Blockchain is a digital ledger that allows for secure and transparent transactions. It is essentially a chain of blocks that contain information, such as transaction data, that is linked together in a decentralized network. Each block is verified and added to the chain using complex algorithms that require significant computational power.

Cryptocurrency, on the other hand, is a digital currency that uses encryption techniques to secure transactions and control the creation of new units. Cryptocurrencies, such as Bitcoin and Ethereum, operate on blockchain technology and are decentralized, meaning that they are not controlled by any central authority.

One of the main advantages of blockchain and cryptocurrency is their potential to increase transparency and security in financial transactions. Blockchain technology allows for secure and transparent record-keeping, which can help prevent fraud and increase trust in financial transactions. Cryptocurrencies, which operate independently of central banks, also provide an alternative to traditional currency systems and can facilitate cross-border transactions with lower transaction fees.

Blockchain technology and cryptocurrencies also have the potential to transform supply chain management. By using blockchain to track products from their origin to their final destination, companies can increase transparency and ensure that products are sourced ethically and sustainably.

To test your comprehension of the text, answer the following questions:

1. What is blockchain?
2. How does blockchain work?
3. What is cryptocurrency?
4. What are some potential applications of blockchain and cryptocurrency?
5. What advantage do blockchain and cryptocurrency offer in financial transactions?

Vocabulary exercise:



<https://medium.com/@DaexBlockchain/the-cryptocurrency-and-blockchain-revolution-is-coming-8b8a12796765>

Choose the best definition for the following words:

1. ledger a. a book or record of financial transactions b. a type of musical instrument c. a small, fast bird
2. decentralized a. not controlled by a central authority b. centralized around a single authority c. located in the center of something
3. encryption a. the process of encoding information to make it secure b. the process of decoding information to make it readable c. the process of erasing information permanently
4. fraud a. intentional deception or misrepresentation for personal gain b. an accidental mistake or error c. an unexpected event or occurrence
5. sustainable a. capable of being maintained over the long term b. harmful or destructive to the environment c. temporary or short-lived

clicking on suspicious links or downloading files from unknown sources. Finally, it is important to use antivirus software and to back up important data regularly to minimize the impact of any successful cyber-attacks.

Cybersecurity is an increasingly important field, and many organizations are investing heavily in this area to protect their sensitive data and intellectual property. Cybersecurity professionals may work in a variety of roles, from network security analysts and penetration testers to cybercrime investigators and cybersecurity policy advisors. As the threats and technologies of the digital age continue to evolve, the demand for skilled cybersecurity professionals is only likely to increase.

Vocabulary exercises:

1. What is phishing?
 - a. A type of cyber-attack that involves an attacker flooding a website or network with traffic from multiple sources
 - b. A type of cyber-attack that involves an attacker sending fraudulent messages in an attempt to trick the recipient into revealing sensitive information
 - c. A type of encryption used to protect sensitive information
2. What is malware?
 - a. A type of software that is designed to cause harm to a computer system or network
 - b. A type of encryption used to protect sensitive information
 - c. A type of firewall that blocks malicious traffic
3. What is a DDoS attack?
 - a. A type of cyber-attack in which the attacker sends a fraudulent message to trick the victim into revealing sensitive information
 - b. A type of cyber-attack in which the attacker floods a website or network with traffic from multiple sources, causing it to crash or become unavailable to legitimate users
 - c. A type of cyber-attack in which the attacker gains access to a computer system or network without authorization

Comprehension exercise:

Read the following passage and answer the questions below:

"Cybersecurity professionals play a critical role in protecting organizations and individuals from cyber threats. These professionals may work in a variety of roles, including network security analysts, penetration testers, and cybersecurity policy advisors. They use their expertise to identify vulnerabilities in computer systems and networks and develop strategies to mitigate these risks. As technology continues to advance, the field of cybersecurity will become even more important, and the demand for skilled professionals is likely to increase."

1. What is the role of cybersecurity professionals?
2. What are some of the roles that cybersecurity professionals may work in?
3. Why is the field of cybersecurity becoming increasingly important?