

CS101

Introduction to Computing

Important subjective

Lec 1 - Introduction to Computer Science

What is a programming language?

Answer: A programming language is a set of instructions and commands used to create software programs, applications, and websites.

What is an algorithm?

Answer: An algorithm is a set of instructions used to solve a problem or complete a task, often used in programming.

What is a data structure?

Answer: A data structure is a way of organizing and storing data in a computer, such as an array or a linked list.

What is a function in programming?

Answer: A function is a reusable block of code that performs a specific task or set of tasks within a program.

What is the difference between a variable and a constant?

Answer: A variable is a value that can change during program execution, while a constant is a value that remains the same throughout the program.

What is an operating system?

Answer: An operating system is software that manages computer hardware and software resources, and provides common services for computer programs.

What is a database?

Answer: A database is a collection of data that is organized and stored in a computer, typically used for managing large amounts of information.

What is a network?

Answer: A network is a collection of computers and devices connected together, often used for sharing information and resources.

What is object-oriented programming?

Answer: Object-oriented programming is a programming paradigm that uses objects and their interactions to design and create software programs.

What is the difference between a compiler and an interpreter?

Answer: A compiler translates entire program into machine language, while an interpreter reads and executes the code line by line.

Lec 2 - What is Computer Science?

1. **What is computer science?** Answer: Computer science is the study of computers, computing, and computational systems. It involves the theory, design, development, and application of computer software and hardware.
2. **What are the main areas of computer science?** Answer: The main areas of computer science include algorithms and data structures, programming languages, computer architecture, software engineering, artificial intelligence, databases, computer networks, human-computer interaction, and cybersecurity.
3. **What is the difference between computer science and computer engineering?** Answer: Computer science focuses on the theory and application of computer software and hardware, while computer engineering focuses on the design and development of computer hardware.
4. **What is the role of algorithms in computer science?** Answer: Algorithms are a fundamental part of computer science. They are a set of instructions that specify a sequence of steps to solve a particular problem or perform a specific task.
5. **What is software engineering?** Answer: Software engineering is the process of designing, developing, testing, and maintaining software systems. It involves the application of engineering principles to software development.
6. **What is artificial intelligence?** Answer: Artificial intelligence is the development of computer systems that can perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and perception.
7. **What is human-computer interaction (HCI)?** Answer: Human-computer interaction (HCI) is the study of how people interact with computer systems and the design of user interfaces to make them more intuitive, efficient, and effective.
8. **What is computer graphics?** Answer: Computer graphics is the creation and manipulation of images and animations using computer software and hardware.
9. **What is computer networking?** Answer: Computer networking is the study of the interconnection of computers and devices to enable communication and the exchange of data.

10. **What is the future of computer science?** Answer: The future of computer science is expected to be focused on new and emerging technologies such as artificial intelligence, machine learning, quantum computing, and the internet of things (IoT). It will continue to be a rapidly evolving field with many opportunities for innovation and growth.

Lec 3 - Computer Science Applications

1. What is the difference between computer science and computer engineering?

Answer: Computer science is concerned with the theoretical aspects of computing, such as algorithms, programming languages, and data structures. Computer engineering, on the other hand, is focused on the design, development, and testing of computer hardware and software systems.

2. How is cybersecurity important in today's digital world?

Answer: Cybersecurity is essential in today's digital world to protect against cyber threats, such as hacking, data breaches, and identity theft. It helps safeguard sensitive information, networks, and systems from unauthorized access and attacks.

3. What is machine learning, and how is it used in computer science applications?

Answer: Machine learning is a subset of artificial intelligence that uses algorithms to analyze and learn from data. It is used in computer science applications such as image and speech recognition, fraud detection, and personalized recommendations.

4. What is virtual reality, and what are its applications in computer science?

Answer: Virtual reality is an immersive technology that simulates a real or imaginary environment. It is used in computer science applications such as gaming, education, and training simulations.

5. What is cloud computing, and how is it used in computer science applications?

Answer: Cloud computing is a technology that allows users to access and store data and applications over the internet. It is used in computer science applications such as online storage and backup, software as a service (SaaS), and virtual machines.

6. What is data mining, and how is it used in computer science applications?

Answer: Data mining is the process of analyzing and discovering patterns in large datasets. It is used in computer science applications such as market research, fraud detection, and personalized recommendations.

7. What is artificial intelligence, and how is it used in computer science applications?

Answer: Artificial intelligence is a branch of computer science that focuses on creating intelligent machines that can simulate human thinking and behavior. It is used in computer science applications such as natural language processing, machine learning, and robotics.

8. **What is computer graphics, and how is it used in computer science applications?**

Answer: Computer graphics is the field of computer science that deals with creating, manipulating, and displaying visual content on a computer. It is used in computer science applications such as gaming, animation, and virtual reality.

9. **What is the role of big data in computer science applications?**

Answer: Big data refers to large, complex datasets that require advanced computing technologies to analyze and process. It is used in computer science applications such as data analytics, artificial intelligence, and machine learning to gain insights and make informed decisions.

10. **How do computer networks play a vital role in computer science applications?**

Answer: Computer networks enable communication and data exchange between multiple devices and systems. They play a vital role in computer science applications such as online transactions, remote access, and real-time collaboration.

Lec 4 - Local Job Market

1. What is the local job market?

Answer: The local job market refers to the availability of job opportunities in a specific geographic area.

2. What is the knowledge-based economy?

Answer: The knowledge-based economy is an economy that is based on the creation, distribution, and use of knowledge and information.

3. How has globalization affected the local job market?

Answer: Globalization has led to increased competition in the local job market, as companies are now able to source labor from anywhere in the world.

4. What are some of the benefits of a strong local job market?

Answer: A strong local job market can lead to lower rates of poverty, increased economic growth, and higher standards of living for residents.

5. What can employers do to attract top talent in the local job market?

Answer: Employers can offer competitive wages and benefits, provide opportunities for career advancement, and create a positive work environment.

6. What impact does technological change have on the local job market?

Answer: Technological change can lead to the creation of new industries and job opportunities, but it can also lead to job losses in industries that become automated.

7. How can job seekers improve their chances of success in the local job market?

Answer: Job seekers can improve their chances of success by acquiring the necessary skills and qualifications, networking with professionals in their field, and staying informed about industry trends.

8. What role do government policies play in the local job market?

Answer: Government policies can impact the local job market by providing tax incentives to businesses, investing in infrastructure, and implementing regulations that affect certain industries.

9. **How do demographic trends impact the local job market?**

Answer: Demographic trends can lead to changes in the types of jobs that are in demand and the skills that are required to succeed in the local job market.

10. **What is the importance of the local job market to the overall health of the economy?**

Answer: The local job market is a key driver of economic growth and prosperity, as it provides opportunities for individuals to earn a living while also driving innovation and entrepreneurship in the community.

Lec 5 - International Job Market

1. **What are some of the benefits of working in the international job market?**

Answer: Some benefits of working in the international job market include the opportunity to gain diverse work experience, develop language skills, and expand one's professional network.

2. **How does cultural competency impact success in the international job market?**

Answer: Cultural competency is crucial for success in the international job market because it allows individuals to navigate cultural differences and work effectively with colleagues from diverse backgrounds.

3. **What are some ways to develop language skills for the international job market?**

Answer: Some ways to develop language skills for the international job market include taking language courses, practicing with native speakers, and immersing oneself in the language and culture.

4. **How do job seekers find international job opportunities?**

Answer: Job seekers can find international job opportunities through online job boards, networking with professionals in their field, and attending career fairs and conferences.

5. **What are some common challenges faced by ex-pats in the international job market?**

Answer: Some common challenges faced by ex-pats in the international job market include adjusting to a new culture and work environment, dealing with language barriers, and obtaining work visas and permits.

6. **How can job seekers prepare for an international job interview?**

Answer: Job seekers can prepare for an international job interview by researching the company and its culture, practicing their language skills, and familiarizing themselves with local customs and business practices.

7. **What are some ways to build a professional network in the international job market?**

Answer: Some ways to build a professional network in the international job market include attending industry events, joining professional associations, and networking with colleagues and peers.

8. **How can job seekers tailor their resumes for international job opportunities?**

Answer: Job seekers can tailor their resumes for international job opportunities by highlighting relevant international experience, language skills, and cultural competencies.

9. **What are some common misconceptions about the international job market?**

Answer: Common misconceptions about the international job market include the belief that English is the only language needed for success, and that ex-pats always receive high salaries and benefits.

10. **How can job seekers prepare for the cultural differences they may encounter in the international job market?**

Answer: Job seekers can prepare for cultural differences in the international job market by researching the local culture and customs, seeking out cross-cultural training, and being open-minded and adaptable.

Lec 6 - Are you not a student of computer science?

1. **What are some examples of technology-related careers that do not require a degree in computer science?**

Answer: Graphic design, business administration, and sales are all examples of technology-related careers that do not require a degree in computer science.

2. **Why is it important to have a basic understanding of technology?**

Answer: Having a basic understanding of technology can be helpful in many different career paths and can make you a more valuable employee.

3. **Can you learn how to code without attending college or university?**

Answer: Yes, there are many resources available for learning how to code online, such as coding tutorials, YouTube videos, and online forums.

4. **What are some free resources available online for learning how to code?**

Answer: Some free resources available online for learning how to code include coding tutorials, YouTube videos, and online forums.

5. **Is it necessary to have a degree in computer science to be successful in technology-related careers?**

Answer: No, there are many different technology-related careers that do not require a degree in computer science.

6. **What is the difference between hardware and software?**

Answer: Hardware refers to the physical components of a computer, while software refers to the programs that run on the computer.

7. **Can you teach yourself how to code?**

Answer: Yes, it is possible to teach yourself how to code through online resources and coding boot camps.

8. **What are some examples of basic computer problems that you should know how to troubleshoot?**

Answer: Examples of basic computer problems include slow performance, connectivity issues, and software glitches.

9. **Should you explore different career paths before deciding on a career in technology?**

Answer: Yes, it is important to explore different career paths before deciding on a career in technology to find the best fit for your skills and interests.

10. **Is it ever too late to start learning about technology?**

Answer: No, it is never too late to start learning about technology, and there are many resources available for individuals of all ages and skill levels.

Lec 7 - Search Engine Using Techniques

1. **What is the purpose of meta tags in search engine optimization?**

Answer: Meta tags provide information about a web page to search engines, including its title, description, and keywords. This information helps search engines to understand the content and relevance of the web page.

2. **How can website owners improve their website's search engine ranking?**

Answer: Website owners can improve their website's search engine ranking by using SEO techniques such as optimizing their website's content for relevant keywords, building high-quality backlinks, improving user engagement metrics, and optimizing their website's structure and navigation.

3. **What is the difference between on-page and off-page SEO?**

Answer: On-page SEO refers to optimizing the content and structure of a website to improve its search engine ranking, while off-page SEO refers to techniques used outside of the website, such as link building and social media marketing, to improve the website's search engine ranking.

4. **What are the benefits of using long-tail keywords in search engine optimization?**

Answer: Long-tail keywords are more specific and less competitive than generic keywords, which makes it easier for website owners to rank for them. Long-tail keywords also tend to have higher conversion rates as they are more relevant to specific user queries.

5. **How can website owners optimize their website's content for search engines?**

Answer: Website owners can optimize their website's content by using relevant keywords in their content, optimizing their title tags and meta descriptions, using header tags to structure their content, and including images and videos with descriptive file names and alt tags.

6. **What are the key elements of a well-optimized web page?**

Answer: The key elements of a well-optimized web page include a descriptive title tag, a compelling meta description, optimized header tags, relevant and high-quality content, optimized images and videos, and high-quality backlinks.

7. **What is the purpose of a sitemap in search engine optimization?**

Answer: A sitemap provides a list of all the pages on a website to search engines, which helps them to crawl and index the website more efficiently.

8. **How can website owners optimize their website's structure and navigation for search engines?**

Answer: Website owners can optimize their website's structure and navigation by organizing their content into categories and subcategories, using descriptive URLs, using breadcrumbs to show users their location on the website, and ensuring that their website is easy to navigate and user-friendly.

9. **What are the risks of using unethical SEO practices?**

Answer: Using unethical SEO practices, such as keyword stuffing and buying backlinks, can lead to penalties and a decrease in search engine ranking. It can also damage a website's reputation and result in a loss of traffic and revenue.

10. **How can website owners monitor their website's search engine ranking?**

Answer: Website owners can monitor their website's search engine ranking by using tools such as Google Search Console and Google Analytics to track their website's search engine performance, including their search engine ranking, traffic, and user engagement metrics.

Lec 8 - History of Computing

1. **Who invented the Difference Engine?**

Answer: Charles Babbage.

2. **What was the first machine that could be programmed to perform different tasks?**

Answer: The Analytical Engine.

3. **What was the punch card machine used for?**

Answer: Processing data for the 1890 U.S. census, as well as other applications such as accounting and inventory management.

4. **What was the Colossus machine used for?**

Answer: Cracking German codes during World War II.

5. **What was the first commercial computer?**

Answer: The UNIVAC.

6. **What was the first successful personal computer for home use?**

Answer: The Apple II.

7. **Who developed the first web browser?**

Answer: Tim Berners-Lee.

8. **What was the first website?**

Answer: A website created by Tim Berners-Lee in 1991.

9. **What was the dominant operating system for personal computers?**

Answer: Windows, developed by Microsoft.

10. **What was the first smartphone?**

Answer: The iPhone, was introduced by Apple in 2007.

Lec 9 - Data Storage

1. **What is the difference between primary and secondary storage?**

Answer: Primary storage, also known as memory, is volatile and is used to temporarily store data that is being actively processed by the computer. Secondary storage, on the other hand, is non-volatile and is used to store data for long-term use.

2. **What is a hard disk drive (HDD)?**

Answer: A hard disk drive uses magnetic fields to store data on spinning disks. The disks are read and written to by a magnetic head that moves across the surface of the disk.

3. **What is a solid-state drive (SSD)?**

Answer: An SSD uses flash memory to store data. This means that they have no moving parts, making them less prone to failure than hard disk drives.

4. **What is a file system?**

Answer: A file system is responsible for organizing and managing the data on the storage device.

5. **What are the advantages of NTFS file system?**

Answer: NTFS is the most common file system used in Windows computers, and it offers advanced features such as file compression and encryption.

6. **What is the purpose of data backup?**

Answer: The purpose of data backup is to protect against data loss due to hardware failure, theft, or other unforeseen events.

7. **What is a full backup?**

Answer: Full backup creates a complete copy of all data, regardless of whether it has changed since the last backup.

8. **What is an incremental backup?**

Answer: Incremental backup only backs up data that has changed since the last backup.

9. **What is a differential backup?**

Answer: Differential backup backs up all data that has changed since the last full backup.

10. **What are the different types of data storage devices?**

Answer: The different types of data storage devices include hard disk drives, solid-state drives, USB flash drives, memory cards, and optical discs such as CDs and DVDs.

Lec 10 - Data Manipulation

1. **What is data manipulation, and why is it important?**

Answer: Data manipulation is the process of transforming and preparing data to make it more suitable for analysis or visualization. It involves cleaning, transforming, and aggregating data. It is important because raw data is often messy and inconsistent, making it difficult to analyze. Data manipulation helps to clean and transform data to make it more usable and accurate for analysis.

2. **What are the common tools used for data manipulation?**

Answer: Microsoft Excel, SQL, and Python are some of the common tools used for data manipulation.

3. **What is data cleaning, and what are its objectives?**

Answer: Data cleaning is the process of identifying and correcting errors and inconsistencies in data. The objectives of data cleaning are to improve the quality of the data, reduce errors and inconsistencies, and prepare the data for further analysis.

4. **What are the common techniques used for data transformation?**

Answer: Common techniques for data transformation include merging, filtering, sorting, and aggregating.

5. **What is the difference between data cleaning and data transformation?**

Answer: Data cleaning is the process of identifying and correcting errors and inconsistencies in data, while data transformation involves converting data from one format to another.

6. **What is the purpose of data wrangling in data manipulation?**

Answer: Data wrangling is the process of cleaning and transforming data to make it more suitable for analysis. The purpose of data wrangling is to prepare the data for analysis by cleaning, transforming, and aggregating it.

7. **What is data aggregation, and what are its common techniques?**

Answer: Data aggregation is the process of summarizing data by calculating totals or averages. Common techniques for data aggregation include grouping, sub-setting, and summarizing.

8. **What are the common types of errors in data, and how can they be corrected?**

Answer: Common types of errors in data include missing values, duplicates, and inconsistencies. They can be corrected by identifying the errors, replacing missing values,

removing duplicates, and standardizing data.

9. **What is data merging, and how is it useful in data manipulation?**

Answer: Data merging is the process of combining data from multiple sources based on a common variable. It is useful in data manipulation because it allows us to combine data from different sources to create a more complete dataset.

10. **What are the common challenges faced in data manipulation?**

Answer: Common challenges in data manipulation include dealing with missing data, handling errors and inconsistencies, and choosing the appropriate tools and techniques for the data.

Lec 11 - Operating System

1. **What is an operating system?**

Answer: An operating system is a software program that manages computer hardware and software resources and provides services to computer programs.

2. **What is a process in the context of an operating system?**

Answer: A process is a program in execution, which includes the current values of the program counter, registers, and variables.

3. **What is a file system in the context of an operating system?**

Answer: A file system is a way of organizing and storing files on a computer. It includes directories, files, and metadata.

4. **What is a shell in the context of an operating system?**

Answer: A shell is a program that provides a command-line interface for interacting with the operating system.

5. **What is virtual memory in the context of an operating system?**

Answer: Virtual memory is a technique that allows a computer to use more memory than it physically has by using the hard drive as a backup storage for unused memory.

6. **What is a device driver in the context of an operating system?**

Answer: A device driver is a program that allows the operating system to communicate with hardware devices, such as printers and scanners.

7. **What is a context switch in the context of an operating system?**

Answer: A context switch is a process of saving the state of the current process and restoring the state of another process to allow multiple processes to run concurrently.

8. **What is scheduling in the context of an operating system?**

Answer: Scheduling is the process of determining which process will run on the CPU at any given time.

9. **What is a system call in the context of an operating system?**

Answer: A system call is a request made by a user program to the operating system to perform a specific task, such as reading or writing a file.

10. **What is a kernel in the context of an operating system?**

Answer: The kernel is the core component of the operating system that manages system resources and provides services to applications.

Lec 12 - Networking and the Internet

1. **What is a network topology?**

Answer: Network topology refers to the physical and logical layout of a network, including the devices and connections that make up the network.

2. **What is bandwidth?**

Answer: Bandwidth refers to the maximum amount of data that can be transmitted over a network or communication channel in a given period of time.

3. **What is latency?**

Answer: Latency refers to the delay between the time a data packet is sent and the time it is received and is measured in milliseconds.

4. **What is a protocol?**

Answer: A protocol is a set of rules that govern the way data is transmitted over a network, including the format of data packets and the methods used to transmit and receive them.

5. **What is a firewall?**

Answer: A firewall is a security device or software that monitors and controls the incoming and outgoing network traffic based on a set of predefined security rules.

6. **What is a VPN?**

Answer: A VPN (Virtual Private Network) is a network technology that allows users to securely connect to a private network over a public network such as the Internet.

7. **What is an IP address?**

Answer: An IP address (Internet Protocol address) is a unique numerical identifier assigned to every device connected to a network, allowing them to communicate with each other over the Internet.

8. **What is DNS?**

Answer: DNS (Domain Name System) is a system that translates domain names into IP addresses, allowing users to access websites and other Internet resources using easy-to-remember names instead of numerical IP addresses.

9. **What is NAT?**

Answer: NAT (Network Address Translation) is a technique used to allow devices on a private network to communicate with devices on the public Internet by assigning unique IP addresses to each device on the private network.

10. **What is a packet?**

Answer: A packet is a unit of data that is transmitted over a network, consisting of a header and payload, and containing information about the source and destination of the data, as well as the data itself.

Lec 13 - Algorithms

1. **What is an algorithm?**

Answer: An algorithm is a set of well-defined instructions or rules to solve a problem or accomplish a specific task.

2. **What is the difference between a linear search and a binary search algorithm?**

Answer: A linear search algorithm checks each element in a list sequentially until the desired element is found or the end of the list is reached. A binary search algorithm, on the other hand, starts at the middle of a sorted list and divides the list in half repeatedly until the desired element is found or determined to not exist.

3. **What is the time complexity of an algorithm, and why is it important?**

Answer: The time complexity of an algorithm is the amount of time it takes to run as a function of the input size. It is important because it helps to determine the efficiency and scalability of the algorithm.

4. **What is a sorting algorithm, and give an example?**

Answer: A sorting algorithm is an algorithm that arranges elements in a list or array in a specific order. An example of a sorting algorithm is the quicksort algorithm.

5. **What is a greedy algorithm, and when is it used?**

Answer: A greedy algorithm is an algorithm that makes the locally optimal choice at each step with the hope of finding a global optimum. It is used when a problem can be divided into subproblems and the solution to each subproblem does not affect the solution to other subproblems.

6. **What is a recursive algorithm, and give an example?**

Answer: A recursive algorithm is an algorithm that calls itself to solve subproblems. An example of a recursive algorithm is the factorial function.

7. **What is a divide and conquer algorithm, and give an example?**

Answer: A divide and conquer algorithm is an algorithm that breaks a problem down into smaller subproblems, solves each subproblem separately, and then combines the solutions to the subproblems to solve the original problem. An example of a divide and conquer algorithm is the merge sort algorithm.

8. **What is a dynamic programming algorithm, and give an example?**

Answer: A dynamic programming algorithm is an algorithm that solves a problem by breaking it down into smaller subproblems, solving each subproblem only once, and storing the solutions to subproblems to avoid redundant computations. An example of a dynamic programming algorithm is the Fibonacci sequence.

9. **What is a heuristic algorithm, and give an example?**

Answer: A heuristic algorithm is an algorithm that uses a rule of thumb or an approximation to find a solution quickly, without guaranteeing the optimal solution. An example of a heuristic algorithm is the nearest neighbor algorithm.

10. **What is an optimization algorithm, and give an example?**

Answer: An optimization algorithm is an algorithm that finds the best solution to a problem with given constraints. An example of an optimization algorithm is the gradient descent algorithm used in machine learning.

Lec 14 - Programming Languages

1. **What is a programming language? Answer:** A programming language is a formal language that specifies a set of instructions for a computer to follow in order to perform a specific task.
2. **What is the difference between a high-level and a low-level language? Answer:** A high-level language is more abstract and easier to read and write than a low-level language, which is closer to machine code and requires a deeper understanding of computer architecture.
3. **What is an interpreted language? Answer:** An interpreted language is a programming language that executes code directly, without compiling it into machine language.
4. **What is a compiler? Answer:** A compiler is a software program that translates source code written in a programming language into machine language that can be executed by a computer.
5. **What is an object-oriented language? Answer:** An object-oriented language is a programming language that organizes code into objects, which encapsulate data and functionality and can communicate with one another.
6. **What is a scripting language? Answer:** A scripting language is a programming language that is designed to automate frequently performed tasks, such as data manipulation, system administration, and web page creation.
7. **What is a variable? Answer:** A variable is a container that holds a value or reference to a value in computer memory.
8. **What is a function? Answer:** A function is a block of code that performs a specific task and can be called from other parts of a program.
9. **What is debugging? Answer:** Debugging is the process of finding and fixing errors in software code.
10. **What is an algorithm? Answer:** An algorithm is a set of instructions for solving a specific problem or performing a specific task, often used in computer programming.

Lec 15 - Software Engineering

1. **What is software engineering?**

Answer: Software engineering is a discipline that involves the development, design, testing, and maintenance of software systems.

2. **What are the phases of the software development process?**

Answer: The phases of the software development process include requirements gathering, design, implementation, testing, and maintenance.

3. **What are requirements gathering?**

Answer: Requirements gathering is the process of gathering information about what the software is supposed to do and what features it should have.

4. **What is software design?**

Answer: Software design is the process of defining the architecture of the software, identifying the components that make up the system, and defining the interactions between these components.

5. **What is software implementation?**

Answer: Software implementation is the process of writing the code that makes up the software system.

6. **What is software testing?**

Answer: Software testing is the process of verifying that the software system works as expected and meets all the requirements.

7. **What is software maintenance?**

Answer: Software maintenance is the process of making changes and updates to the software system over time.

8. **What are some important soft skills for software engineers?**

Answer: Some important soft skills for software engineers include communication, teamwork, and problem-solving.

9. **What is project management in software engineering?**

Answer: Project management in software engineering involves planning, organizing, and

controlling resources to achieve specific goals.

10. **What is quality assurance in software engineering?**

Answer: Quality assurance in software engineering involves ensuring that the software system meets the specified requirements and is free from defects.

Lec 16 - Data Abstraction

1. **What is data abstraction in software development?**

Answer: Data abstraction is the process of hiding implementation details and presenting only the necessary information to the user, in order to manage complexity in large software systems.

2. **Why is data abstraction important in software development?**

Answer: Data abstraction is important in software development because it helps manage complexity in large software systems, improves software quality, and makes it easier to maintain and fix bugs without disrupting the user experience.

3. **How is data abstraction achieved in object-oriented programming?**

Answer: Data abstraction is achieved in object-oriented programming through the use of classes, interfaces, and inheritance. Classes and interfaces define the essential features of an object, while inheritance allows for the creation of new classes that inherit the properties and methods of existing classes.

4. **What are abstract data types?**

Answer: Abstract data types (ADTs) are data structures that encapsulate data and operations that can be performed on the data. ADTs provide a simplified view of the data structure, which makes it easier for programmers to use the data structure without worrying about the underlying implementation.

5. **How does data abstraction improve software quality?**

Answer: Data abstraction improves software quality by reducing the likelihood of errors and bugs, and by making it easier to maintain the software system without disrupting the user experience.

6. **What is modular programming and how is data abstraction achieved in it?**

Answer: Modular programming is the process of dividing a software system into modules, which are self-contained units of code that perform specific tasks. Data abstraction is achieved in modular programming by allowing developers to focus on the essential features of the module without worrying about the details of other modules.

7. **What are APIs and how do they use data abstraction?**

Answer: APIs are sets of functions or methods that can be used to interact with a software system. APIs use data abstraction by providing a simplified interface to complex software systems, making it easier for developers to use the system without worrying about the underlying implementation.

8. **How does data abstraction help manage complexity in large software systems?**

Answer: Data abstraction helps manage complexity in large software systems by providing a simplified view of the system, which makes it easier for developers to understand and maintain the system.

9. **What is the role of libraries in data abstraction?**

Answer: Libraries provide pre-built code that can be used to perform specific tasks, using data abstraction to simplify the process for developers.

10. **How does data abstraction make software systems easier to use for end-users?**

Answer: Data abstraction makes software systems easier to use for end-users by hiding implementation details and providing a simplified view of the system, allowing users to interact with the system without worrying about the underlying code.

Lec 17 - Database Systems

- 1. What is a data model?**
Answer: A data model is a conceptual representation of the data that is stored in a database. It defines the structure, relationships, and constraints of the data.
- 2. What is the most widely used data model in modern database systems?**
Answer: The relational model is the most widely used data model in modern database systems.
- 3. What is a database management system (DBMS)?**
Answer: A DBMS is a software system that manages the storage, retrieval, and manipulation of data in a database.
- 4. What is data integrity?**
Answer: Data integrity refers to the accuracy and consistency of the data in a database. It is maintained through a set of constraints that ensure that the data meets certain standards.
- 5. What is a primary key constraint?**
Answer: A primary key constraint ensures that each record in a table is uniquely identified by a specific attribute or set of attributes.
- 6. What is a foreign key constraint?**
Answer: A foreign key constraint ensures that the relationship between two tables is maintained, by requiring that a record in one table must exist in another table.
- 7. What is a check constraint?**
Answer: A check constraint ensures that the data in a table meets a specific set of criteria, such as a range of values or a pattern.
- 8. What is data normalization?**
Answer: Data normalization is the process of organizing data in a database to reduce redundancy and improve data consistency.
- 9. What is a first normal form (1NF)?**
Answer: In the first normal form, each table has a primary key, and all attributes in the table are atomic, meaning they cannot be further broken down.

10. **What is third normal form (3NF)?**

Answer: In third normal form, each attribute in a table is dependent only on the primary key, and not on any other attributes in the table.

Lec 18 - Artificial Intelligence

1. What is Artificial Intelligence?

Answer: Artificial Intelligence is a branch of computer science that focuses on creating intelligent machines that can perform tasks that typically require human intelligence, such as understanding natural language, recognizing objects, and making decisions.

2. What are the different types of Artificial Intelligence?

Answer: AI can be broadly divided into two categories: narrow or weak AI, which is designed to perform a specific task, and general or strong AI, which has the ability to perform any intellectual task that a human can.

3. What is the difference between narrow and general AI?

Answer: Narrow AI is designed to perform a specific task, while general AI has the ability to perform any intellectual task that a human can.

4. What is the history of Artificial Intelligence?

Answer: The idea of creating machines that can think and learn like humans has been around for centuries. However, it wasn't until the mid-20th century that the field of AI began to take shape.

5. What was the Dartmouth Conference?

Answer: In 1956, a group of computer scientists held a conference at Dartmouth College in New Hampshire to discuss the possibility of creating intelligent machines. This conference is considered the birthplace of AI.

6. What are the potential applications of AI?

Answer: AI has the potential to transform a wide range of industries, from healthcare and finance to manufacturing and transportation.

7. What are some examples of how AI is being used today?

Answer: AI is being used to develop new drugs and treatments, detect fraud, optimize production processes, develop self-driving cars, and more.

8. What are some of the benefits of AI?

Answer: AI has the potential to make our lives easier, more efficient, and more productive, by

automating repetitive tasks, improving decision-making, and reducing errors.

9. **What are some of the challenges associated with AI?**

Answer: Some of the challenges associated with AI include concerns about job displacement, ethical issues surrounding the use of AI, and the potential for bias in AI systems.

10. **What is the future of AI?**

Answer: The future of AI is bright, with continued advances in computing power and the development of new algorithms. As AI continues to evolve and improve, it has the potential to transform a wide range of industries and make our lives easier and more efficient.

Lec 19 - CS impact on society

1. **What is the most obvious way in which computer science has impacted society?**

Answer: The most obvious way in which computer science has impacted society is through the proliferation of computing devices, such as desktop computers, laptops, tablets, and smartphones.

2. **What are the primary means of communication and information sharing for people around the world?**

Answer: The internet has become the primary means of communication and information sharing for people around the world.

3. **What industry has a computer-aided design (CAD) and computer-aided manufacturing (CAM) revolutionized?**

Answer: Computer-aided design (CAD) and computer-aided manufacturing (CAM) have revolutionized the manufacturing industry.

4. **What is artificial intelligence (AI)?**

Answer: Artificial intelligence (AI) is the development of computer systems that can perform tasks that typically require human intelligence, such as understanding natural language, recognizing images, and making decisions.

5. **What is the potential of AI?**

Answer: AI has the potential to revolutionize many industries, from healthcare to finance.

6. **What impact has computer science had on education?**

Answer: Computer science has had a significant impact on education by creating new opportunities for online learning and access to high-quality education regardless of location or financial situation.

7. **What is the impact of automation and robotics on the job market?**

Answer: The rise of automation and robotics has led to the displacement of many jobs traditionally performed by humans, but it has also created new job opportunities in fields such as programming, data science, and cybersecurity.

8. **What are MOOCs?**

Answer: MOOCs (massive open online courses) are online courses that make it possible for people to learn new skills and advance their careers without the need to attend traditional brick-

and-mortar schools.

9. **What impact has computer science had on healthcare?**

Answer: Computer science has had a significant impact on healthcare by facilitating the creation of electronic medical records (EMRs), which make it easier for doctors and nurses to access patient information and make informed decisions about their care.

10. **What are some of the new industries created by the internet?**

Answer: The internet has facilitated the creation of new industries such as e-commerce, social media, and online advertising.

Lec 21 - Content Filtering, Spam, International laws

1. **What is content filtering, and why is it important?**

Answer: Content filtering is the process of screening and blocking access to specific websites, web pages, or online content deemed inappropriate, offensive, or harmful. It is important to protect children from exposure to inappropriate content, such as violence, pornography, and hate speech.

2. **What are the criticisms of content filtering?**

Answer: Critics argue that content filtering can be used to limit freedom of speech and access to information, and its criteria can be arbitrary, leading to unjustified censorship.

3. **What is spam, and why is it a problem?**

Answer: Spam is unsolicited and unwanted messages sent to individuals or organizations, usually for commercial purposes. It is a problem because it can be an annoyance and can also pose security risks, as it can contain malware or phishing attempts.

4. **How can individuals protect themselves from spam?**

Answer: Individuals can use email filters to block messages from specific senders or with specific keywords. Email providers and social media platforms also have spam filters that automatically identify and remove spam messages.

5. **What is the CAN-SPAM Act, and what does it require?**

Answer: The CAN-SPAM Act is a law in the United States that requires senders to provide recipients with a way to opt out of future messages.

6. **What is the GDPR, and how does it address content filtering and spam?**

Answer: The GDPR is a European Union regulation that provides individuals with the right to control their personal data and be informed of data breaches. It also requires companies to obtain explicit consent before collecting and using personal data.

7. **What is the ITU, and what is its role in addressing content filtering and spam?**

Answer: The ITU is the International Telecommunication Union, which aims to promote the development and use of information and communication technologies in a safe and secure manner. It has developed guidelines and best practices for content filtering and spam, which governments and organizations can use to implement effective policies and procedures.

8. **What are some examples of organizations that use content filtering?**

Answer: Schools, libraries, and public institutions commonly use content filters to comply with legal obligations and ensure a safe online environment for students and users.

9. **How can companies comply with international laws and regulations regarding content filtering and spam?**

Answer: Companies can comply with international laws and regulations by implementing policies and procedures that prioritize the protection of personal data and promote a safe and secure online environment for users.

10. **Why is it essential to remain informed about content filtering, spam, and international laws?**

Answer: It is essential to remain informed about these issues to protect oneself and others from inappropriate content and unsolicited messages, comply with legal obligations, and promote a safe and secure online environment.

Lec 22 - Word Processing

1. **What is word processing?**

Answer: Word processing refers to the creation, editing, and formatting of electronic text documents using specialized software.

2. **What are some common uses for word processing software?**

Answer: Some common uses for word processing software include creating letters, memos, reports, brochures, and flyers.

3. **What are some benefits of word processing software?**

Answer: Benefits of word processing software include efficiency, collaboration, formatting options, and the ability to save documents in a variety of file formats.

4. **What are some potential drawbacks of word processing software?**

Answer: Potential drawbacks of word processing software include the potential for errors and the cost of some of the most feature-rich programs.

5. **What are some formatting options available in word processing software?**

Answer: Some formatting options available in word processing software include font selection, sizing, style, headings, subheadings, and bullet points, and the ability to add images, tables, and charts.

6. **What are some common file formats used for word-processing documents?**

Answer: Some common file formats used for word-processing documents include Microsoft Word, PDF, and RTF.

7. **Can multiple users collaborate on a single document using word processing software?**

Answer: Yes, word processing software allows for easy collaboration between multiple users on a single document.

8. **Is it possible to copy and paste text in word processing software?**

Answer: Yes, word processing software allows for easy copying and pasting of text.

9. **What is the difference between a spell check and a grammar check?**

Answer: A spell check checks for spelling errors, while a grammar check checks for grammatical errors and inconsistencies.

10. **Is word processing software easy to use?**

Answer: Word processing software can be easy to use, with many user-friendly features and interfaces. However, some of the more advanced features may require some training or experience to use effectively.

