

Advanced Computer Science Concepts

Computer Science · Answer Key · 8 Questions

1. In the context of Big O notation, what does $O(n \log n)$ typically represent the time complexity of?

- A) Linear search
- B) Insertion sort
- C) Merge sort**
- D) Bubble sort

2. Which data structure is most suitable for implementing a Breadth-First Search (BFS) algorithm on a graph?

- A) Stack
- B) Queue**
- C) Hash Table
- D) Linked List

3. What is the primary function of the 'git rebase' command in version control?

- A) To merge changes from one branch into another, creating a merge commit
- B) To discard all changes in a branch and revert to a previous commit
- C) To rewrite commit history by moving or combining commits**
- D) To create a new branch from an existing one

4. In computer networking, what does the acronym 'TCP' stand for and what is its key characteristic?

- A) Transfer Control Protocol; guarantees packet delivery**
- B) Transmission Control Protocol; connectionless
- C) Transport Control Protocol; prioritizes speed over reliability
- D) Text Communication Protocol; encrypts data

5. What is the fundamental principle behind a 'hash function' in cryptography?

- A) To reversibly transform data into a fixed-size output
- B) To ensure that even a small change in input drastically alters the output**
- C) To compress data for efficient storage without loss
- D) To generate a unique key for every piece of data

6. Which of the following best describes the purpose of a compiler?

- A) To execute code line by line as it is written
- B) To translate source code written in a high-level language into machine code**
- C) To manage the computer's memory and processes
- D) To provide an interactive environment for writing and testing code

7. What is the Turing completeness of a programming language?

- A) Its ability to perform floating-point arithmetic with high precision.
- B) Its capability to simulate any Turing machine, meaning it can compute any computable function.**
- C) Its efficiency in handling large datasets.
- D) Its support for object-oriented programming paradigms.

8. In the context of computer security, what does the term 'SQL injection' refer to?

- A) A method of encrypting sensitive database information.
- B) A type of malware that corrupts SQL databases.
- C) An attack where malicious SQL code is inserted into input fields to manipulate a database.**
- D) A technique for optimizing SQL query performance.