

Software Engineering Mastery

Software Engineering · Answer Key · 18 Questions

1. Which software development model is characterized by sequential phases where progress flows steadily downwards through conception, initiation, analysis, design, construction, testing, production, and maintenance?

- A) Agile
- B) Waterfall**
- C) Spiral
- D) Iterative

2. In Big O notation, what is the time complexity of a standard Binary Search algorithm on a sorted array of size n?

- A) $O(n)$
- B) $O(n \log n)$
- C) $O(\log n)$**
- D) $O(n^2)$

3. Which version control system, created by Linus Torvalds in 2005, uses a directed acyclic graph to track changes in source code?

- A) Subversion
- B) Mercurial
- C) CVS
- D) Git**

4. What is the primary purpose of a 'Compiler' in the software build process?

- A) To execute code line-by-line
- B) To translate high-level source code into machine code**
- C) To debug memory leaks
- D) To manage database connections

5. In Object-Oriented Programming, which principle allows a subclass to provide a specific implementation of a method that is already provided by its superclass?

- A) Encapsulation
- B) Polymorphism**
- C) Inheritance
- D) Abstraction

6. Which testing level focuses on verifying the interactions between integrated units or modules of an application?

A) Unit Testing

B) Integration Testing

C) System Testing

D) Acceptance Testing

7. What is the term for the 'Code Smell' where a single method or class has grown so large that it is difficult to maintain and understand?

A) Dead Code

B) God Object

C) Shotgun Surgery

D) Feature Envy

8. In the context of database engineering, what does ACID stand for regarding transaction properties?

A) Atomicity, Consistency, Isolation, Durability

B) Array, Code, Input, Data

C) Algorithm, Computation, Integration, Design

D) Access, Control, Index, Database

9. Which software architectural pattern separates an application into three interconnected components: the data, the user interface, and the logic?

A) Microservices

B) Model-View-Controller

C) Serverless

D) Monolithic

10. What is the function of a 'Stack' data structure following the LIFO principle?

A) First In, First Out

B) Last In, First Out

C) Random In, Random Out

D) First In, Last Out

11. Which type of memory management error occurs when a program fails to release memory that is no longer needed?

A) Buffer Overflow

B) Stack Overflow

C) Memory Leak

D) Segmentation Fault

12. In API design, what does the HTTP status code '404' specifically indicate?

- A) Internal Server Error
- B) Unauthorized Access
- C) Not Found**
- D) Bad Request

13. Which mathematical concept is foundational to understanding the efficiency of algorithms in terms of time and space?

- A) Linear Algebra
- B) Set Theory
- C) Asymptotic Analysis**
- D) Probability

14. What is the process of hiding internal state and requiring all interaction to be performed through an object's methods called?

- A) Encapsulation**
- B) Inheritance
- C) Polymorphism
- D) Abstraction

15. Which term refers to the process of rewriting existing source code without changing its external behavior to improve its structure?

- A) Compiling
- B) Refactoring**
- C) Debugging
- D) Deploying

16. In software engineering, what is the 'Technical Debt' metaphor used to describe?

- A) The cost of hardware upgrades
- B) The implied cost of additional rework caused by choosing an easy solution now instead of a better approach**
- C) The amount of money spent on software licenses
- D) The time spent writing documentation

17. Which IEEE standard is widely recognized for defining the structure and content of Software Requirements Specifications (SRS)?

- A) IEEE 829
- B) IEEE 830**
- C) IEEE 12207
- D) IEEE 754

18. What is the primary benefit of 'Continuous Integration' (CI) in a DevOps pipeline?

A) Eliminating the need for testing

B) Automating the merging and testing of code changes frequently

C) Reducing the need for version control

D) Replacing human developers with bots