

# ASE Written Test Preparation (OOP, DBMS, DSA)

Focused questions commonly asked by interviewers for Associate Software Engineer roles.

## OOP QUESTIONS (JavaScript / MERN Focus)

- What is Object-Oriented Programming? Explain its four pillars.
- How is OOP implemented in JavaScript (prototype-based inheritance)?
- Difference between class-based and prototype-based inheritance.
- Explain Encapsulation with a real-world or project example.
- What is Abstraction? How do you achieve it in JavaScript or TypeScript?
- Inheritance vs Composition — which is better and why?
- Explain Polymorphism with a JavaScript example.
- What are SOLID principles? Explain any two with examples.
- How would you design a payment module (Stripe) using OOP concepts?
- How do you structure backend code to make it reusable and scalable?

## DBMS / SQL QUESTIONS (ASE Level)

- Difference between SQL and NoSQL databases.
- Why would you choose MongoDB over PostgreSQL and vice versa?
- What is normalization? Explain 1NF, 2NF, and 3NF.
- What is denormalization and when is it used?
- What are indexes? How do they improve query performance?
- Why can excessive indexing reduce performance?
- What is a transaction? Explain ACID properties.
- How do you handle database consistency during payments?
- Difference between INNER JOIN and LEFT JOIN.
- What is the difference between GROUP BY and HAVING?
- How do you prevent duplicate records in a database?
- How would you design a database for a booking system?
- How do you optimize slow database queries?

## DSA QUESTIONS (Written Test Focus)

- Reverse an array without using built-in functions.
- Find the maximum and minimum element in an array.
- Remove duplicate elements from an array.
- Check if a string is a palindrome.
- Find the first non-repeating character in a string.
- Explain time and space complexity.
- What is a stack? Give real-world use cases.
- What is a queue? Difference between stack and queue.
- Detect a loop in a linked list.
- Reverse a linked list.
- What is hashing? Why is it fast?
- Explain recursion with an example.
- Difference between recursion and iteration.
- What is a binary tree? Difference between binary tree and BST.