

Object-Oriented Programming Practice Questions

Exercise 1: Library Management System

Scenario: Create a simple library system to manage books and members.

Questions:

1. What data (HAS) should a `Book` class contain?
2. What methods (DOES) should a `Book` class have?
3. What data (HAS) should a `Member` class contain?
4. What methods (DOES) should a `Member` class have?
5. What data (HAS) should a `Library` class contain?
6. What methods (DOES) should a `Library` class have?

Exercise 2: Banking System

Scenario: Create a banking system with different account types.

Questions:

1. What data (HAS) should a `BankAccount` class contain?
2. What methods (DOES) should a `BankAccount` class have?
3. What data (HAS) should an `ATM` class contain?
4. What methods (DOES) should an `ATM` class have?
5. How would a `SavingsAccount` differ from a regular `BankAccount` ?
6. How would a `CheckingAccount` differ from a regular `BankAccount` ?

Exercise 3: E-commerce System

Scenario: Create an online shopping system.

Questions:

1. What data (HAS) should a `Product` class contain?

2. What methods (DOES) should a `Product` class have?
3. What data (HAS) should a `ShoppingCart` class contain?
4. What methods (DOES) should a `ShoppingCart` class have?
5. What data (HAS) should a `Customer` class contain?
6. What methods (DOES) should a `Customer` class have?
7. What data (HAS) should an `Order` class contain?
8. What methods (DOES) should an `Order` class have?

Exercise 4: School Management System

Scenario: Manage students, teachers, and courses.

Questions:

1. What data (HAS) should a `Student` class contain?
2. What methods (DOES) should a `Student` class have?
3. What data (HAS) should a `Teacher` class contain?
4. What methods (DOES) should a `Teacher` class have?
5. What data (HAS) should a `Course` class contain?
6. What methods (DOES) should a `Course` class have?
7. What common data might `Student` and `Teacher` share in a `Person` class?
8. What data (HAS) should a `School` class contain?
9. What methods (DOES) should a `School` class have?

Exercise 5: Vehicle Management System

Scenario: Create different types of vehicles with common and specific behaviors.

Questions:

1. What data (HAS) should all vehicles have in common?
2. What methods (DOES) should all vehicles have in common?
3. What specific data (HAS) should a `Car` class contain?
4. What specific methods (DOES) should a `Car` class have?
5. What specific data (HAS) should a `Motorcycle` class contain?
6. What specific methods (DOES) should a `Motorcycle` class have?
7. What specific data (HAS) should a `Truck` class contain?
8. What specific methods (DOES) should a `Truck` class have?

Exercise 6: Restaurant System

Scenario: Create a restaurant management system.

Questions:

1. What data (HAS) should a `Restaurant` class contain?
2. What methods (DOES) should a `Restaurant` class have?
3. What data (HAS) should a `Chef` class contain?
4. What methods (DOES) should a `Chef` class have?
5. What data (HAS) should an `Order` class contain?
6. What methods (DOES) should an `Order` class have?
7. What data (HAS) should a `MenuItem` class contain?
8. What methods (DOES) should a `MenuItem` class have?
9. What data (HAS) should a `Table` class contain?
10. What methods (DOES) should a `Table` class have?

Exercise 7: Hospital System

Scenario: Create a hospital management system.

Questions:

1. What data (HAS) should a `Patient` class contain?
2. What methods (DOES) should a `Patient` class have?
3. What data (HAS) should a `Doctor` class contain?
4. What methods (DOES) should a `Doctor` class have?
5. What data (HAS) should a `Nurse` class contain?
6. What methods (DOES) should a `Nurse` class have?
7. What data (HAS) should an `Appointment` class contain?
8. What methods (DOES) should an `Appointment` class have?
9. What data (HAS) should a `MedicalRecord` class contain?
10. What methods (DOES) should a `MedicalRecord` class have?

Exercise 8: Social Media Platform

Scenario: Create a social media platform system.

Questions:

1. What data (HAS) should a `User` class contain?
2. What methods (DOES) should a `User` class have?
3. What data (HAS) should a `Post` class contain?
4. What methods (DOES) should a `Post` class have?
5. What data (HAS) should a `Comment` class contain?
6. What methods (DOES) should a `Comment` class have?
7. What data (HAS) should a `Friend` relationship contain?
8. What methods (DOES) should handle friend relationships?

Exercise 9: Gaming System

Scenario: Create a role-playing game character system.

Questions:

1. What data (HAS) should all game characters have in common?
2. What methods (DOES) should all game characters have in common?
3. What specific data (HAS) should a `Warrior` class contain?
4. What specific methods (DOES) should a `Warrior` class have?
5. What specific data (HAS) should a `Mage` class contain?
6. What specific methods (DOES) should a `Mage` class have?
7. What specific data (HAS) should an `Archer` class contain?
8. What specific methods (DOES) should an `Archer` class have?
9. What data (HAS) should a `Weapon` class contain?
10. What methods (DOES) should a `Weapon` class have?

Exercise 10: Hotel Management System

Scenario: Create a hotel booking and management system.

Questions:

1. What data (HAS) should a `Hotel` class contain?
2. What methods (DOES) should a `Hotel` class have?
3. What data (HAS) should a `Room` class contain?
4. What methods (DOES) should a `Room` class have?
5. What data (HAS) should a `Guest` class contain?
6. What methods (DOES) should a `Guest` class have?
7. What data (HAS) should a `Reservation` class contain?

8. What methods (DOES) should a `Reservation` class have?
9. What data (HAS) should a `Staff` class contain?
10. What methods (DOES) should a `Staff` class have?

Exercise 11: Transportation System

Scenario: Create a public transportation system.

Questions:

1. What data (HAS) should a `Bus` class contain?
2. What methods (DOES) should a `Bus` class have?
3. What data (HAS) should a `Train` class contain?
4. What methods (DOES) should a `Train` class have?
5. What data (HAS) should a `Passenger` class contain?
6. What methods (DOES) should a `Passenger` class have?
7. What data (HAS) should a `Route` class contain?
8. What methods (DOES) should a `Route` class have?
9. What data (HAS) should a `Ticket` class contain?
10. What methods (DOES) should a `Ticket` class have?

Exercise 12: Fitness Center System

Scenario: Create a gym/fitness center management system.

Questions:

1. What data (HAS) should a `Member` class contain?
2. What methods (DOES) should a `Member` class have?
3. What data (HAS) should a `Trainer` class contain?
4. What methods (DOES) should a `Trainer` class have?
5. What data (HAS) should an `Equipment` class contain?
6. What methods (DOES) should an `Equipment` class have?
7. What data (HAS) should a `Workout` class contain?
8. What methods (DOES) should a `Workout` class have?
9. What data (HAS) should a `Membership` class contain?
10. What methods (DOES) should a `Membership` class have?

Instructions:

- Choose any exercise and answer all the questions for that scenario
- Focus on realistic, practical attributes and behaviors
- Think about what data each object would actually need to store
- Consider what actions each object would actually perform
- Don't worry about implementation details - just identify the HAS and DOES