

# Question Bank

## Unit 1: Introduction to Kotlin Programming Language

1. What is Kotlin, and what are its key advantages over other programming languages for Android development?
2. Explain the complete process of setting up the Android Studio development environment for a new Kotlin-based Android project.
3. Describe the fundamental syntax of a "Hello, World!" program in Kotlin. Include details on package declaration, the main function, and printing to the console.
4. Differentiate between `val` and `var` keywords in Kotlin. Provide code examples for each and explain the concept of mutability.
5. Elaborate on the basic data types available in Kotlin (e.g., `Int`, `Double`, `String`, `Boolean`) and demonstrate how to declare and initialize variables of each type.

## Unit 2: Kotlin Fundamentals

6. Explain the use of conditional statements in Kotlin. Provide syntax and examples for `if-else` and `when` expressions.
7. Describe the different types of loops available in Kotlin (`for`, `while`, `do-while`). Provide a code example for iterating over a Kotlin collection using a `for` loop.
8. What is a function in Kotlin? Explain how to define a function, specify parameters, and define a return type with a clear example.
9. Differentiate between a class and an object in Kotlin. Write the code to define a simple `Person` class with properties and a method.
10. Elaborate on the concept of inheritance in Kotlin. How do you declare a class as open and how does another class inherit from it?
11. What is polymorphism? Describe how it is achieved in Kotlin, providing an example using an overridden method.
12. Explain the purpose and syntax of an interface in Kotlin. Provide an example of a class implementing an interface.
13. What are Kotlin collections? Differentiate between `List`, `Set`, and `Map`, and explain a common use case for each.
14. Describe the special characteristics and use cases for data classes in Kotlin. What functions are automatically generated for them?
15. Explain the concept of a sealed class. How is it different from an enum or a regular open class, and when would you use it?

### **Unit 3: Android Architecture, Android UI, and Networking**

16. Describe the core components of the Android Architecture (Activities, Services, Broadcast Receivers, Content Providers).
17. Explain the Android Activity lifecycle. List the key lifecycle methods (e.g., onCreate, onStart, onResume, onPause, onStop, onDestroy) and describe when each one is called.
18. Differentiate between a View and a ViewGroup in Android. Provide examples of common View (like TextView, Button) and ViewGroup (like LinearLayout, RelativeLayout) components.
19. What is a Fragment? Explain the Fragment lifecycle and describe its advantages over using only Activities.
20. Elaborate on the process of working with RESTful APIs in an Android application. What role does JSON data play in this process?
21. Explain the purpose of the Retrofit and OkHttp libraries. How do they work together to simplify network communication in Android?
22. What is LiveData? Describe its benefits and how it is used to hold and observe data within an Android app.
23. Explain the role of the ViewModel in the Android Architecture Components. How does it help in managing UI-related data and surviving configuration changes?
24. What is asynchronous programming, and why is it crucial in Android development? Describe one method (e.g., Coroutines) for performing asynchronous operations.

### **Unit 4: Android App Development and Testing**

25. Based on the case study, write a brief description of the steps you would take to develop a "Picture Gallery" app, focusing on the UI and data handling.
26. What is unit testing in the context of Android development? Explain the role of JUnit in writing and executing these tests.
27. Describe the purpose of UI testing. How is Espresso used to simulate user interactions and verify UI behavior?
28. Differentiate between unit testing (JUnit) and UI testing (Espresso). Explain what each type of test is designed to validate.
29. Elaborate on the process of preparing an Android application for release. What are the key steps involved before you can publish it?
30. Describe the final steps for publishing an app to the Google Play Store, including creating a developer account and setting up the store listing.