

4. Can the printf function available in C be run on Android native code?

No, the printf function cannot be used in Android, since Android does not have the required glibc library which provides the printf function.

No / cannot be used – 1 mark

Android does not have glibc/required library – 2 marks

5. Can a malicious app change stored fingerprint information for authentication in a banking app?

No / cannot be done – 1 mark

Sandboxing / permission system – 1 mark

Presence of Trusted Execution Environment / Secure Element – 1 mark

6. What application-level and transport-layer protocols are likely used by a video streaming service like YouTube on a smartphone?

Application-level – HTTP / HTTP2 / HTTP3 – 1.5 marks

Transport-level – QUIC / UDP (only if HTTP/3 is mentioned above), TCP – 1.5 marks

7. Is using an SQL query to create the first schema from Android a good plan?

No, not a good plan – 1 mark

Using annotations / libraries to build queries – 1 mark

Reduces errors and makes better code – 1 mark

8. How can a Service without a user interface inform the user about a task being completed?

Notification / NotificationManager – 1.5 mark

Sending Intent messages – 1.5 marks

9. What does a variable name ending with a question mark signify in Kotlin?

Nullable – 2 marks

Avoid NullPointerException / easier handling of null values – 1 mark

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10. Which layer should be added to an app to handle the complexity of being used on both a smartphone and a smartwatch?

Extra UI Presentation / Data layer – 1.5

Leads to More modular / better separation of code – 1.5

11. Would functionality be missing in a modified version of Android Studio that does not maintain semantic information of UI elements?

Yes, if a modified version of Android Studio lacks semantic information of UI elements, several functionalities would be affected, particularly those related to accessibility, UI testing, and possibly some aspects of UI design and development. Semantic information includes details about what UI elements represent, such as buttons, text fields, and their intended actions or content. This information is crucial for:

- Accessibility: Screen readers and other assistive technologies rely on semantic information to convey the purpose of UI elements to users with disabilities. Lacking this, an app's accessibility would be significantly reduced.
- UI Testing: Automated UI testing frameworks, like Espresso, use semantic information to locate and interact with UI elements reliably during tests. Without semantic details, writing and maintaining tests would be more challenging.

- Code Generation and Design Tools: Features like the layout editor, preview tools, and code generation for data binding or view binding might be less effective without understanding the semantics of UI elements.

Any two of the above would lead to full marks (1.5 + 1.5)

12. How would two apps utilize the same sensor of a smartphone, and would it lead to too many requests to the sensor?

Via mediation through a software – 1.5 marks

No, requests are handled by an extra software layer, so the software would handle requests – 1.5 marks

13. Is using a static variable to handle changes in UI text upon clicks in a composable function a valid method, and are there alternatives?

No, not a good idea – 1.5 marks

Utilize Remember / Mutable State – 1.5 marks

## Allocation of TAs to Questions

- Abhishek – 4-5
- Amey Subhash – 6-7
- Aryaman – 8-9
- Atishay – 10-11
- Rohit – 12-13
- Sohail, Vedant – 2
- Najiya, Shraman – 3

