

UNIT 2 – Networking and Multithreading

Assignment 2

Q1. What is the role of Networking and Web Services in Android apps? Give an example where they are commonly used.

Answer:

Networking and Web Services allow Android apps to communicate with remote servers over the internet. Using networking, apps can **send and receive data**, access **APIs**, and update information in real time.

Web services like **REST APIs**, **SOAP**, or **GraphQL** enable apps to fetch resources such as JSON or XML data.

Roles:

- Fetching online data (news, weather, maps, etc.)
- User authentication (login/signup)
- Uploading or downloading files
- Real-time updates using WebSockets or Firebase

Example:

A **Weather App** uses networking to call an online weather API and display the current temperature and forecast on the screen.

Q2. Explain how sensors in Android devices (like accelerometer or gyroscope) can be used in mobile applications.

Answer:

Android devices contain many built-in sensors used to detect motion, orientation, environment conditions, etc. Apps can access these sensors using the **SensorManager** API.

Uses of Sensors:

1. Accelerometer

- Detects motion, vibration, and tilt.
- Used in step counters, screen rotation, shake detection.

2. Gyroscope

- Measures angular rotation and orientation.
- Used in AR apps, VR headsets, gaming (e.g., steering in racing games).

Example:

A **fitness app** uses the accelerometer to count steps and calculate calories burned.

Q3. What is the importance of background processing in Android apps? Give an example of when it is needed.

Answer:

Background processing allows an app to perform tasks **without blocking the user interface** and even when the app is not visible.

Android provides tools like:

- **Services**
- **WorkManager**

- **Foreground Services**
- **AsyncTask (deprecated)**

Importance:

- Ensures smooth UI performance
- Manages long-running tasks efficiently
- Improves user experience by not freezing the app

Example:

A **music player app** uses a background service to continue playing songs even when the user minimises the app.

Q4. Define multithreading in Android. Why is it useful in app development?

Answer:

Multithreading refers to running multiple tasks **at the same time** in separate threads.

Android has:

- **Main UI Thread** → Handles UI updates
- **Background Threads** → Handles long tasks like downloads, database operations

Why it is useful:

- Prevents UI from freezing
- Improves app performance
- Allows background processes to run smoothly (e.g., network calls)

Example:

A separate thread downloads images while the main thread updates the UI smoothly.

Q5. What are the key principles of Android Material Design? Why is it important for modern apps?

Answer:

Material Design is Google's design language that ensures apps look modern, clean, and consistent.

Key Principles:

1. **Bold, meaningful visuals** – Clean colors, shapes, typography.
2. **Responsive animations and transitions** – Smooth interactions.
3. **Consistent spacing and layouts** – Grid-based structure.
4. **Meaningful motion** – Animation to guide the user.
5. **Elevation and Shadows** – Depth to show hierarchy.
6. **Adaptive UI** – Works across all screen sizes.

Importance:

- Provides a professional look
 - Enhances usability
 - Boosts user engagement
 - Provides consistency across all Android apps
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Q6. Explain the use of Fragments in Android. How do they help in building flexible UIs?

Answer:

Fragments are **reusable portions of the UI** that can be combined inside an Activity. They have their own layout and lifecycle.

Uses:

- Create modular interfaces
- Reuse the same UI component on multiple screens
- Build multi-pane layouts for tablets and large screens

How they help:

- Allow **dynamic UI changes** (adding/replacing fragments at runtime)
- Support **responsive design**
- Improve flexibility by separating UI logic into smaller components

Example:

A News App can use:

- Fragment A → List of articles
- Fragment B → Article details

On a tablet, both fragments can be shown side-by-side.

Q7. What are Advanced Views in Android? Give two examples and explain their uses.

Answer:

Advanced Views are UI components that provide complex functionality beyond basic widgets like TextView or Button.

Examples:

1. RecyclerView

- Used to display large lists or grids efficiently.
- Supports view recycling, animations, custom layout managers.

2. ViewPager2

- Allows users to swipe between screens or images.
- Common in onboarding screens, image galleries.

Other examples:

- CardView
 - ChipGroup
 - NavigationView
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Q8. Explain how multimedia features (audio, video, or images) can enhance user experience in Android apps.

Answer:

Multimedia features make apps more interactive, engaging, and user-friendly.

Benefits:

1. Audio

- Voice instructions in learning apps
- Background music in games

2. Video

- Tutorials, trailers, reels
- Video streaming apps

3. Images

- Better visual representation
- Product images in shopping apps

Enhancement in UX:

- Improves user attention and retention
- Makes information easier to understand
- Provides dynamic and immersive experience

Example:

A learning app with step-by-step videos helps students understand topics better.