Lab Experiment No 1 : Developing a "Hello World" Android Application

Objective:
To introduce students to Android app development by guiding them through the process of creating a simple "Hello World" application. This lab will cover setting up the development environment, creating a new project, designing a basic user interface, and running the application on an emulator or physical device.

Pre-requisites:

- Basic understanding of Java or Kotlin programming language.
- Installed Android Studio IDE.
- Android SDK and Emulator setup.

1. **Setting Up the Development Environment**

   1. Install Android Studio:
   - Download and install Android Studio from the official website: [Android Studio](https://developer.android.com/studio).

   2. Set Up Android SDK:
   - During installation, Android Studio will prompt you to install the Android SDK. Ensure it is installed, as it contains the necessary tools and libraries.

   3. Create an Emulator (Optional):
   - Open Android Studio.
   - Go to `AVD Manager` (Android Virtual Device Manager).
   - Click on `Create Virtual Device` and follow the prompts to set up a new emulator.

2. **Creating a New Android Project**

   1. Launch Android Studio:
   - Open Android Studio and click on `Start a new Android Studio project`.

   2. Configure Your Project:
   - Project Name: HelloWorld
   - Package Name: com.example.helloworld
   - Save Location: Choose your preferred directory.
   - Language: Choose Java or Kotlin.
   - Minimum API Level: Select the appropriate API level (e.g., API 21: Android 5.0 (Lollipop)).

   3. Select Project Template:
   - Choose `Empty Activity` and click `Finish`.

3. Designing the User Interface

1. Open `activity_main.xml`:
   - Navigate to `res/layout/activity_main.xml` in the project explorer.

2. Modify the Layout:

3. Customize UI Elements:
   - Change the `TextView` properties such as text size, color, and style as needed.
   - Set a background color for the `LinearLayout` using `android:background`.

4. Adding Functionality (Optional)

1. Adding a Button:
   - Add a `Button` below the `TextView` in `activity_main.xml`.

2. Implementing OnClickListener:
   - In `MainActivity.java` or `MainActivity.kt`, set up an `OnClickListener` for the button.

5. Running the Application

1. Run on Emulator:
   - Click on the green `Run` button or press `Shift + F10`.
   - Choose the emulator you created and click `OK`.

2. Run on Physical Device:
   - Enable Developer Options and USB Debugging on your Android device.
   - Connect your device via USB.
   - Select your device in the target device dropdown and click `Run`.

6. Debugging and Testing

- Test the application by running it on different devices or emulators with varying screen sizes and Android versions.
- Use Logcat in Android Studio to monitor the application's behavior and troubleshoot any issues.

7. Submission Guidelines

- Project Files: Submit the entire project folder in a zip file.
- Screenshots: Include screenshots showing the application running with the "Hello World" text and any additional features implemented.
- Documentation: Provide a brief report explaining the steps followed, any challenges faced, and how they were resolved.

8. Evaluation Criteria

- Correctness: The application correctly displays "Hello World" and meets any additional requirements.
- UI Design: The user interface is clean, well-designed, and functional.
- Code Quality: The code is well-organized, commented, and follows best practices.
- Creativity: Additional features and customizations beyond the basic requirements.

***