# Lab 01

Instructor: Sidra Khatoon E-mail: skhatoon[@uit.edu](mailto:ad@uit.edu)

# Objective

The purpose of this lab session is do comparison study on Android Studio and Flutter. We have to find that which tool is best for app development. Student do research on it in lab.

**Student Information**

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| --- | --- |
| **Student Name** |  |
| **Student ID** |  |
| **Date** |  |

**Assessment**

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| --- | --- |
| **Marks Obtained** |  |
| **Remarks** |  |
| **Signature** |  |

UIT University

Department of Engineering Technology

CET 222 Mobile Application Development

Lab 01

### Instructions

* Come to the lab on time. Students who are late more than 15 minutes, will not be allowed to attend the lab.
* Students have to perform the examples and exercises by themselves.
* Raise your hand if you face any difficulty in understanding and solving the examples or exercises.
* Lab work must be submitted on or before the submission date.
* Every lab Task is evaluated, so perform your lab task cautiously and get it checked timely.
* Mobile Phones are strictly prohibited in the lab.

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1. Labs Descriptions

What is Android Studio?

**Android Studio** is an **Integrated Development Environment (IDE)** built by Google for developing **native Android applications**. It is based on **IntelliJ IDEA** and provides tools and resources for creating, testing, and debugging Android apps. Here’s an overview:

* **Key Features**:
  + **Native Android Development**: Android Studio is specifically designed for building apps that run on Android devices, from smartphones to tablets, TVs, and wearables.
  + **Languages Supported**: Primarily supports **Kotlin** and **Java** as the main programming languages for Android app development.
  + **Emulator**: Comes with a built-in Android Emulator for testing apps on various virtual Android devices.
  + **Layout Editor**: Provides a visual tool to design your app’s UI using a drag-and-drop interface and preview it on different screen sizes.
  + **Gradle Build System**: Android Studio uses Gradle for build automation, allowing developers to manage dependencies and optimize build processes.
  + **Debugging & Profiling Tools**: Provides in-depth debugging tools (Logcat, breakpoints, etc.) and performance profilers for CPU, memory, and network usage.
* **Use Cases**:
  + When building **native Android apps** that require deep integration with Android-specific APIs or performance optimization.
  + When using **Kotlin** or **Java** for Android development.
  + For creating apps that interact heavily with the Android system, like those involving sensors, background services, or native Android libraries.

**Pros of Android Studio:**

* High-performance, resource-intensive apps.
* Deep integration with Android-specific features.
* Maximum control over UI/UX and system-level components.

**Cons of Android Studio:**

* High resource usage and slow performance on less powerful systems.
* Steep learning curve and a complex project structure, especially for beginners.
* Long build times and issues with managing Gradle dependencies.
* Limited to Android development, making cross-platform development more cumbersome.
* Emulator issues and fragmentation challenges when dealing with a diverse set of Android devices and versions.

**What is Flutter?**

**Flutter** is an open-source UI software development kit (SDK) created by Google. It allows developers to build **cross-platform applications** from a single codebase. This means you can write one set of code that runs on multiple platforms like **iOS**, **Android**, **web**, and **desktop**. Here’s an overview:

* **Key Features**:
  + **Cross-Platform Development**: Develop applications for iOS, Android, web, and desktop with one codebase.
  + **Programming Language**: Flutter uses **Dart**, a programming language developed by Google, which is known for its fast performance and ease of use.
  + **Rich Widget Library**: Flutter provides a wide variety of customizable widgets to build native-like user interfaces.
  + **Hot Reload**: This feature allows developers to see the results of code changes in real-time without having to restart the entire app.
  + **High Performance**: Flutter uses its own rendering engine and doesn’t rely on platform-specific UI components, which helps it deliver smooth animations and fast UI performance.
  + **Growing Ecosystem**: It has a large and growing number of plugins and third-party packages available on **pub.dev**, making it easy to extend app functionalities.
* **Use Cases**:
  + When you need to build apps for both Android and iOS.
  + When you want a fast development cycle and a single codebase for multiple platforms.
  + For building high-performance apps with rich and customizable UIs.

**Pros of Flutter:**

* High flexibility
* No need to write different code for creating app on android and iOS
* Material Design Support
* Responsive Design
* Presence of classes for animation that you can directly use

**Cons of Flutter:**

* New language dart need more time to learnt
* Lack of resources allowed to developed app using flutter

Assessments:

Q 1: Compare and contrast Flutter and Native Android Development in the aspects of Development language and framework?

Q2: Discuss the pros and cons of using Android Studio versus Flutter for mobile app development?