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| **BATCH AND ROLL NO:** |
| **EXPERIMENT NO.10** |
| **TITLE:** Design a mobile app using Google Map and GPS to trace the location. |
| **DATE OF PERFORMANCE:** |
| **DATE OF SUBMISSION:** |

**Title:** Design a mobile app using Google Map and GPS to trace the location.

**Requirements:**

1 Android studio

2.Google Play service Packages

**Theory:**

**Introduction**

In the ever-connected world of mobile applications, harnessing the power of location-based services has become essential for creating dynamic and context-aware applications. This lab focuses on designing a mobile application that integrates Google Maps and Global Positioning System (GPS) functionalities, enabling users to trace their location and visualize it on a map. The fusion of Google Maps and GPS empowers developers to craft applications that provide real-time location-based information, fostering an enriched user experience.

**Objective of the Lab:** The primary objective of this lab is to guide you through the process of designing a mobile application that leverages Google Maps and GPS technology. By the end of this lab, you should be adept at implementing features such as obtaining real-time location updates, displaying the user's location on a Google Map, and incorporating additional functionalities to enhance the overall location tracking experience.

**Components of the Application:**

1. **Google Maps Integration:**
   * The application will integrate Google Maps, allowing users to view and interact with a map interface.
   * Developers will utilize the Google Maps API to embed the map and leverage its rich features for location-based interactions.
2. **GPS Location Tracking:**
   * The application will utilize the device's GPS functionality to trace and update the user's real-time location.
   * GPS data will be used to dynamically update the user's marker on the Google Map.

**Lab Prerequisites:**

* Basic understanding of mobile application development concepts.
* Familiarity with the chosen development environment (e.g., Android Studio).
* Prior knowledge of programming languages such as Java (for Android)

**Steps:**

### **Step 1: Set Up Your Development Environment**

* Ensure that you have Android Studio installed and configured on your machine.
* Create a new project in Android Studio.

### **Step 2: Obtain Google Maps API Key**

* Obtain a Google Maps API key from the Google Cloud Console.
* Enable the "Maps SDK for Android" for your project.

### **Step 3: Add Google Maps SDK to Your Project**

* Open the build.gradle file (Module: app) and add the following dependency:

implementation 'com.google.android.gms:play-services-maps:17.0.1'

### **Step 4: Design the User Interface**

* Open the XML layout file associated with your main activity (e.g., activity\_main.xml).
* Add a SupportMapFragment or MapView element to your layout to display the Google Map.

### **Step 5: Implement Google Maps Integration**

* Open the Java file associated with your main activity (e.g., MainActivity.java).
* Initialize the Google Map and set up its features, such as zoom controls and markers.

### **Step 6: Implement GPS Location Tracking**

* Request permission for accessing the device's location in the AndroidManifest.xml.
* Implement a LocationListener to receive location updates.

### **Step 7: Test Your Application**

* Run your application on an emulator or a physical device.
* Verify that the Google Map is displayed, and the user's location is updated on the map as they move.

**XML Code:**

**Java Code:**

**Output:**

#### Conclusion:

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