

## Trace user route (Project 1)

App should be tracking the location of user and show the tracking steps in open street map. So, these are some analysis and notes about app

### Notes:

#### Packages:

- 1- **flutter/material.dart**: for Flutter UI components
- 2- **dart: async**: for asynchronous programming.
- 3- **flutter\_osm\_plugin package**: for getting user location and tracking user device

**Permissions:** You must allow access location, before using app and these is permissions which used in app

#### Android:

```
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION"/>
```

#### IOS:

```
<string>Need location when in use</string>
<key>CLLocationWhenInUseUsageDescription</key>
<string>any text you want</string>
<key>CLLocationAlwaysUsageDescription</key>
<string>any text you want</string>
```

<b>Mobile phone model</b>	Samsung galaxy A10.
<b>OS</b>	Android 9.0 (Pie), upgradable to Android 11, One UI 3
<b>Sensor</b>	gps sensor to get location using satellite signals

- **GPS** : is often provided via a Global Navigation Satellite System (GNSS) receiver. This receiver can pick up signals from the GPS (United States), GLONASS (Russia), Galileo (European Union), and Bidou (China) satellite constellations, among others. The precise location of the device is determined by the GNSS receiver by combining signals from these satellite systems. The Samsung A10's GPS sensor may be of a different specific type or model based on the device's manufacturing batch or geographical

variances, but it is made to deliver precise location data utilizing satellite signals.

- **OpenStreetMap (OSM)** :is a collaborative mapping project and open source data initiative that aims to create a free and editable map of the world. It is often referred to as the "Wikipedia of maps" due to its community-driven nature.
- **The flutter\_osm\_plugin package** :seems to provide convenient features for working with OSM maps, such as displaying user location, adding markers, and drawing roads.
- **The periodic timer**: for updating the user's location is set to 3 seconds (Duration (seconds: 3)). you can adjust this duration according to your app's needs.

**Accuracy:** The accuracy of the location tracking depends on the underlying system and the hardware being used. The code utilizes the Flutter OSM Plugin, which interacts with the device's location services. The accuracy of the location data would rely on the capabilities and settings of the device's GPS or other location sensors.

**Power Consumption:** Continuous location tracking can consume a significant amount of power, especially if it involves frequent updates and network communication. The code uses a periodic timer (every 3 seconds) to update the location, which can have an impact on the device's battery life. Power optimization techniques, such as reducing the update frequency or utilizing low-power location services, could be considered to mitigate power consumption.

**Efficiency:** The efficiency of the code can be evaluated in terms of computational resources and response time. The code uses a timer and asynchronous operations to periodically retrieve and update the location. However, without further details on the specific use case and performance requirements, it is difficult to assess the overall efficiency.

**Reliability:** The reliability of the location tracking depends on various factors, including the stability of the device's location sensors, network connectivity, and the underlying Flutter OSM Plugin. Robust error handling and proper handling of edge cases (such as loss of signal or intermittent network connectivity) are important for improving reliability.

**Advantages:** - provide position - velocity - timing information.

**Disadvantages:** - Inaccuracy - The chance of signal or battery failure  
- Lack of local knowledge - Privacy issues and crime.  
- Reliance on US Department of Defense