

ASSIGNMENT 1

INTRODUCTION TO MOBILE COMPUTING

GIVEN OUT: MARCH 6TH, 2018, DUE: MARCH 20TH, 2018, 11:59 PM.

In this assignment, you will build an Android application that finds your location using two methods.

Method 1: Your application uses the GPS unit to find your location outdoors and network triangulation to find your location indoors. You should access your location as fast as possible.

Method 2: Your application uses the GPS unit to find your location outdoors and network triangulation to find your location indoors only **ONCE**. Hence your application should take a GPS location (or using network localization) once when the app starts. From this point onwards your application should only use the accelerometer and gyroscope to find your location. The location should be in the form of <latitude, longitude> duples. The algorithm that you use to calculate your location using the single GPS/Network location is totally up to you. You may also choose to only use the accelerometer.

USER INTERFACE

The user interface should display the following components.

- (1) Latitude and Longitude from Method 1.
- (2) Latitude and Longitude from Method 2
- (3) A distance value (d) between the lat, long calculated from the two methods. The formula for calculating d is the following.

$$dlon = lon2 - lon1$$

$$dlat = lat2 - lat1$$

$$a = (\sin(dlat/2))^2 + \cos(lat1) * \cos(lat2) * (\sin(dlon/2))^2$$

$$c = 2 * \text{atan2}(\text{sqrt}(a), \text{sqrt}(1-a))$$

$$d = R * c \text{ (where R is the radius of the Earth).}$$

Where lon1 and lat1 are the latitude and longitude from Method 1, and lon2 and lat2 are the latitude and longitude from Method 2.

WHAT TO SUBMIT (TOTAL: 10 POINTS)

- (1) Source code of your project as a .zip or .tar.gz. **[6 points]**
- (2) A video demonstrating the project features. **[2 points]**
- (3) A doc file that describes the algorithm used for Method 2. **[2 points]**
- (4) The link to the video can be embedded in the doc file for (3)

- (5) Zip the source code and doc file and call the zipped file Assignment1.zip. **Text the .zip file to the TA over email (pratikb1@umbc.edu). You can email multiple times before the deadline. The TA will discard all messages received after the deadline.**
- (6) This assignment will be solved by you individually. No group discussion is allowed.
- (7) Make sure that you use proper Android lifecycle functions.
- (8) Extra Credit: The assignment will the lowest distance between the two methods would get an extra **2 points**.