The goal of this assignment is to create a more complicated (and useful) App Inventor app using a Canvas and LocationSensor. The app will act as a “breadcrumb trail” which will track the user’s recent locations on campus.

1. [10] Create a new App Inventor project called Assignment2. Add a Canvas named MapCanvas to your project and set LokeyScienceAreaSmall.png as the background image (see link on Piazza).

2. [10] Add a TableArrangement named TableArrangement to your project with five rows and two columns. In the left column, add Labels with text values “Lat: “, “Long: “, “Map X: “, “Map Y: “, and “Location: “. In the right column, add Labels which will hold values associated with the name to their left. The right-column Labels should have initial text values “Undefined”, “Undefined”, “Undefined”, “Undefined”, “Out of area”. All Labels should be named intuitively.


4. [5] Add a LocationSensor named LocationSensor to your project. Your project should now look like:

5. [10] Add a Screen1.Initialize block (activated when the app is first launched), which sets the LocationSensor’s ProviderName to “gps” and ProviderLocked to true. This will force the app to use GPS satellites when available. You’ll want to ensure that your phone has all GPS capabilities enabled (Settings -> Location and Security Settings; Use wireless networks, Use GPS satellites,
and Enable Assisted GPS enabled). Note that your app will only receive GPS data if the app has been installed on the phone (i.e., Package for Phone -> Download to Connected Phone; this will only work with the Blocks Editor open and connected to the phone) and the phone is outside.


7. [10] Add variable blocks with the associated values: longMin (-123.075), longMax (-123.07), longRange (.005), latMin (44.045), latMax (44.047), latRange (.002), mapX (0), and mapY (0).

8. [40] Add a LocationSensor.LocationChanged block. When activated, this block should first check to make sure that the current longitude is >= longMin and <= longMax and that latitude is >= latMin and <= latMax. This test will determine whether or not the current GPS coordinates lie within the bounds of the canvas. If they do:

   Calculate the X and Y coordinates on the MapCanvas corresponding to the current GPS coordinates. To accomplish this, assume that (longMin, latMax) is the longitude (East/West) and latitude (North/South) at the top-left corner of the canvas. Similarly, (longMax, latMin) is the bottom-right corner of the canvas. longRange and latRange are the differences between longMax and longMin, and latMax and latMin, respectively. Store the resulting X and Y coordinates in the mapX and mapY variables so that they can be reused later in the LocationChanged block. Use the current width and height of the canvas in your calculations so that the app will work on a variety of applications and when the app is resized.

   Then, set text values for the appropriate Labels (from part 2) to the current latitude, longitude, map X and, map Y coordinates. Set the text value for the Label associated with “Location: “ to LocationSensor.CurrentAddress.

   Then, draw a black circle of radius 3 followed by a yellow circle of radius 2 at (mapX, mapY) on the canvas. The yellow circle on top of the black circle will ensure visibility in both dark and light areas of the canvas.

   If the current GPS coordinates do not lie within the bounds of the canvas:

   Set text values for Labels associated with the latitude, longitude, max X, and map Y coordinates to “Undefined” and set the value associated with “Location: “ to “Out of area” (these are the application defaults).

9. [+10] (Extra credit) Draw lines between locations as the user moves around campus instead of circles such that a line is always drawn from the user’s last position to their current position. You’ll need to be careful with the first line drawn when the user enters the canvas area, and the
lines should have the same dimensions and colors as the circles (i.e., draw a black line of width 6 followed by a yellow line of width 4).

Download your Assignment2 project directory to your computer (i.e. My Projects -> More Actions -> Download Source) and then upload to Blackboard (i.e., Course Documents -> Assignment 2).