SPU 26 Assignment 4 Due Monday, October 15th in lecture

In this assignment, you will use a compass to 1.) find your heading as you walk down JFK Street toward the Anderson Memorial Bridge and 2.) use compass triangulation to find your position on the bridge itself by taking bearings to identifiable sights on the map provided. The map has its origin (0,0) at the John Harvard Statue and has markings in tenths of a mile (that is to say, the lines on the map are separated by 0.1 miles). You will be supplied a compass in section that you will share will someone. It's fine to do the assignment in pairs. Alternatively, you may purchase a compass (e.g. at EMS in Harvard Square). *Note: avoid placing near iron/steel (these may reinforce structural parts of bridges/buildings etc and be hidden from view).*

1.) Walk from Harvard Square toward the Charles River along JFK Street.
2.) Stop at the northwest corner of the intersection of JFK and Winthrop Street (near the entrance to Staples). Take a heading down JFK Street. Remember that the magnetic declination is 15^{o} west. That is to say, the magnetic needle will point 15^{o} to the west of true north. Make a note of your heading, and estimate the uncertainty.
3.) Walk to the Anderson Memorial Bridge. This is the bridge that crosses over the Charles River at the end of JFK Street. Go to the middle of the bridge on the western side.
4.) Take a bearing on three landmarks that you can identify on the map. Remember to adjust for the magnetic declination, so that the bearings are referenced to true north (which is the grid on the map). Make a note of these three bearings. If you are unsure of what you're sighting, make a rough sketch of what the object looks like so you can find out what it is by investigating. Part of the exercise is identifying the landmarks. Make a note of your three bearings, and your estimate of the uncertainty in each of these.
5.) If necessary, you might have to walk to the landmarks you sighted to make sure you know what they are on the map.
6.) You may return to your room, or some location where you can complete the exercise.
7.) Take the back-bearings of each of your bearings. Make a note of the back-bearings.
8.) From each of the landmarks draw a line representing your line of position using the back-bearings on the map.
9.) The intersection of any pair of lines gives you your position. You will have three intersections. What is the best estimate of your position based on the intersection?
10.) How well does the estimate of your position compare with the actual position on the map?
11.) What is your estimate of your uncertainty in position in both the north and east direction? Draw cones of uncertainty for the angles and report the spatial extent expressed in miles (including 10ths and 100ths)
12.) Enter these data onto the form provided.
13.) Hand in the map and form in lecture.

Your name_____ TF's Name_____

Section time _____

1.) What is the heading down JFK Street at the intersection with Winthrop?

2.) List the names of the three objects you took bearings on and their back bearings.

Name	Bearing	Backbearing

3.) What is the best estimate of your position in terms of the coordinate system shown on the map below?

4.) How well does the estimate of your position agree with the actual position on the map? Express your answer in miles of northing and easting (remember the map is graduated in tenths of a mile!).

5.) What is your estimate of your uncertainty in position based on the uncertainties in the compass bearings? How far off northing and easting are you (express your answer in miles – remember the chart is graduated in tenths of a mile!).


-5
-4
-3
-2
-1
0
1
-0
-1
-2
-3
-4
-5
-6
0.1 mi
MN = 15° W
N
E