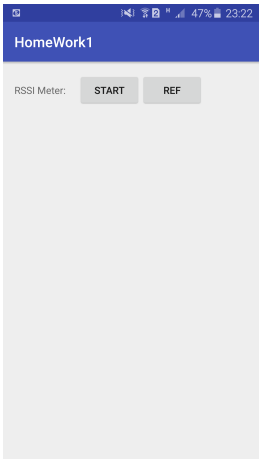
Homework 1 Report (Yunke Tian – 109929662)

Problem 1

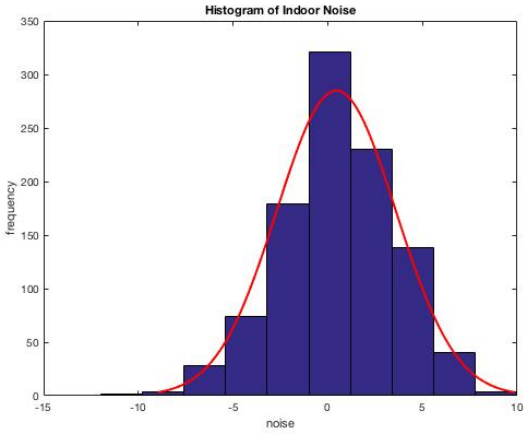
What I did:

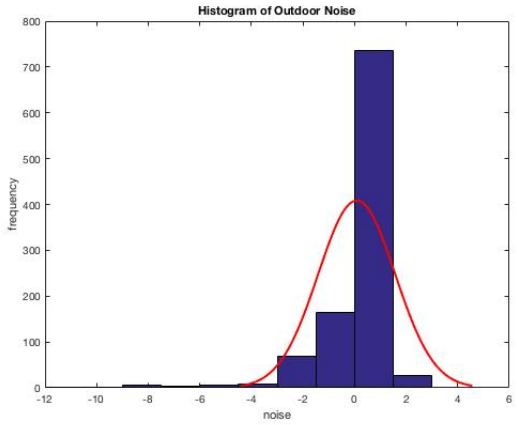
I wrote a very simple android program (as I'm totally new to it), where I press the "start" button and it starts to scan the connection wifi signal strength. I tested indoor with NLOS, and outdoor of LOS, with 1020 data each, and 3 seconds of scan interval. The data were written to .txt files in my android mobile, and I use thirdparty app to send it to my laptop for processing.



Result & discussion:

Below are the indoor noise and outdoor noise histogram:





Indoor Outdoor

From the figures, it's obvious that indoor noise has larger variance, while outdoor noise is more centralized to 0 with smaller variance. This mainly results from the shadowing/fading source.

Source Code:

Main files are in the "android_code" directory.

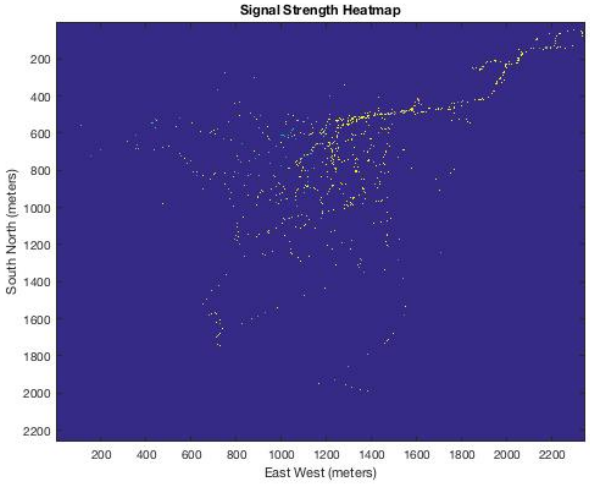
Problem 2

What I did:

Exactly according to the assignment instructions. All codes implemented in MatLab.

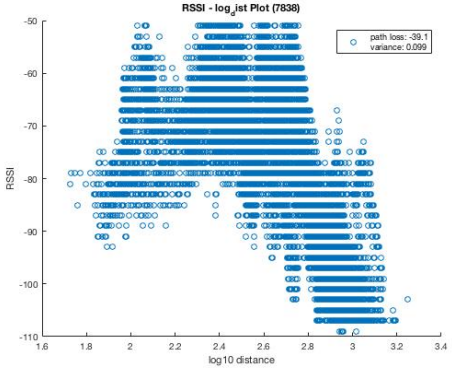
Result & discussion:

a. Heatmap as follows:

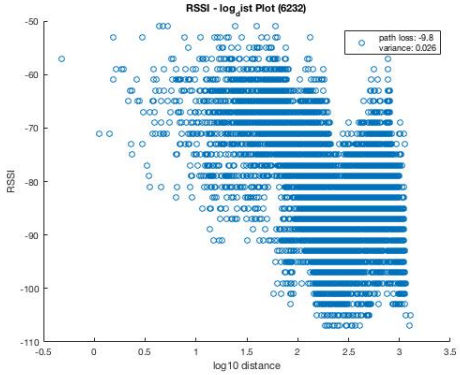


b. The closer to the base station, the stronger the signal strength. It's like a wave spreading out.

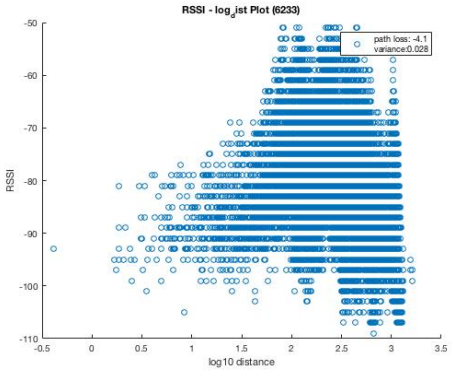
c. RSSI – log(dist) plot for 6 base stations (7838, 6232, 6233, 6231, 7837, 5338): (I used log10)



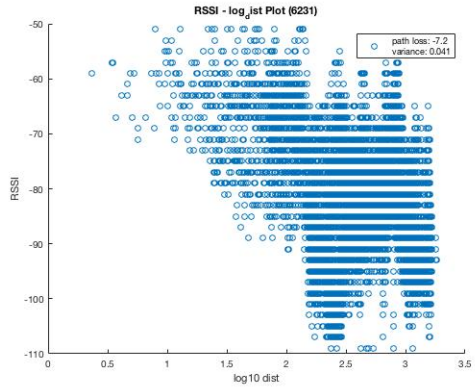
7838



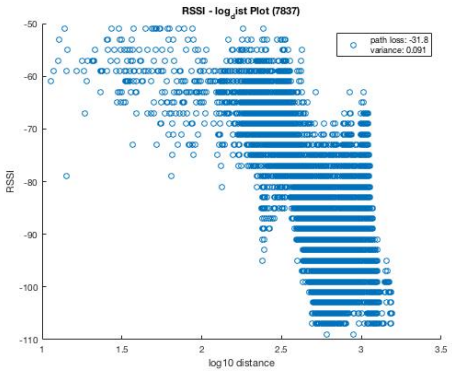
6232

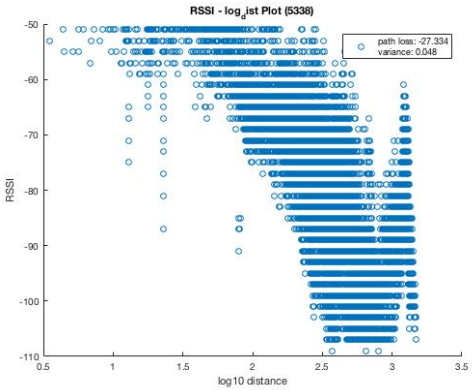


6233



6231





7837 5338

d.

	Path loss exponent	Shadowing variance
7838	-39.1	0.099
6232	-9.8	0.026
6233	-4.1	0.028
6231	-7.2	0.041
7838	-31.8	0.091
5338	-27.3	0.048

Source Code:

Codes for problem 1 and problem 2 are in corresponding folders in “matlab_code” directory. For problem 1, run ‘prob_main.m; for problem 2, run ‘htMap.m’ and ‘scatterPlot.m’.