1. Given the following data:

x	y
0	.4
1	1.3
4	4.8

a. You want to fit a line through the data using least squares. Solve for the optimal slope and y-intercept symbolically.
b. Compute the optimal slope and y-intercept numerically. What are their values?
c. Plot the given data and line fit on the same graph.
d. Compute the error squared between the line fit and given data. What is it's value? Try some values for the slope and y-intercept that are close to their optimal values. Compute the error squared for these values of the slope and y-intercept. Is the error squared larger, smaller, or the same?

2. Manufacture some data for a user and a satellite constellation. Define user coordinates and SV coordinates, assume all coordinates are in the same reference frame. Generate range data and pseudorange data for a user clock bias (you choose). Write a MATLAB function that accepts SV positions, estimated user position, pseudoranges, and estimated user clock bias. The function shall return the vector of corrections, Δx . Use your MATLAB function to solve for user position and clock bias using your generated data. Iterate until the position corrections are less than 1 meter each and the user clock correction is less than 10^(-8). Included below is some validation data. Verify the data using your program. Is the user clock advanced or retarded?

SV data (meters)

SV#	$x/10^7$	$y/10^7$	$z/10^7$
18	-1.13550126370661	-1.63114165127841	1.78583422891763
21	-0.34063593613493	-1.69807514863560	2.00474729459851
06	-0.56524602637906	-2.56210948442484	-0.36690287522384
07	-1.64696970556889	-1.59087787173377	1.36826494171335
09	1.42353427507316	-2.17433151532453	-0.52021995161359
15	-1.12712029405625	-1.02948523651676	2.15827825563964

Pseudorange data (meters)

SV#	$\rho_i/10^7$
18	2.34595265864385
21	2.24910133010162
06	2.41504401929870
07	2.42503441064139
09	2.49401794775179
15	2.40061779630390

User position: $(0.42319357512711, -5.36218773200293, 3.41605098218218)*10^6$ m
User clock bias: 0.00615401480935 seconds