Lab 10 Assignment

Due November 21st on Blackboard by 5pm.

The files *"Lab 10 - Real Estate Data.txt"* and *"Lab 10 - Real Estate Data.csv"* contain real estate transaction data from 2014 - 2015. There are 21,597 tuples of data,which we describe below.
First column: the selling price of the property in dollars.
Second column: the number of bedrooms.
Third column: The number of bathrooms.
Fourth column: The number of floors.
Fifth column: Waterfront (0=no, 1=yes).
Sixth column: Condition (1=worn, 5=excellent).
Seventh column: Grade (1=poor,13=excellent)
Eighth column: Year Built (for example 1980).
Ninth column: The living space in sq. ft.
Tenth column: The lot size in sq. ft.
The task is to determine a multi-linear regression relationship of the form,

$$x_1 + x_2 \cdot Bedrooms + x_3 \cdot Bathrooms + x_4 \cdot Floors + x_5 \cdot Waterfront$$
$$+x_6 \cdot Condition + x_7 \cdot Grade + x_8 \cdot YearBuilt$$
$$+x_9 \cdot LivingSpace + x_{10} \cdot LotSize = SellingPrice.$$

Set up and solve the multi-linear regression system, then report the solution.

1. Import the data from *Lab 10 - Real Estate Data.txt*.
2. Create the multi-linear regression system, i.e. determine A and $\boldsymbol{b}$.
3. Solve for $\hat{\boldsymbol{x}} = \begin{pmatrix} x_1 \\ x_2 \\ . \\ . \\ . \\ x_{10} \end{pmatrix}$, the vector which minimizes $||A\hat{\boldsymbol{x}} - \boldsymbol{b}||^2$.
4. Report the least-squares solution $\hat{\boldsymbol{x}}$.

Now that you know $x_1, x_2, ..., x_{10}$ you can use the given model to predict the selling price when you are given the number of bedrooms,bathrooms,..., lot size. Use this model to predict the selling price for the real estate transaction with the following data. The predicted price you should get is $2,608,060.01 (but observe from the data that the real selling price is 5.3 million dollars).

```
Selling Price = $5,300,000  ( don't use this value)
Bedrooms = 6
Bathrooms = 6
Floors = 2
Waterfront = Yes
```

```
Condition = 4
Grade = 12
Year Built = 1991
Living Space = 4,320 sq. ft.
Lot Size = 24,619 sq. ft.
```

Submit a pdf file with all MATLAB work shown (don't print unnecessary matrices, but make sure to print the results) .