6. In this problem we want to play with hedonic pricing model we discussed in the class. Download the dataset from the website. Explain all the predictors you have in this dataset. Answer the following questions regarding this dataset.

   (a) Calculate the average price of apartments that have 1, 2, 3, 4, 5 bedrooms respectively. Plot these averages in terms of the number of bedrooms. Use OLS to fit a line to this graph. Given this model, how much does the price on average increase for an extra bedroom? Do you think that the loss function that OLS uses is good for this model? Explain your answer?

   (b) I make the following claim. The higher price of the apartments with more bedrooms is because of the fact that houses with more bedrooms have larger lot-sizes and the increase you see in the price is because of larger lot-size and not more bedrooms. Can you do some regression analysis to see if my claim is true or not? What is the conclusion?

   (c) I claim that apartments with fully furnished basements have higher prices. Can you check whether this claim is true or not? How do you check it?

   (d) Plot the price of the apartments in terms of their lot-sizes for the apartments which have 2 bedrooms and 1 bathroom? Fit a line to predict the price of these apartments from their lot-size.

   (e) Suppose that given the lot size you get the prediction $\widehat{Price} = \hat{\beta}_0 + \hat{\beta}_1 \text{lot} - \text{size}$ from part (d). Find the apartments in your data for which $Price - \widehat{Price}$ is the largest and one for which $Price - \widehat{Price}$ is smallest. Can you explain why our predictions are not accurate for these two cases? Also what is the maximum of $Price - \widehat{Price}$.

   (f) Consider the full linear model we considered in the class and make predictions on the price of apartments. For which 2 bedroom,1 bathroom apartment $Price - \widehat{Price}$ is largest. If you compare this difference with the one you got in part (e), is your full linear model better than what you had before for two bedroom one bathroom apartments? If yes, did you expect it to be? If no, why do you think this is the case?

   (g) (optional) In case you have other ideas how you can improve the predictions implement them and provide results that show why your predictions are better.