IMPORTANT NOTES. Please upload your homework to Canvas or email your homework to our TA: ys688 at stat.rutgers.edu. For the simulation and data analysis problems, please put the code you developed at the end of the homework report (no separated files).

Suppose a person has a house to sell in the area, from which the data were gathered. The variables in the data set are:

- PRICE: selling price of house in thousands of dollars
- BDR: number of bedrooms
- FLR: floor space in sq. ft.
- FP: number of fireplaces
- RMS: number of rooms ST: storm windows (1 if present, 0 if
- absent)
- LOT: front footage of lot in feet
- TAX: annual taxes
- BTH: number of bathrooms
- CON: construction (0 if frame, 1 if brick)
- GAR: garage size (0=no garage, 1=one-car garage, etc.)
- CDN: condition (1="needs work", 0 otherwise)
- L1: location (L1=1 if property is in zone A, L1=0 otherwise)
- L2: location (L2=1 if property is in zone B, L2=0 otherwise)

Based on some prior analysis, we have the following R output: Call:
lm(formula = Price FLR + RMS + BDR + BTH + ST + GAR + FP +LOT, data = house)
Coefficients:

	$Estimate$	$Std.Error$	$tvalue$	$Pr(>\|t\|)$	
$(Intercept)$	18.64	5.24	3.56	0.0024	$**$
FLR	0.02	0.003	5.43	$4.49e-05$	$***$
RMS	3.90	1.62	2.42	0.0272	$*$
BDR	-7.70	1.83	-4.21	0.0006	$***$
BTH	2.37	2.56	0.93	0.3662	
ST	10.82	2.30	4.70	0.0002	$***$
GAR	1.77	1.40	1.26	0.2243	
FP	6.91	3.08	2.24	0.0387	$*$
LOT	0.26	0.14	1.95	0.0678	.

Multiple R-Squared: 0.9044, Adjusted R-squared: 0.8595
F-statistic: 20.11 on 8 and 17 DF, p-value: 3.147e-07

(1) Based on the R output, what would be the regression model you suggest?

(2) Write down the full model and reduced model associated with the following test and draw a conclusion based on this test (Note: This is a row obtained from the R output):

$$GAR \quad 1.77 \quad 1.40 \quad 1.26 \quad 0.2243$$

(3) Write down the null hypothesis and alternative hypothesis associated with the F-statistic and what is the conclusion based on the test.

(4) The house for selling has 750 square feet of space, 5 rooms, 2 bedrooms, 1.5 baths, storm windows, a 1-car garage, 1 fireplace and a 25 front-foot lot. Analyze the `housing price` data. Based on this dataset, what can you tell this person about how much he could expect to get for the house? Please report your fitted model and also construct a confidence interval for the prediction (Hint: You can try different variable selection methods to find the final model).