Answers to the short answers in Assessment 3

3. The term “Least Squares” refers to how the line of best fit is calculated. The Least Squares regression line minimizes the squared error terms (i.e the vertical distance between the observed response value and its corresponding predicted value on the line).

6. In the case of multiple linear regression, we need the assumption that there is no multicollinearity (two explanatory variables are highly related). Multicollinearity will create unstable estimates (it is not an issue in simple linear regression since there is only one explanatory variable).

7. The null hypothesis for this test is that there is no significant linear relationship between a corporation's 2009 profits and their 2009 bond prices. The alternative would be that there is a relationship between the corporation's profits for 2009 and their bond prices for 2009.

8.

H_0: $\beta_1 = 0$

H_A: $\beta_1 \neq 0$

$\hat{\beta}_1$= 3.54, $s_{\hat{\beta}_1} = \frac{\sqrt{\frac{854127}{75}}}{\sqrt{1089}}$ =3.255, t=$\frac{3.54-0}{3.255}$=1.087, p-value=(.2,.3), Do not reject H0. There does not appear to be a significant linear relationship between corporate’s 2009 profits and their 2009 bond prices.

9. When all other variables are held constant, as the maximum number of occupants increases by 1 the expected increase in price is $985.40.

10. R^2= SSR/TSS= 236165 / (236165 +101578) = 236165 / 337743 = 0.699

adjusted R^2 = 1- (1-0.699)(53 / 54-4-1) = 1-(0.301)(53/49) = 1- 0.32557 = 0.674

11. H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

H_A: At least one $\beta_i \neq 0$

12. SSE = 101578, SSR = 236165

n = 54, k = 4

F = MSR / MSE = (SSR/k) / (SSE/n-k-1) = (236165/4) / (101578/49) = 28.481