MS4215/MS6061 Lab 2

In the dataset **Lab2.xls** the variables x1, x2 and x3 are potential predictor variables and y is the dependent variable.

1. Use R to compute the following using matrix operations, where the X is the design matrix for the MLR model that includes x1, x2 and x3 as the independent variables.

   (i) $(X'X)^{-1}$

   (ii) $b = (X'X)^{-1}X'$y and write the equation for the fitted regression model

   (iii) Variance-covariance matrix for the regression coefficients
   $Var(b_j) = \hat{\sigma}^2((X'X)^{-1})$

2. Use the lm() function in R to fit the regression model in 1.

3. Test the significance of the model and the regression coefficients.

4. Are there any issues with multicollinearity?

5. Check the residual plots.

6. In your opinion what would be the best regression model to fit to the data?