CS6464 - CSLT
SOFTWARE ASSIGNMENT - 1

1. **Correlation Assignment:**
   The assignment is to measure the correlation, and produce a scatterplot, that shows the relationship between any two variables. The attached "Q1_data_xx.Rda" file contains the predictors $(x_1, x_2, ...)$ and the outcome (y). Use R and perform experiments to:
   i) Calculate the correlation between the predictors and also between the predictor and the outcome.
   ii) Generate the scatterplot matrix.
   iii) Based on the correlation values, discuss about the influence of predictors $(x_1, x_2, ...)$ on y.
   iv) Fit linear model on the data; Based on the coefficient of the predictors, identify the significant predictors.

   File Names (Links to download files are given in the webpage):
   Q1_data_01.Rda
   Q1_data_02.Rda

   (Refer to Table 1 for your assigned dataset)

2. **Regression - Polynomial Fitting:**
   Consider the problem of fitting one-dimensional data with a polynomial. Write an R code to:
   i) Plot function y given in "Q2_fun_xx".
   ii) Randomly extract 100 points from the function and add normally distributed noise to the data points to get "noisy data", $\hat{y}$.
   iii) Fit polynomial of degree d (values given in the table 1 below) to the noisy data.
   iv) Compute the bias and variance for the models fitted.
   v) Plot the bias-variance plot.

   Functions: (Code for both functions)
   Q2_fun_01: $y = e^{-5(x-0.3)^2} + 0.5\, e^{-100(x-0.5)^2} + 0.5\, e^{-100(x-0.75)^2}$
   Q2_fun_02: $y = 2 - 3x + 10x^4 - 5x^9 + 6x^{14}$

Deadline : 15/02/2018

Table 1:

S.No	Roll number	Q1 Data	d values
1	CS14B035	Q1_data_01.Rda	1,9,25
2	CS17D012	Q1_data_02.Rda	2,10,26
3	CS17M013	Q1_data_01.Rda	3,11,27
4	CS17M015	Q1_data_02.Rda	4,12,28
5	CS17M024	Q1_data_01.Rda	5,13,29
6	CS17M041	Q1_data_02.Rda	6,14,30
7	CS17M044	Q1_data_01.Rda	7,15,1
8	CS17M049	Q1_data_02.Rda	8,16,28
9	CS17M051	Q1_data_01.Rda	1,17,23
10	CS17M052	Q1_data_02.Rda	2,24,13
11	CS17M060	Q1_data_01.Rda	3,23,11
12	CS17S009	Q1_data_02.Rda	4,22,17
13	CS17S010	Q1_data_01.Rda	5,21,12
14	CS18E001	Q1_data_02.Rda	6,20,15
15	CS18E002	Q1_data_01.Rda	7,19,2
16	EE18E004	Q1_data_02.Rda	8,18,1
17	ME14B034	Q1_data_01.Rda	1,9,28