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 : 25/02/2019

Table 1:

S.No	Roll number	Q1 Data	d values		
1	CH15B033	Q1_data_01.Rda	1	9	18
2	CH15B054	Q1_data_02.Rda	2	10	19
3	CH15B061	Q1_data_01.Rda	3	11	20
4	CS17M046	Q1_data_02.Rda	4	12	21
5	CS18D018	Q1_data_01.Rda	5	13	22
6	CS18D300	Q1_data_02.Rda	6	14	23
7	CS18M002	Q1_data_01.Rda	7	15	24
8	CS18M013	Q1_data_02.Rda	8	16	25
9	CS18M017	Q1_data_01.Rda	1	17	18
10	CS18M024	Q1_data_02.Rda	2	9	19
11	CS18M025	Q1_data_01.Rda	3	10	20
12	CS18M028	Q1_data_02.Rda	4	11	21
13	CS18M031	Q1_data_01.Rda	5	12	22
14	CS18M033	Q1_data_02.Rda	6	13	23
15	CS18M035	Q1_data_01.Rda	7	14	24
16	CS18M038	Q1_data_02.Rda	8	15	25
17	CS18M039	Q1_data_01.Rda	1	16	18
18	CS18M040	Q1_data_02.Rda	2	17	19
19	CS18M041	Q1_data_01.Rda	3	9	20
20	CS18M042	Q1_data_02.Rda	4	10	21
21	CS18M043	Q1_data_01.Rda	5	11	22
22	CS18M045	Q1_data_02.Rda	6	12	23
23	CS18M047	Q1_data_01.Rda	7	13	24
24	CS18M048	Q1_data_02.Rda	8	14	25
25	CS18M049	Q1_data_01.Rda	1	15	18
26	CS18M050	Q1_data_02.Rda	2	16	19
27	CS18M051	Q1_data_01.Rda	3	17	20
28	CS18M052	Q1_data_02.Rda	4	9	21
29	CS18M055	Q1_data_01.Rda	5	10	22
30	CS18M058	Q1_data_02.Rda	6	11	23
31	CS18M059	Q1_data_01.Rda	7	12	24
32	CS18M060	Q1_data_02.Rda	8	13	25
33	CS18M062	Q1_data_01.Rda	1	14	18
34	CS18S038	Q1_data_02.Rda	2	15	19
35	CS18S039	Q1_data_01.Rda	3	16	20
36	EE15B094	Q1_data_02.Rda	4	17	21
37	EE18M058	Q1_data_01.Rda	5	9	22
38	MA17M001	Q1_data_02.Rda	6	10	23
39	MA17M003	Q1_data_01.Rda	7	11	24
40	MA17M006	Q1_data_02.Rda	8	12	25
41	MA17M008	Q1_data_01.Rda	1	13	18
42	MA17M009	Q1_data_02.Rda	2	14	19
43	MA17M010	Q1_data_01.Rda	3	15	20
44	MA17M011	Q1_data_02.Rda	4	16	21
45	MA17M012	Q1_data_01.Rda	5	17	22
46	MA17M013	Q1_data_02.Rda	6	9	23
47	MA17M014	Q1_data_01.Rda	7	10	24
48	ME17M024	Q1_data_02.Rda	8	11	25