CSE214 – Statistical Programming
Project-3
Due Date: 20.05.2024

General Description

You need to work in the group that was created for the first project.
Please use "**MultRegData.txt**" to answer the questions below. The file of "MultRegData.txt" includes 100 observations from 8 variables:

IndNo: Id numbers of individuals in the sample
Y, X1, X2, X3, X4, X5, X6 and **X7**: continuous variables.
Y: dependent variable.
X1, X2, X3, X4, X5, X6 and **X7**: Independent variables.

Questions

In order to answer each question, please WRITE YOUR OWN FUNCTION USING R-PROJECT, hand in the r functions and outputs through CLASSROOM portal.

1. Please write a R function to do simple and multiple linear regression analyses using matrix applications. In this function:
    a. Y and single or multiple X variables will be input.
    b. Intercept β_0 and regression coefficients β_i for independent X variables will be estimated
    c. Estimates of Y ($\hat{Y}$) and residuals ($\hat{e}$) will calculated.
    d. Total sum of square (TSS), regression model sum of square (RMSS), residual sum of square (RSS) and coefficient of determination (R-square) will be calculated.
2. Please write a R function to do model selection based on R-square as a model choice criterium in the multiple regression analysis.
    a. The R function should list all possible models with total sum of square (TSS), regression model sum of square (RMSS), residual sum of square (RSS) and coefficient of determination (R-square), e.g:

Model	Number of Variables	Variable (X) Name	TSS	RMSS	RSS	R-Square
1	1	X2	..	..	..	..
2	1	X4	..	..	..	..
:						
8	2	X2 X5	..	..	..	..
n	7	X1 X2 X3 X4 X5 X6 X7	..	..	..	..

The list of models should be from the highest R-square to lowest R-square within number of variables.

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Dataset : “MultRegData.txt”

IndNo	Y	X1	X2	X3	X4	X5	X6	X7
1	67.21	3.77	22.11	79.58	78.27	73.19	88.73	15.51
2	61.10	3.76	19.88	71.23	70.67	78.50	88.87	15.52
3	59.89	3.96	22.36	71.44	73.27	76.10	88.65	15.61
4	61.00	3.92	19.04	70.36	71.72	73.02	87.54	15.57
5	60.89	4.13	22.97	69.12	68.66	68.81	88.97	16.58
6	57.87	3.64	18.45	67.29	66.73	68.66	86.87	14.33
7	62.42	4.36	22.45	74.30	74.71	74.31	89.06	17.26
8	60.64	3.99	18.39	70.71	72.01	72.41	89.17	14.83
9	57.74	3.93	19.59	65.62	63.89	70.44	89.22	16.57
10	63.99	3.89	21.49	73.61	73.77	72.26	86.45	14.64
11	62.67	4.38	22.70	74.27	73.89	72.19	90.45	15.89
12	60.75	3.86	21.16	68.79	70.19	70.22	89.45	14.35
13	62.96	4.02	22.32	71.35	70.38	75.69	89.62	15.41
14	63.36	3.92	20.93	72.86	75.43	76.21	89.01	15.34
15	66.19	4.55	24.67	78.91	79.39	76.01	87.07	15.72
16	59.88	3.75	17.06	68.95	68.74	71.15	88.81	14.69
17	60.08	3.98	19.16	71.06	72.58	72.15	87.53	16.53
18	64.96	3.21	17.98	76.02	77.89	76.26	88.69	14.74
19	64.51	4.27	23.19	75.38	76.21	76.22	89.55	16.09
20	62.95	3.79	20.95	72.67	75.33	75.17	88.03	15.02
21	63.71	4.53	25.04	73.80	77.29	78.47	88.31	17.51
22	62.71	4.05	21.06	74.14	75.05	78.22	88.76	15.45
23	61.41	3.92	21.05	72.02	72.51	71.98	91.01	15.18
24	66.81	4.28	24.38	78.17	78.53	77.04	91.18	16.74
25	61.02	3.79	20.20	71.42	72.54	77.29	87.63	15.30
26	61.60	4.80	22.31	72.73	74.03	66.19	88.15	16.23
27	61.80	4.07	23.54	74.75	74.01	67.02	89.72	16.10
28	63.69	3.79	22.72	72.58	74.03	76.61	90.24	16.25
29	60.03	4.13	22.39	70.19	71.61	66.64	89.43	16.38
30	60.80	4.11	23.97	71.24	71.74	75.77	87.81	15.80
31	64.66	3.73	21.31	74.71	74.34	80.00	90.09	15.46
32	55.68	3.90	17.49	66.30	67.10	67.12	85.64	15.33
33	64.77	4.31	24.02	75.40	75.51	73.08	90.55	15.69
34	62.06	4.05	21.61	71.99	73.09	65.20	89.35	15.70
35	64.76	4.01	18.13	74.57	75.86	74.13	89.81	16.12
36	63.82	3.70	17.26	73.35	74.60	72.37	90.08	16.23
37	60.09	4.11	20.06	70.29	72.03	72.92	87.09	15.97
38	61.50	3.75	20.90	71.47	71.79	74.59	89.94	14.68
39	56.15	4.11	21.55	67.88	71.42	70.16	87.32	14.58

40	61.78	4.03	22.55	74.41	74.41	69.68	87.15	14.28
41	64.21	3.76	22.49	74.03	73.78	65.76	90.13	14.26
42	60.70	3.39	20.62	70.37	71.30	72.63	88.59	15.79
43	57.91	3.78	16.16	67.13	68.46	71.81	88.91	14.22
44	62.93	4.11	20.76	72.25	73.06	69.92	88.72	15.80
45	60.80	4.52	20.07	71.69	73.02	70.36	87.40	15.17
46	64.41	3.94	22.45	75.36	75.12	76.94	91.89	16.46
47	59.34	3.70	20.55	69.53	70.75	68.16	86.34	17.01
48	55.85	3.61	18.67	66.98	71.07	69.38	86.21	16.03
49	60.73	3.70	20.98	69.36	71.65	68.07	89.03	13.89
50	60.17	3.83	18.10	69.78	69.41	68.33	87.30	18.03
51	61.36	4.53	21.76	72.77	73.20	72.37	86.54	16.65
52	62.32	3.84	19.28	71.78	71.65	69.29	89.83	15.97
53	61.64	3.74	19.75	72.67	73.11	64.93	89.44	15.60
54	65.30	4.01	21.08	75.36	76.08	79.00	88.68	15.22
55	59.31	3.94	21.96	68.41	70.66	70.76	87.26	14.44
56	61.42	3.67	21.63	71.16	71.34	71.64	88.59	16.49
57	62.59	4.07	22.03	73.62	74.10	73.15	88.67	15.10
58	65.55	4.11	21.80	76.23	76.48	77.28	89.54	16.75
59	62.43	4.67	22.74	72.46	74.56	70.38	90.98	15.49
60	65.40	4.36	21.87	77.07	79.08	74.23	85.96	16.89
61	58.99	4.08	23.55	69.12	67.92	69.67	88.36	15.29
62	60.71	3.64	18.53	70.76	71.90	71.33	89.62	15.22
63	61.17	4.14	20.28	72.25	73.16	66.09	89.71	16.25
64	64.98	4.11	21.91	74.76	76.74	76.40	86.43	15.80
65	64.30	3.82	22.98	73.33	75.05	74.26	91.63	16.44
66	61.05	3.74	21.18	70.48	70.17	70.82	86.79	16.13
67	57.77	3.93	21.00	67.66	69.77	65.96	85.77	15.81
68	59.35	4.46	19.08	69.62	70.98	71.56	84.99	14.52
69	63.38	4.16	25.11	73.17	73.29	80.00	89.56	15.77
70	61.19	4.47	21.96	71.28	72.43	72.28	89.06	14.73
71	64.31	4.07	19.12	75.23	74.67	76.14	90.25	15.09
72	58.15	3.41	18.74	68.05	69.01	68.81	87.96	15.00
73	59.78	3.76	18.63	69.92	70.55	72.62	89.21	15.55
74	62.25	3.85	17.72	71.97	71.78	73.55	88.08	15.99
75	64.23	4.09	19.70	73.60	74.94	74.03	87.67	14.11
76	63.02	3.91	21.22	75.81	72.86	74.14	89.75	14.23
77	59.83	4.44	22.14	69.13	70.32	72.64	85.96	16.69
78	66.01	4.26	21.42	77.39	77.72	74.18	91.64	15.01
79	61.65	3.71	20.79	72.07	73.66	73.70	90.26	15.36
80	54.84	3.99	16.52	65.64	67.14	70.03	87.90	17.18
81	61.67	4.03	19.02	72.12	73.32	68.35	86.44	16.80
82	63.11	3.68	20.74	73.45	75.89	74.03	91.09	15.77

83	63.73	4.05	21.30	73.84	75.41	69.34	89.57	16.33
84	62.05	4.39	24.01	73.31	73.74	72.90	87.46	15.66
85	62.84	3.65	20.15	72.24	73.52	72.03	89.98	15.52
86	64.11	4.06	23.76	74.49	75.75	70.89	87.94	16.46
87	64.14	4.24	19.89	73.85	76.38	70.34	87.53	15.86
88	62.18	3.78	19.58	73.36	74.90	77.07	87.84	16.09
89	64.61	3.51	20.21	73.20	74.21	73.64	89.21	15.42
90	65.45	4.25	23.25	78.05	77.74	73.38	88.28	15.84
91	63.03	3.89	19.44	73.15	74.19	67.70	89.40	14.05
92	60.89	3.79	23.08	69.91	70.12	75.94	88.61	16.30
93	65.29	3.72	17.02	76.92	78.23	75.80	89.67	14.67
94	65.45	4.22	23.11	76.18	76.90	72.26	90.14	16.72
95	59.27	3.87	21.94	69.66	68.53	68.33	87.57	16.71
96	65.13	3.93	21.51	76.90	78.70	75.15	92.12	16.97
97	65.02	3.80	19.08	74.82	78.67	72.54	90.99	16.54
98	61.65	4.24	22.39	71.72	72.01	79.79	89.44	15.40
99	61.36	3.55	22.02	71.07	73.37	67.24	88.32	17.18
100	58.85	4.14	20.44	70.08	70.28	65.68	88.51	14.21