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REG NO.: N15/3/1007/020

INTERNAL ATTACHMENT

DATA MANAGEMENT AND ANALYSIS USING EXCEL

UNIVERSITY EXAMINATION 2023/2024

INSTRUCTIONS: You are required to demonstrate that you did the work independently; if not so, you will be required to sit for the examination in the computer laboratory. Work will look similar will be deducted Half the total marks.

Submit the work by 26 May,2024 at 5pm using the email address

Question 1

a)Consider the data below(Performance DATA):

- i) Create a new variable called Average performance. Average performance is the average of performance in English, reading and Maths

How I got the average performance:

English	Read	Math	Average performance
0.00	691.60	690.00	=AVERAGE(I2:K2)

English	Read	Math	Average performance
0.00	691.60	690.00	460.53
4.58	660.50	661.90	442.33
30.00	636.30	650.90	439.07
0.00	651.90	643.50	431.80
13.86	641.80	639.90	431.85
12.41	605.70	605.40	407.84
68.72	604.50	609.00	427.41
46.96	605.50	612.50	421.65
30.08	608.90	616.10	418.36
40.28	611.90	613.40	421.86
52.91	612.80	618.70	428.14
54.61	616.60	616.00	429.07
42.72	612.80	619.80	425.11

20.53	610.00	622.60	417.71
80.12	611.90	621.00	437.67
49.41	614.80	619.90	428.04
85.54	611.70	624.40	440.55
58.91	614.90	621.70	431.84
77.01	619.10	620.50	438.87
49.81	621.30	619.30	430.14
40.68	615.60	625.40	427.23
16.21	619.90	622.90	419.67
45.07	622.90	620.60	429.52
39.08	620.70	623.40	427.73
76.67	619.50	625.70	440.62
40.49	625.00	621.20	428.90
73.72	620.40	626.00	440.04
70.01	616.50	630.40	438.97
55.96	620.10	627.10	434.39
11.06	627.90	620.40	419.79
80.42	620.40	628.70	443.17
63.13	623.00	626.90	437.68
65.12	620.80	629.80	438.57
53.42	626.10	625.60	435.04
49.82	625.40	626.80	434.01
35.47	625.40	628.20	429.69
56.13	623.60	630.20	436.64
32.39	628.90	625.30	428.86
65.51	624.40	630.10	440.00
53.06	627.50	627.10	435.89
49.64	627.80	628.70	435.38
45.11	621.60	635.20	433.97
30.32	629.40	627.70	429.14
52.24	621.10	636.20	436.51
36.80	626.50	631.00	431.43
30.28	630.20	629.40	429.96
49.86	629.50	631.20	436.85
13.76	631.90	628.90	424.85
28.86	631.60	629.50	429.99
52.80	628.50	632.60	437.97
44.09	628.40	633.70	435.40
35.25	635.70	627.10	432.68
37.49	633.00	630.70	433.73
50.39	629.60	634.20	438.06
31.07	634.20	629.70	431.66
18.26	633.50	630.50	427.42
34.70	631.40	633.00	433.03
33.29	637.50	627.00	432.60
33.49	637.30	627.60	432.80
38.16	633.20	632.50	434.62
36.93	629.20	636.70	434.28

32.99	630.30	635.80	433.03
58.22	629.60	636.70	441.51
17.00	634.40	632.90	428.10
17.66	634.70	633.10	428.49
7.32	638.40	629.60	425.11
31.20	631.90	636.20	433.10
16.62	637.70	630.50	428.27
58.08	631.50	636.70	442.09
55.89	636.80	631.50	441.40
5.49	631.80	636.60	424.63
14.43	637.70	631.10	427.74
22.85	635.50	633.60	430.65
38.78	633.20	636.20	436.06
64.25	631.10	638.70	444.68
25.23	637.80	632.10	431.71
5.38	636.60	633.50	425.16
6.08	644.30	626.10	425.49
0.00	640.90	630.00	423.63
0.00	634.60	636.60	423.73
34.89	633.00	638.20	435.36
13.06	636.70	634.80	428.19
36.03	633.20	638.70	435.98
34.65	633.90	638.30	435.62
28.69	634.70	638.30	433.90
1.80	645.40	627.80	425.00
30.63	632.30	641.10	434.68
59.03	632.40	641.40	444.28
13.56	636.20	637.70	429.15
5.01	636.10	637.90	426.34
0.96	638.00	636.20	425.05
0.67	640.90	633.80	425.12
38.51	644.90	630.40	437.94
0.00	646.10	629.80	425.30
17.17	633.20	642.70	431.02
9.89	636.70	639.30	428.63
19.39	640.40	636.00	431.93
36.49	636.20	640.40	437.70
39.40	630.40	646.20	438.67
28.68	638.60	638.10	435.13
13.70	637.50	639.60	430.27
11.35	636.90	640.50	429.58
3.44	640.30	638.20	427.31
15.43	642.70	635.90	431.34
17.97	639.90	638.80	432.22
22.72	641.40	637.60	433.91
18.44	641.70	637.80	432.65
16.17	641.50	638.10	431.92
2.02	641.40	638.30	427.24

9.62	634.30	645.50	429.81
41.46	643.50	636.70	440.55
9.90	640.40	639.90	430.07
16.08	637.70	643.30	432.36
43.49	638.50	643.00	441.66
8.79	644.90	636.90	430.20
39.02	640.40	641.80	440.41
53.89	639.30	643.60	445.60
41.13	638.60	644.30	441.34
1.38	640.80	642.30	428.16
35.44	638.90	644.70	439.68
8.64	641.80	642.60	431.01
15.35	637.00	647.40	433.25
19.86	640.20	644.60	434.89
3.06	652.60	632.90	429.52
9.87	642.00	644.10	431.99
16.10	642.60	643.80	434.17
43.50	639.40	647.10	443.33
45.04	638.90	647.90	443.95
18.20	641.70	645.10	435.00
15.49	644.20	642.80	434.16
0.93	652.70	634.30	429.31
7.59	633.60	653.80	431.66
29.09	645.70	641.70	438.83
0.13	652.30	636.10	429.51
50.86	644.50	643.90	446.42
11.50	652.10	636.70	433.43
13.46	649.50	639.40	434.12
4.73	643.20	645.70	431.21
21.44	644.30	644.70	436.81
12.35	646.00	643.10	433.82
30.15	645.30	644.10	439.85
15.86	649.70	640.20	435.25
43.75	642.90	647.30	444.65
0.00	656.80	633.70	430.17
0.00	658.00	633.10	430.37
16.65	647.70	643.40	435.92
3.22	644.80	646.40	431.47
0.00	644.30	647.20	430.50
48.52	645.50	646.00	446.67
0.75	652.50	639.50	430.92
1.93	650.90	641.50	431.44
13.51	643.00	649.70	435.40
0.00	641.60	651.20	430.93
16.71	647.80	645.20	436.57
5.94	649.10	644.00	433.01
36.17	644.00	649.40	443.19
44.97	645.60	648.20	446.26

16.67	647.80	646.10	436.86
15.19	642.50	651.60	436.43
34.34	645.00	649.50	442.95
0.00	650.80	643.80	431.53
13.07	649.40	645.80	436.09
4.28	651.60	643.60	433.16
39.59	645.00	651.00	445.20
21.67	648.00	648.40	439.36
3.26	648.80	647.70	433.25
7.86	651.60	645.10	434.85
39.57	643.40	654.00	445.66
10.13	645.10	652.80	436.01
27.52	646.00	652.30	441.94
14.00	655.20	643.40	437.53
8.84	649.80	649.20	435.95
6.41	651.30	648.10	435.27
2.40	652.60	647.10	434.03
5.96	655.10	645.80	435.62
8.17	654.60	646.50	436.42
15.46	655.40	645.80	438.89
0.00	653.60	647.70	433.77
0.00	651.80	650.00	433.93
0.00	656.10	645.70	433.93
31.82	653.30	649.00	444.71
12.80	651.70	650.70	438.40
0.00	654.40	648.30	434.23
3.85	662.00	640.80	435.55
2.47	647.00	655.90	435.12
10.71	654.20	649.40	438.10
0.00	651.90	651.80	434.57
1.94	656.30	647.50	435.25
4.63	648.20	655.80	436.21
5.25	656.40	647.80	436.48
27.54	651.60	652.60	443.91
14.98	655.10	649.50	439.86
47.88	650.90	653.70	450.83
0.00	657.20	647.50	434.90
1.76	660.30	644.50	435.52
0.00	655.20	649.60	434.93
0.00	653.10	651.90	435.00
7.29	656.80	648.90	437.66
17.03	656.10	650.10	441.08
10.44	653.70	653.10	439.08
2.27	652.40	654.60	436.42
28.25	655.60	651.50	445.12
8.77	653.40	653.70	438.62
7.49	654.10	653.30	438.30
9.80	655.50	652.10	439.13

12.50	655.90	651.80	440.07
0.00	656.60	651.30	435.97
31.20	651.40	656.80	446.47
1.37	657.80	650.60	436.59
9.62	659.80	648.60	439.34
0.00	655.10	653.50	436.20
24.26	652.70	656.50	444.49
9.55	654.20	655.50	439.75
5.93	653.50	656.20	438.54
0.97	662.20	647.60	436.92
18.29	650.00	660.10	442.80
4.98	657.40	652.70	438.36
4.29	660.40	649.70	438.13
3.35	660.80	649.60	437.92
32.71	655.40	655.20	447.77
9.47	653.00	657.70	440.06
6.26	657.60	653.10	438.99
13.25	653.20	657.60	441.35
3.17	662.00	649.10	438.09
16.99	651.60	659.80	442.80
0.85	662.00	649.60	437.48
6.65	655.90	655.80	439.45
0.12	654.10	658.70	437.64
0.00	657.80	655.20	437.67
6.93	658.70	654.40	440.01
9.56	655.40	657.90	440.95
0.90	661.50	651.90	438.10
1.16	663.40	650.20	438.25
40.11	656.70	656.90	451.24
16.66	657.60	656.40	443.55
21.96	657.30	656.70	445.32
8.86	661.00	653.30	441.05
0.85	664.90	649.90	438.55
0.00	672.80	642.20	438.33
3.91	664.20	650.90	439.67
11.95	659.70	655.60	442.42
3.99	660.20	655.30	439.83
22.94	655.10	660.50	446.18
2.49	658.50	657.30	439.43
9.87	657.00	659.00	441.96
0.54	664.00	652.70	439.08
8.96	654.70	662.50	442.05
6.47	661.30	656.30	441.36
20.73	654.90	663.20	446.28
0.19	662.10	656.20	439.50
13.99	658.30	660.40	444.23
8.74	662.80	656.00	442.51
20.03	660.00	658.80	446.28

1.38	660.80	658.80	440.33
2.06	660.40	659.40	440.62
28.57	661.70	658.40	449.56
0.17	673.10	647.10	440.12
13.74	659.80	660.60	444.71
0.00	667.80	652.80	440.20
0.22	666.90	654.60	440.57
3.12	662.10	659.80	441.67
47.37	661.10	661.60	456.69
22.71	662.00	660.90	448.54
29.12	659.10	664.10	450.77
4.43	672.40	650.80	442.54
4.81	660.10	663.60	442.84
5.25	665.40	658.30	442.98
1.90	662.70	661.00	441.87
8.66	664.30	659.50	444.15
10.48	662.50	661.30	444.76
1.24	660.40	663.50	441.71
0.00	663.10	661.70	441.60
9.38	651.40	673.40	444.73
1.39	665.40	659.50	442.10
35.34	663.50	661.50	453.45
9.64	661.70	663.40	444.91
2.23	669.40	655.70	442.44
0.37	658.30	667.00	441.89
0.58	662.40	663.00	441.99
0.00	667.10	658.40	441.83
0.85	668.30	657.50	442.22
5.52	667.40	659.30	444.07
0.00	664.30	662.60	442.30
0.00	660.20	666.80	442.33
2.44	666.40	661.30	443.38
20.77	659.40	668.30	449.49
2.19	657.70	670.10	443.33
13.63	666.20	661.80	447.21
13.28	668.70	659.30	447.09
1.94	671.30	657.00	443.41
23.06	666.70	661.60	450.45
0.62	674.00	654.60	443.07
3.26	663.40	665.40	444.02
0.00	663.10	665.80	442.97
2.22	665.50	663.90	443.87
18.56	663.70	665.80	449.35
6.20	667.60	662.30	445.37
18.46	665.90	664.00	449.45
32.07	666.80	663.40	454.09
3.97	656.20	674.20	444.79
15.34	669.80	660.90	448.68

27.67	663.90	667.40	452.99
12.54	670.30	661.50	448.11
12.68	664.50	667.40	448.19
6.91	668.00	664.00	446.30
14.96	668.70	663.40	449.02
11.27	666.90	665.30	447.82
9.72	671.90	660.40	447.34
3.32	671.00	661.30	445.21
0.69	668.80	664.10	444.53
5.14	671.20	661.90	446.08
4.97	663.70	669.50	446.06
6.97	672.10	661.20	446.76
8.00	667.50	665.80	447.10
0.48	662.10	671.30	444.63
2.50	666.90	666.80	445.40
3.84	671.30	662.40	445.85
1.32	667.70	666.60	445.21
4.91	669.80	664.60	446.44
0.00	672.20	662.70	444.97
0.22	667.00	667.90	445.04
0.00	669.20	666.00	445.07
17.85	669.40	666.60	451.28
4.46	660.50	675.70	446.89
9.55	665.80	671.00	448.78
3.99	672.70	664.50	447.06
20.67	668.80	668.50	452.66
7.63	668.50	669.10	448.41
27.45	666.20	671.60	455.08
10.86	665.50	672.40	449.59
5.03	666.10	672.10	447.74
14.24	668.90	669.70	450.95
0.24	680.90	657.70	446.28
2.07	673.30	665.40	446.92
8.56	664.60	674.10	449.09
0.00	670.10	669.50	446.53
4.79	673.20	666.50	448.16
3.96	669.20	670.70	447.95
1.58	669.20	670.80	447.19
3.59	672.80	668.60	448.33
8.73	671.20	671.30	450.41
0.00	674.60	668.00	447.53
0.26	674.90	668.30	447.82
1.45	671.40	671.80	448.22
0.15	677.60	665.70	447.82
0.00	679.80	663.60	447.80
3.71	668.90	674.60	449.07
0.27	673.10	670.70	448.02
0.00	679.60	664.20	447.93

4.52	672.30	671.60	449.47
2.44	676.10	668.00	448.85
0.00	673.90	670.20	448.03
0.00	668.10	676.50	448.20
5.41	674.60	670.10	450.04
0.00	672.70	672.20	448.30
6.42	669.40	675.70	450.51
6.54	676.10	669.30	450.65
14.29	679.10	667.00	453.46
3.68	675.00	671.50	450.06
0.50	676.10	670.50	449.03
0.00	680.50	666.60	449.03
22.69	670.50	676.60	456.60
0.00	670.50	677.30	449.27
0.14	676.00	672.50	449.55
2.73	681.00	669.80	451.18
1.68	683.00	668.40	451.03
0.00	680.10	672.20	450.77
0.14	673.80	679.30	451.08
0.00	673.30	679.90	451.07
11.05	680.50	673.20	454.92
0.00	672.80	681.10	451.30
0.00	679.00	675.50	451.50
0.06	678.50	677.40	451.99
0.00	682.90	673.20	452.03
0.00	685.30	671.50	452.27
15.06	679.00	678.60	457.55
1.48	684.10	674.70	453.43
2.65	676.80	682.20	453.88
1.48	683.10	676.20	453.59
4.47	678.70	680.80	454.66
0.33	680.20	679.40	453.31
2.54	685.70	674.40	454.21
0.54	684.20	676.70	453.81
11.59	682.80	679.80	458.06
11.38	680.80	681.80	457.99
0.00	688.50	674.70	454.40
1.37	689.80	674.00	455.06
2.24	681.80	682.50	455.51
5.33	680.00	684.90	456.74
2.77	685.60	679.50	455.96
0.00	687.30	678.00	455.10
17.73	682.40	684.30	461.48
0.00	684.50	682.30	455.60
0.00	680.40	688.20	456.20
0.43	688.50	680.20	456.38
6.07	682.20	687.40	458.56
10.13	686.20	683.70	460.01

3.38	692.20	679.90	458.49
8.65	683.10	690.30	460.68
12.35	693.80	681.30	462.48
1.59	691.60	686.60	459.93
1.50	693.50	688.60	461.20
10.39	687.70	695.00	464.36
6.13	693.70	690.10	463.31
2.27	695.90	692.00	463.39
2.48	693.60	694.90	463.66
0.89	697.90	691.70	463.50
2.42	695.10	695.30	464.27
3.77	701.30	689.30	464.79
1.96	697.40	695.70	465.02
0.58	699.10	697.30	465.66
2.81	695.40	701.10	466.44
1.36	693.30	703.60	466.09
1.16	698.30	699.90	466.45
2.05	698.90	701.70	467.55
6.00	700.90	707.70	471.53
4.73	704.00	709.50	472.74
24.26	648.30	641.70	438.09
2.97	667.90	676.50	449.12
5.01	660.50	651.00	438.84

- ii) Obtain the list of students whose average performance lies between 400 and 420

I used filters:

Custom Autofilter

Show rows where:
Average performance

is greater than 400

☒ And ☐ Or

is less than 420

Use ? to represent any single character
Use * to represent any series of characters

OK Cancel

county	student	teache	calwor	lunc	comput	expenditu	incon	Engli	Reac	Mat	Average performan
Fresno	137.00	6.40	12.32	86.96	25.00	5580.15	10.41	12.41	605.70	605.40	407.84
Fresno	379.00	19.00	32.19	93.14	35.00	5355.55	7.39	30.08	608.90	616.10	418.36
Tulare	487.00	24.34	24.61	77.15	0.00	4818.61	8.28	20.53	610.00	622.60	417.71
Tulare	475.00	21.00	21.65	91.55	53.00	4542.10	9.63	16.21	619.90	622.90	419.67
Tulare	452.00	22.00	14.50	81.02	55.00	4614.25	8.55	11.06	627.90	620.40	419.79

iii) Sort the data according to average performance

Sort

☒ My data has headers

Column	Sort On	Order
Sort by: Average performance	Cell Values	Smallest to Largest

OK Cancel

county	students	English	Read	Math	Average performance
Fresno	137.00	12.41	605.70	605.40	407.84
Tulare	487.00	20.53	610.00	622.60	417.71
Fresno	379.00	30.08	608.90	616.10	418.36
Tulare	475.00	16.21	619.90	622.90	419.67
Tulare	452.00	11.06	627.90	620.40	419.79
Kern	888.00	46.96	605.50	612.50	421.65
Sacramento	2247.00	40.28	611.90	613.40	421.86
Siskiyou	252.00	0.00	640.90	630.00	423.63
Siskiyou	175.00	0.00	634.60	636.60	423.73
Kern	237.00	5.49	631.80	636.60	424.63
Kern	814.00	13.76	631.90	628.90	424.85
San Bernardino	1114.00	1.80	645.40	627.80	425.00
Sacramento	417.00	0.96	638.00	636.20	425.05
Tulare	103.00	42.72	612.80	619.80	425.11
Kern	1639.00	7.32	638.40	629.60	425.11
Lake	300.00	0.67	640.90	633.80	425.12
Contra Costa	353.00	5.38	636.60	633.50	425.16
Butte	146.00	0.00	646.10	629.80	425.30
Humboldt	329.00	6.08	644.30	626.10	425.49
Tulare	499.00	5.01	636.10	637.90	426.34
Imperial	440.00	40.68	615.60	625.40	427.23
Kern	2621.00	2.02	641.40	638.30	427.24
Sutter	610.00	3.44	640.30	638.20	427.31
San Joaquin	195.00	68.72	604.50	609.00	427.41
Los Angeles	2404.00	18.26	633.50	630.50	427.42
Tulare	476.00	39.08	620.70	623.40	427.73
Los Angeles	2987.00	14.43	637.70	631.10	427.74
Tulare	852.00	49.41	614.80	619.90	428.04

Kings	3017.00	17.00	634.40	632.90	428.10
Merced	446.00	52.91	612.80	618.70	428.14
Shasta	1735.00	1.38	640.80	642.30	428.16
Fresno	314.00	13.06	636.70	634.80	428.19
Kings	5079.00	16.62	637.70	630.50	428.27
Kings	957.00	17.66	634.70	633.10	428.49
Tulare	354.00	9.89	636.70	639.30	428.63
Fresno	284.00	32.39	628.90	625.30	428.86
Tulare	1588.00	40.49	625.00	621.20	428.90
Fresno	987.00	54.61	616.60	616.00	429.07
Kern	1217.00	30.32	629.40	627.70	429.14
Kern	6195.00	13.56	636.20	637.70	429.15
Siskiyou	216.00	0.93	652.70	634.30	429.31
Tuolumne	752.00	0.13	652.30	636.10	429.51
Monterey	196.00	3.06	652.60	632.90	429.52
Kern	2538.00	45.07	622.90	620.60	429.52
Kern	2141.00	11.35	636.90	640.50	429.58
Los Angeles	2267.00	35.47	625.40	628.20	429.69
Ventura	426.00	9.62	634.30	645.50	429.81
Los Angeles	1235.00	30.28	630.20	629.40	429.96
Kern	27176.00	28.86	631.60	629.50	429.99
Los Angeles	13668.00	9.90	640.40	639.90	430.07
Kern	2688.00	49.81	621.30	619.30	430.14
Humboldt	149.00	0.00	656.80	633.70	430.17
Tulare	239.00	8.79	644.90	636.90	430.20
Kern	146.00	13.70	637.50	639.60	430.27
Humboldt	220.00	0.00	658.00	633.10	430.37
Humboldt	133.00	0.00	644.30	647.20	430.50
Kings	499.00	22.85	635.50	633.60	430.65
Tehama	133.00	0.75	652.50	639.50	430.92
Siskiyou	285.00	0.00	641.60	651.20	430.93
Tehama	544.00	8.64	641.80	642.60	431.01
San Mateo	460.00	17.17	633.20	642.70	431.02
San Joaquin	275.00	4.73	643.20	645.70	431.21
Mendocino	337.00	15.43	642.70	635.90	431.34
Riverside	4258.00	36.80	626.50	631.00	431.43
Sacramento	519.00	1.93	650.90	641.50	431.44
Lake	590.00	3.22	644.80	646.40	431.47
Shasta	477.00	0.00	650.80	643.80	431.53
Los Angeles	7151.00	31.07	634.20	629.70	431.66
Kern	224.00	7.59	633.60	653.80	431.66
San Bernardino	2660.00	25.23	637.80	632.10	431.71
Butte	243.00	0.00	651.90	643.50	431.80
Kern	421.00	58.91	614.90	621.70	431.84
Butte	1335.00	13.86	641.80	639.90	431.85
Butte	3401.00	16.17	641.50	638.10	431.92
Los Angeles	1841.00	19.39	640.40	636.00	431.93

Tulare	2208.00	9.87	642.00	644.10	431.99
San Bernardino	4501.00	17.97	639.90	638.80	432.22
Madera	342.00	16.08	637.70	643.30	432.36
Sacramento	2253.00	33.29	637.50	627.00	432.60
Los Angeles	19402.00	18.44	641.70	637.80	432.65
Madera	1600.00	35.25	635.70	627.10	432.68
Monterey	2807.00	33.49	637.30	627.60	432.80
Fresno	2019.00	5.94	649.10	644.00	433.01
Sacramento	5138.00	32.99	630.30	635.80	433.03
Los Angeles	5804.00	34.70	631.40	633.00	433.03
Los Angeles	4340.00	31.20	631.90	636.20	433.10
Sutter	374.00	4.28	651.60	643.60	433.16
Tulare	1987.00	15.35	637.00	647.40	433.25
Kern	797.00	3.26	648.80	647.70	433.25
El Dorado	548.00	11.50	652.10	636.70	433.43
Monterey	9028.00	37.49	633.00	630.70	433.73
Tuolumne	474.00	0.00	653.60	647.70	433.77
Sacramento	10337.00	12.35	646.00	643.10	433.82
Fresno	474.00	28.69	634.70	638.30	433.90
San Benito	5718.00	22.72	641.40	637.60	433.91
Placer	223.00	0.00	651.80	650.00	433.93
Sonoma	92.00	0.00	656.10	645.70	433.93
Merced	184.00	45.11	621.60	635.20	433.97
San Bernardino	25151.00	49.82	625.40	626.80	434.01
Tuolumne	501.00	2.40	652.60	647.10	434.03
Merced	104.00	13.46	649.50	639.40	434.12
San Mateo	7761.00	15.49	644.20	642.80	434.16
Riverside	1255.00	16.10	642.60	643.80	434.17
Shasta	242.00	0.00	654.40	648.30	434.23
Tulare	723.00	36.93	629.20	636.70	434.28
Tulare	847.00	55.96	620.10	627.10	434.39
Sonoma	181.00	0.00	651.90	651.80	434.57
Ventura	3074.00	38.16	633.20	632.50	434.62
Riverside	1358.00	30.63	632.30	641.10	434.68
Sutter	140.00	7.86	651.60	645.10	434.85
Fresno	418.00	19.86	640.20	644.60	434.89
Humboldt	577.00	0.00	657.20	647.50	434.90
Shasta	164.00	0.00	655.20	649.60	434.93
Tehama	1962.00	18.20	641.70	645.10	435.00
Kern	382.00	0.00	653.10	651.90	435.00
Monterey	2488.00	53.42	626.10	625.60	435.04
Tulare	324.00	2.47	647.00	655.90	435.12
Los Angeles	5112.00	28.68	638.60	638.10	435.13
Lassen	516.00	1.94	656.30	647.50	435.25
Merced	227.00	15.86	649.70	640.20	435.25
Tehama	2326.00	6.41	651.30	648.10	435.27

Ventura	3835.00	34.89	633.00	638.20	435.36
Ventura	15386.00	49.64	627.80	628.70	435.38
Los Angeles	8935.00	44.09	628.40	633.70	435.40
San Joaquin	222.00	13.51	643.00	649.70	435.40
Sutter	170.00	1.76	660.30	644.50	435.52
Humboldt	780.00	3.85	662.00	640.80	435.55
Merced	1313.00	34.65	633.90	638.30	435.62
Siskiyou	470.00	5.96	655.10	645.80	435.62
Kern	2471.00	53.06	627.50	627.10	435.89
San Diego	4612.00	16.65	647.70	643.40	435.92
Shasta	3981.00	8.84	649.80	649.20	435.95
Shasta	532.00	0.00	656.60	651.30	435.97
Merced	4458.00	36.03	633.20	638.70	435.98
San Bernardino	8294.00	10.13	645.10	652.80	436.01
Merced	11474.00	38.78	633.20	636.20	436.06
Merced	727.00	13.07	649.40	645.80	436.09
Kern	1129.00	0.00	655.10	653.50	436.20
Imperial	108.00	4.63	648.20	655.80	436.21
Kern	793.00	2.27	652.40	654.60	436.42
Humboldt	575.00	8.17	654.60	646.50	436.42
Tulare	7210.00	15.19	642.50	651.60	436.43
Lassen	419.00	5.25	656.40	647.80	436.48
Kern	6219.00	52.24	621.10	636.20	436.51
Stanislaus	3129.00	16.71	647.80	645.20	436.57
Nevada	2045.00	1.37	657.80	650.60	436.59
Merced	1657.00	56.13	623.60	630.20	436.64
Fresno	443.00	21.44	644.30	644.70	436.81
Santa Clara	16244.00	49.86	629.50	631.20	436.85
Kings	246.00	16.67	647.80	646.10	436.86
Sutter	103.00	0.97	662.20	647.60	436.92
El Dorado	586.00	0.85	662.00	649.60	437.48
Sonoma	150.00	14.00	655.20	643.40	437.53
Shasta	859.00	0.12	654.10	658.70	437.64
San Diego	1221.00	7.29	656.80	648.90	437.66
Nevada	145.00	0.00	657.80	655.20	437.67
Tulare	649.00	80.12	611.90	621.00	437.67
Monterey	2102.00	63.13	623.00	626.90	437.68
Imperial	3760.00	36.49	636.20	640.40	437.70
San Joaquin	865.00	3.35	660.80	649.60	437.92
Santa Clara	457.00	38.51	644.90	630.40	437.94
Santa Clara	10696.00	52.80	628.50	632.60	437.97
Santa Barbara	10625.00	50.39	629.60	634.20	438.06
Ventura	441.00	24.26	648.30	641.70	438.09
Placer	2903.00	3.17	662.00	649.10	438.09
Shasta	775.00	0.90	661.50	651.90	438.10
Glenn	140.00	10.71	654.20	649.40	438.10

Siskiyou	280.00	4.29	660.40	649.70	438.13
Calaveras	777.00	1.16	663.40	650.20	438.25
San Joaquin	307.00	7.49	654.10	653.30	438.30
Humboldt	160.00	0.00	672.80	642.20	438.33
Contra Costa	4153.00	4.98	657.40	652.70	438.36
Stanislaus	2617.00	12.80	651.70	650.70	438.40
San Diego	4928.00	5.93	653.50	656.20	438.54
Nevada	117.00	0.85	664.90	649.90	438.55
Los Angeles	10012.00	65.12	620.80	629.80	438.57
Imperial	536.00	8.77	653.40	653.70	438.62
Imperial	500.00	39.40	630.40	646.20	438.67
Stanislaus	7887.00	29.09	645.70	641.70	438.83
Yuba	1778.00	5.01	660.50	651.00	438.84
Los Angeles	6880.00	77.01	619.10	620.50	438.87
Contra Costa	3519.00	15.46	655.40	645.80	438.89
Kern	2601.00	70.01	616.50	630.40	438.97
Stanislaus	6373.00	6.26	657.60	653.10	438.99
Butte	1550.00	30.00	636.30	650.90	439.07
Riverside	4523.00	10.44	653.70	653.10	439.08
Humboldt	370.00	0.54	664.00	652.70	439.08
Tehama	347.00	9.80	655.50	652.10	439.13
Tulare	156.00	9.62	659.80	648.60	439.34
Los Angeles	8787.00	21.67	648.00	648.40	439.36
San Bernardino	6437.00	2.49	658.50	657.30	439.43
San Bernardino	5068.00	6.65	655.90	655.80	439.45
El Dorado	1068.00	0.19	662.10	656.20	439.50
Sonoma	511.00	3.91	664.20	650.90	439.67
Tulare	474.00	35.44	638.90	644.70	439.68
San Benito	157.00	9.55	654.20	655.50	439.75
Tehama	551.00	3.99	660.20	655.30	439.83
Stanislaus	806.00	30.15	645.30	644.10	439.85
Sonoma	287.00	14.98	655.10	649.50	439.86
San Mateo	5370.00	65.51	624.40	630.10	440.00
San Mateo	649.00	6.93	658.70	654.40	440.01
Monterey	7306.00	73.72	620.40	626.00	440.04
Kings	412.00	9.47	653.00	657.70	440.06
Humboldt	168.00	12.50	655.90	651.80	440.07
Nevada	590.00	0.17	673.10	647.10	440.12
Tulare	248.00	0.00	667.80	652.80	440.20
Madera	1012.00	1.38	660.80	658.80	440.33
Santa Clara	2911.00	39.02	640.40	641.80	440.41
Kern	491.00	85.54	611.70	624.40	440.55
Fresno	205.00	41.46	643.50	636.70	440.55
Tuolumne	461.00	0.22	666.90	654.60	440.57
Siskiyou	1212.00	2.06	660.40	659.40	440.62
Merced	2357.00	76.67	619.50	625.70	440.62

Kings	1789.00	9.56	655.40	657.90	440.95
Sutter	158.00	8.86	661.00	653.30	441.05
Santa Cruz	2214.00	17.03	656.10	650.10	441.08
San Diego	10218.00	41.13	638.60	644.30	441.34
San Joaquin	332.00	13.25	653.20	657.60	441.35
San Luis Obispo	139.00	6.47	661.30	656.30	441.36
Sonoma	1154.00	55.89	636.80	631.50	441.40
Orange	20927.00	58.22	629.60	636.70	441.51
Shasta	510.00	0.00	663.10	661.70	441.60
Orange	6518.00	43.49	638.50	643.00	441.66
Los Angeles	6312.00	3.12	662.10	659.80	441.67
Lassen	1449.00	1.24	660.40	663.50	441.71
Placer	507.00	0.00	667.10	658.40	441.83
Tuolumne	895.00	1.90	662.70	661.00	441.87
Kern	3548.00	0.37	658.30	667.00	441.89
Orange	2409.00	27.52	646.00	652.30	441.94
Los Angeles	1712.00	9.87	657.00	659.00	441.96
Shasta	868.00	0.58	662.40	663.00	441.99
San Bernardino	3182.00	8.96	654.70	662.50	442.05
San Diego	6639.00	58.08	631.50	636.70	442.09
Los Angeles	433.00	1.39	665.40	659.50	442.10
Siskiyou	822.00	0.85	668.30	657.50	442.22
Madera	1202.00	0.00	664.30	662.60	442.30
Butte	240.00	4.58	660.50	661.90	442.33
Humboldt	515.00	0.00	660.20	666.80	442.33
San Mateo	2770.00	11.95	659.70	655.60	442.42
Sonoma	717.00	2.23	669.40	655.70	442.44
Inyo	1510.00	8.74	662.80	656.00	442.51
Sonoma	564.00	4.43	672.40	650.80	442.54
Fresno	175.00	18.29	650.00	660.10	442.80
San Benito	565.00	16.99	651.60	659.80	442.80
Kern	12380.00	4.81	660.10	663.60	442.84
San Diego	21338.00	34.34	645.00	649.50	442.95
Placer	762.00	0.00	663.10	665.80	442.97
San Mateo	3772.00	5.25	665.40	658.30	442.98
Humboldt	966.00	0.62	674.00	654.60	443.07
San Diego	4142.00	80.42	620.40	628.70	443.17
Orange	5620.00	36.17	644.00	649.40	443.19
Tehama	823.00	2.19	657.70	670.10	443.33
Sonoma	1469.00	43.50	639.40	647.10	443.33
El Dorado	1354.00	2.44	666.40	661.30	443.38
Placer	309.00	1.94	671.30	657.00	443.41
San Diego	19294.00	16.66	657.60	656.40	443.55
El Dorado	1708.00	2.22	665.50	663.90	443.87
Orange	12567.00	27.54	651.60	652.60	443.91
Los Angeles	7114.00	45.04	638.90	647.90	443.95

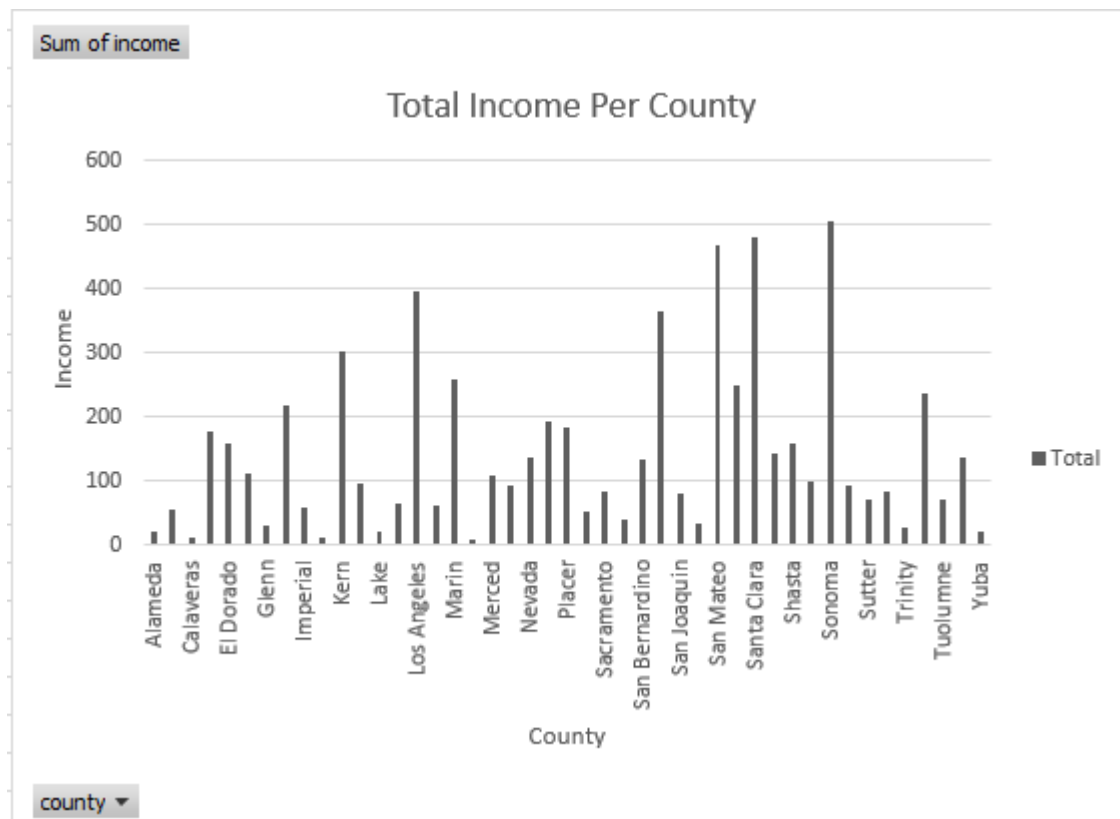
San Bernardino	7710.00	3.26	663.40	665.40	444.02
Sonoma	1792.00	5.52	667.40	659.30	444.07
Placer	5714.00	8.66	664.30	659.50	444.15
Los Angeles	2295.00	13.99	658.30	660.40	444.23
Los Angeles	11629.00	59.03	632.40	641.40	444.28
Sacramento	3669.00	24.26	652.70	656.50	444.49
Nevada	721.00	0.69	668.80	664.10	444.53
Tuolumne	830.00	0.48	662.10	671.30	444.63
Ventura	8416.00	43.75	642.90	647.30	444.65
Santa Barbara	1088.00	64.25	631.10	638.70	444.68
Sonoma	4971.00	31.82	653.30	649.00	444.71
Tulare	546.00	13.74	659.80	660.60	444.71
Tulare	160.00	9.38	651.40	673.40	444.73
Stanislaus	105.00	10.48	662.50	661.30	444.76
San Bernardino	580.00	3.97	656.20	674.20	444.79
Los Angeles	5010.00	9.64	661.70	663.40	444.91
Humboldt	245.00	0.00	672.20	662.70	444.97
Kern	1349.00	0.22	667.00	667.90	445.04
Tulare	400.00	0.00	669.20	666.00	445.07
Santa Clara	1678.00	28.25	655.60	651.50	445.12
San Diego	18255.00	39.59	645.00	651.00	445.20
Sonoma	573.00	3.32	671.00	661.30	445.21
San Diego	2272.00	1.32	667.70	666.60	445.21
Santa Clara	7661.00	21.96	657.30	656.70	445.32
Glenn	129.00	6.20	667.60	662.30	445.37
Siskiyou	160.00	2.50	666.90	666.80	445.40
Imperial	6272.00	53.89	639.30	643.60	445.60
San Diego	235.00	39.57	643.40	654.00	445.66
Sonoma	1588.00	3.84	671.30	662.40	445.85
San Diego	8432.00	4.97	663.70	669.50	446.06
Kings	992.00	5.14	671.20	661.90	446.08
Orange	5205.00	22.94	655.10	660.50	446.18
Orange	9775.00	44.97	645.60	648.20	446.26
Santa Clara	11855.00	20.73	654.90	663.20	446.28
Santa Barbara	579.00	20.03	660.00	658.80	446.28
Marin	424.00	0.24	680.90	657.70	446.28
Orange	6601.00	6.91	668.00	664.00	446.30
San Mateo	9328.00	50.86	644.50	643.90	446.42
Sonoma	1425.00	4.91	669.80	664.60	446.44
Los Angeles	3272.00	31.20	651.40	656.80	446.47
Humboldt	129.00	0.00	670.10	669.50	446.53
Ventura	2440.00	48.52	645.50	646.00	446.67
Lassen	244.00	6.97	672.10	661.20	446.76
Kern	224.00	4.46	660.50	675.70	446.89

Santa Clara	2801.00	2.07	673.30	665.40	446.92
San Diego	451.00	3.99	672.70	664.50	447.06
Sonoma	271.00	13.28	668.70	659.30	447.09
Ventura	7116.00	8.00	667.50	665.80	447.10
Kern	2596.00	1.58	669.20	670.80	447.19
Sonoma	2231.00	13.63	666.20	661.80	447.21
Glenn	144.00	9.72	671.90	660.40	447.34
El Dorado	868.00	0.00	674.60	668.00	447.53
Los Angeles	3303.00	5.03	666.10	672.10	447.74
Santa Clara	8735.00	32.71	655.40	655.20	447.77
Humboldt	162.00	0.00	679.80	663.60	447.80
El Dorado	678.00	0.15	677.60	665.70	447.82
El Dorado	3787.00	0.26	674.90	668.30	447.82
Santa Cruz	2458.00	11.27	666.90	665.30	447.82
Placer	1452.00	0.00	679.60	664.20	447.93
Shasta	1212.00	3.96	669.20	670.70	447.95
Placer	1862.00	0.27	673.10	670.70	448.02
Nevada	567.00	0.00	673.90	670.20	448.03
Santa Barbara	670.00	12.54	670.30	661.50	448.11
San Diego	188.00	4.79	673.20	666.50	448.16
San Diego	14708.00	12.68	664.50	667.40	448.19
Madera	953.00	0.00	668.10	676.50	448.20
Placer	6423.00	1.45	671.40	671.80	448.22
Lassen	198.00	0.00	672.70	672.20	448.30
Santa Clara	4925.00	3.59	672.80	668.60	448.33
Tulare	118.00	7.63	668.50	669.10	448.41
San Mateo	2325.00	22.71	662.00	660.90	448.54
Sonoma	2569.00	15.34	669.80	660.90	448.68
Kings	576.00	9.55	665.80	671.00	448.78
San Mateo	2536.00	2.44	676.10	668.00	448.85
Santa Barbara	675.00	14.96	668.70	663.40	449.02
Placer	208.00	0.00	680.50	666.60	449.03
El Dorado	2987.00	0.50	676.10	670.50	449.03
Los Angeles	8529.00	3.71	668.90	674.60	449.07
Tehama	187.00	8.56	664.60	674.10	449.09
Yuba	101.00	2.97	667.90	676.50	449.12
El Dorado	145.00	0.00	670.50	677.30	449.27
Orange	9850.00	18.56	663.70	665.80	449.35
San Mateo	10619.00	18.46	665.90	664.00	449.45
Sonoma	155.00	4.52	672.30	671.60	449.47
Sonoma	1252.00	20.77	659.40	668.30	449.49
Nevada	706.00	0.14	676.00	672.50	449.55
Sonoma	119.00	28.57	661.70	658.40	449.56
Orange	4734.00	10.86	665.50	672.40	449.59
San Luis Obispo	296.00	5.41	674.60	670.10	450.04

San Mateo	2528.00	3.68	675.00	671.50	450.06
Orange	6257.00	8.73	671.20	671.30	450.41
Santa Cruz	3005.00	23.06	666.70	661.60	450.45
Fresno	218.00	6.42	669.40	675.70	450.51
Sonoma	734.00	6.54	676.10	669.30	450.65
Trinity	139.00	0.00	680.10	672.20	450.77
Santa Clara	11885.00	29.12	659.10	664.10	450.77
Santa Barbara	6201.00	47.88	650.90	653.70	450.83
Los Angeles	6055.00	14.24	668.90	669.70	450.95
Humboldt	594.00	1.68	683.00	668.40	451.03
Placer	326.00	0.00	673.30	679.90	451.07
Nevada	2089.00	0.14	673.80	679.30	451.08
Sonoma	878.00	2.73	681.00	669.80	451.18
Marin	3518.00	40.11	656.70	656.90	451.24
Santa Clara	4632.00	17.85	669.40	666.60	451.28
Trinity	449.00	0.00	672.80	681.10	451.30
Shasta	297.00	0.00	679.00	675.50	451.50
Nevada	1579.00	0.06	678.50	677.40	451.99
Humboldt	383.00	0.00	682.90	673.20	452.03
Sonoma	81.00	0.00	685.30	671.50	452.27
San Diego	900.00	20.67	668.80	668.50	452.66
Santa Clara	6022.00	27.67	663.90	667.40	452.99
Monterey	919.00	0.33	680.20	679.40	453.31
Marin	1960.00	1.48	684.10	674.70	453.43
Santa Clara	3186.00	35.34	663.50	661.50	453.45
Sonoma	189.00	14.29	679.10	667.00	453.46
Los Angeles	946.00	1.48	683.10	676.20	453.59
Santa Clara	738.00	0.54	684.20	676.70	453.81
Santa Clara	151.00	2.65	676.80	682.20	453.88
Santa Barbara	4521.00	32.07	666.80	663.40	454.09
Sonoma	945.00	2.54	685.70	674.40	454.21
Stanislaus	125.00	0.00	688.50	674.70	454.40
Sonoma	2707.00	4.47	678.70	680.80	454.66
Ventura	516.00	11.05	680.50	673.20	454.92
Marin	1091.00	1.37	689.80	674.00	455.06
San Diego	1457.00	27.45	666.20	671.60	455.08
Santa Cruz	158.00	0.00	687.30	678.00	455.10
Santa Barbara	134.00	2.24	681.80	682.50	455.51
Shasta	526.00	0.00	684.50	682.30	455.60
Marin	1803.00	2.77	685.60	679.50	455.96
Santa Cruz	141.00	0.00	680.40	688.20	456.20
Santa Cruz	235.00	0.43	688.50	680.20	456.38
San Diego	379.00	22.69	670.50	676.60	456.60
Merced	285.00	47.37	661.10	661.60	456.69
Sonoma	600.00	5.33	680.00	684.90	456.74

San Diego	5259.00	15.06	679.00	678.60	457.55
Sonoma	167.00	11.38	680.80	681.80	457.99
Sonoma	164.00	11.59	682.80	679.80	458.06
Marin	948.00	3.38	692.20	679.90	458.49
Contra Costa	3280.00	6.07	682.20	687.40	458.56
Santa Clara	2768.00	1.59	691.60	686.60	459.93
Santa Barbara	1254.00	10.13	686.20	683.70	460.01
Alameda	195.00	0.00	691.60	690.00	460.53
Santa Clara	15228.00	8.65	683.10	690.30	460.68
Santa Barbara	535.00	1.50	693.50	688.60	461.20
San Mateo	2392.00	17.73	682.40	684.30	461.48
Santa Cruz	81.00	12.35	693.80	681.30	462.48
San Mateo	1940.00	6.13	693.70	690.10	463.31
Marin	1059.00	2.27	695.90	692.00	463.39
Contra Costa	3469.00	0.89	697.90	691.70	463.50
Marin	2340.00	2.48	693.60	694.90	463.66
San Diego	2106.00	2.42	695.10	695.30	464.27
San Diego	2542.00	10.39	687.70	695.00	464.36
San Mateo	478.00	3.77	701.30	689.30	464.79
Contra Costa	1885.00	1.96	697.40	695.70	465.02
Contra Costa	2422.00	0.58	699.10	697.30	465.66
Santa Barbara	220.00	1.36	693.30	703.60	466.09
San Mateo	1318.00	2.81	695.40	701.10	466.44
San Mateo	687.00	1.16	698.30	699.90	466.45
Santa Clara	2341.00	2.05	698.90	701.70	467.55
San Mateo	984.00	6.00	700.90	707.70	471.53
Santa Clara	3724.00	4.73	704.00	709.50	472.74

iv) Plot a suitable graph showing total income for each county



- v) Obtain the list of students come from Kern and Nevada and whose average performance is between 500 and 600

No student from either of the counties had an average performance between 500 and 600.

They all had an average performance between 421 and 452 as shown below

county	students	English	Read	Math	Average performance
Kern	888.00	46.96	605.50	612.50	421.65
Kern	237.00	5.49	631.80	636.60	424.63
Kern	814.00	13.76	631.90	628.90	424.85
Kern	1639.00	7.32	638.40	629.60	425.11
Kern	2621.00	2.02	2.02	638.30	214.11
Kern	1217.00	30.32	629.40	627.70	429.14
Kern	6195.00	13.56	636.20	637.70	429.15
Kern	2538.00	45.07	622.90	620.60	429.52
Kern	2141.00	11.35	636.90	640.50	429.58
Kern	27176.00	28.86	631.60	629.50	429.99
Kern	2688.00	49.81	621.30	619.30	430.14
Kern	146.00	13.70	637.50	639.60	430.27
Kern	224.00	7.59	633.60	653.80	431.66
Kern	421.00	58.91	614.90	621.70	431.84
Kern	797.00	3.26	648.80	647.70	433.25

Kern	382.00	0.00	653.10	651.90	435.00
Kern	2471.00	53.06	627.50	627.10	435.89
Kern	1129.00	0.00	655.10	653.50	436.20
Kern	793.00	2.27	652.40	654.60	436.42
Kern	6219.00	52.24	621.10	636.20	436.51
Nevada	2045.00	1.37	657.80	650.60	436.59
Nevada	145.00	0.00	657.80	655.20	437.67
Nevada	117.00	0.85	664.90	649.90	438.55
Kern	2601.00	70.01	616.50	630.40	438.97
Nevada	590.00	0.17	673.10	647.10	440.12
Kern	491.00	85.54	611.70	624.40	440.55
Kern	3548.00	0.37	658.30	667.00	441.89
Kern	12380.00	4.81	660.10	663.60	442.84
Nevada	721.00	0.69	668.80	664.10	444.53
Kern	1349.00	0.22	667.00	667.90	445.04
Kern	224.00	4.46	660.50	675.70	446.89
Kern	2596.00	1.58	669.20	670.80	447.19
Nevada	567.00	0.00	673.90	670.20	448.03
Nevada	706.00	0.14	676.00	672.50	449.55
Nevada	2089.00	0.14	673.80	679.30	451.08
Nevada	1579.00	0.06	678.50	677.40	451.99

vi) Obtain the list of students whose average performance is more than 450

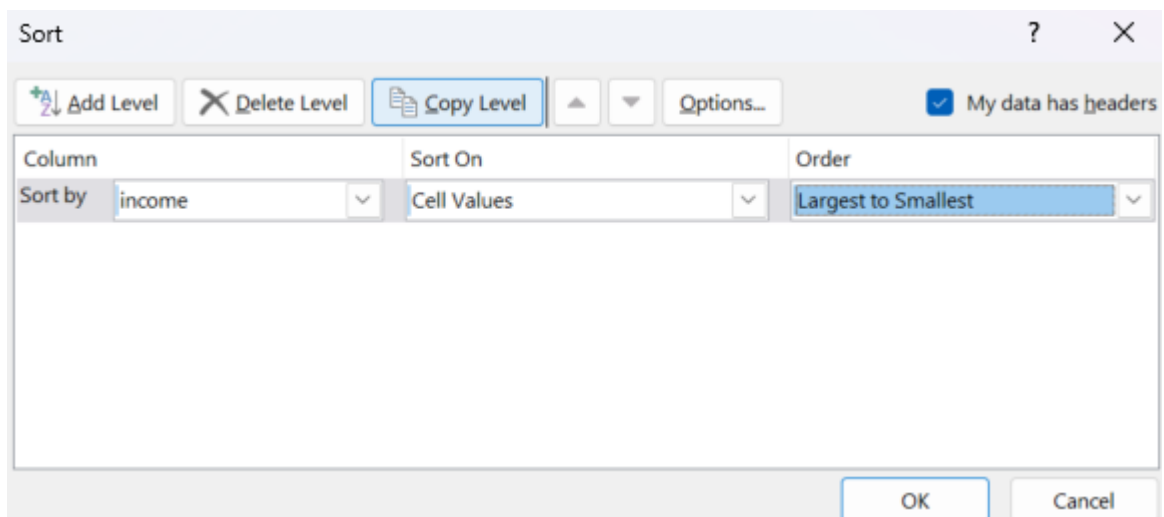
county	students	English	Read	Math	Average performance
San Luis Obispo	296.00	5.41	674.60	670.10	450.04
San Mateo	2528.00	3.68	675.00	671.50	450.06
Orange	6257.00	8.73	671.20	671.30	450.41
Santa Cruz	3005.00	23.06	666.70	661.60	450.45
Fresno	218.00	6.42	669.40	675.70	450.51
Sonoma	734.00	6.54	676.10	669.30	450.65
Trinity	139.00	0.00	680.10	672.20	450.77
Santa Clara	11885.00	29.12	659.10	664.10	450.77
Santa Barbara	6201.00	47.88	650.90	653.70	450.83
Los Angeles	6055.00	14.24	668.90	669.70	450.95
Humboldt	594.00	1.68	683.00	668.40	451.03
Placer	326.00	0.00	673.30	679.90	451.07
Nevada	2089.00	0.14	673.80	679.30	451.08
Sonoma	878.00	2.73	681.00	669.80	451.18
Marin	3518.00	40.11	656.70	656.90	451.24
Santa Clara	4632.00	17.85	669.40	666.60	451.28
Trinity	449.00	0.00	672.80	681.10	451.30
Shasta	297.00	0.00	679.00	675.50	451.50
Nevada	1579.00	0.06	678.50	677.40	451.99

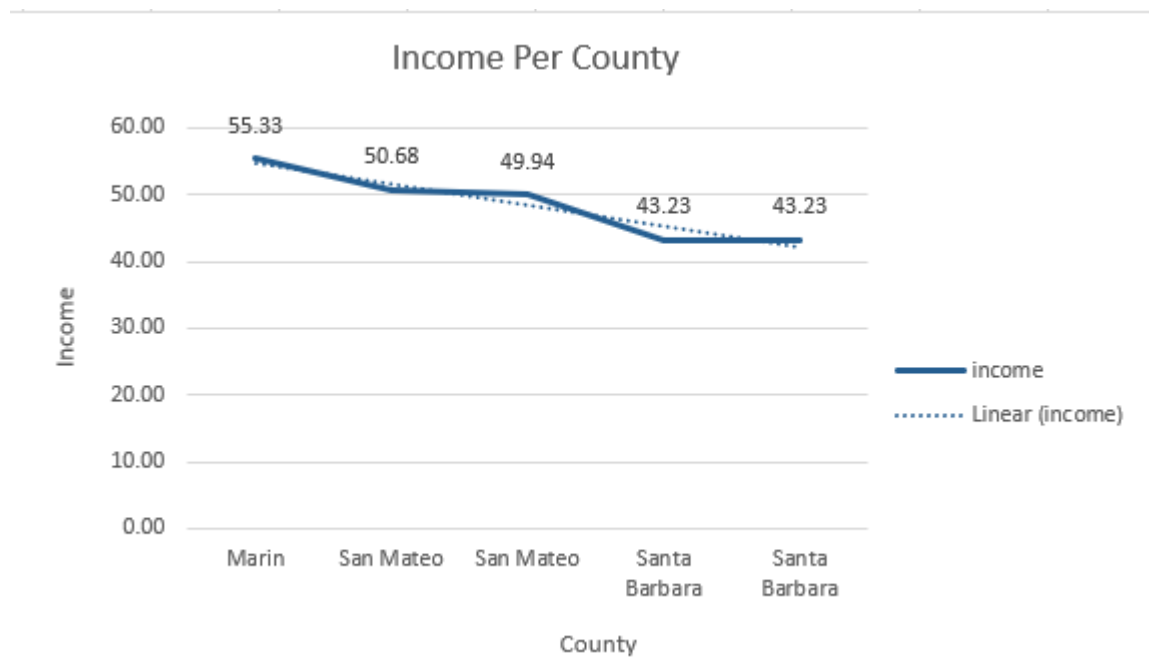
Humboldt	383.00	0.00	682.90	673.20	452.03
Sonoma	81.00	0.00	685.30	671.50	452.27
San Diego	900.00	20.67	668.80	668.50	452.66
Santa Clara	6022.00	27.67	663.90	667.40	452.99
Monterey	919.00	0.33	680.20	679.40	453.31
Marin	1960.00	1.48	684.10	674.70	453.43
Santa Clara	3186.00	35.34	663.50	661.50	453.45
Sonoma	189.00	14.29	679.10	667.00	453.46
Los Angeles	946.00	1.48	683.10	676.20	453.59
Santa Clara	738.00	0.54	684.20	676.70	453.81
Santa Clara	151.00	2.65	676.80	682.20	453.88
Santa Barbara	4521.00	32.07	666.80	663.40	454.09
Sonoma	945.00	2.54	685.70	674.40	454.21
Stanislaus	125.00	0.00	688.50	674.70	454.40
Sonoma	2707.00	4.47	678.70	680.80	454.66
Ventura	516.00	11.05	680.50	673.20	454.92
Marin	1091.00	1.37	689.80	674.00	455.06
San Diego	1457.00	27.45	666.20	671.60	455.08
Santa Cruz	158.00	0.00	687.30	678.00	455.10
Santa Barbara	134.00	2.24	681.80	682.50	455.51
Shasta	526.00	0.00	684.50	682.30	455.60
Marin	1803.00	2.77	685.60	679.50	455.96
Santa Cruz	141.00	0.00	680.40	688.20	456.20
Santa Cruz	235.00	0.43	688.50	680.20	456.38
San Diego	379.00	22.69	670.50	676.60	456.60
Merced	285.00	47.37	661.10	661.60	456.69
Sonoma	600.00	5.33	680.00	684.90	456.74
San Diego	5259.00	15.06	679.00	678.60	457.55
Sonoma	167.00	11.38	680.80	681.80	457.99
Sonoma	164.00	11.59	682.80	679.80	458.06
Marin	948.00	3.38	692.20	679.90	458.49
Contra Costa	3280.00	6.07	682.20	687.40	458.56
Santa Clara	2768.00	1.59	691.60	686.60	459.93
Santa Barbara	1254.00	10.13	686.20	683.70	460.01
Alameda	195.00	0.00	691.60	690.00	460.53
Santa Clara	15228.00	8.65	683.10	690.30	460.68
Santa Barbara	535.00	1.50	693.50	688.60	461.20
San Mateo	2392.00	17.73	682.40	684.30	461.48
Santa Cruz	81.00	12.35	693.80	681.30	462.48
San Mateo	1940.00	6.13	693.70	690.10	463.31
Marin	1059.00	2.27	695.90	692.00	463.39
Contra Costa	3469.00	0.89	697.90	691.70	463.50
Marin	2340.00	2.48	693.60	694.90	463.66
San Diego	2106.00	2.42	695.10	695.30	464.27

San Diego	2542.00	10.39	687.70	695.00	464.36
San Mateo	478.00	3.77	701.30	689.30	464.79
Contra Costa	1885.00	1.96	697.40	695.70	465.02
Contra Costa	2422.00	0.58	699.10	697.30	465.66
Santa Barbara	220.00	1.36	693.30	703.60	466.09
San Mateo	1318.00	2.81	695.40	701.10	466.44
San Mateo	687.00	1.16	698.30	699.90	466.45
Santa Clara	2341.00	2.05	698.90	701.70	467.55
San Mateo	984.00	6.00	700.90	707.70	471.53
Santa Clara	3724.00	4.73	704.00	709.50	472.74

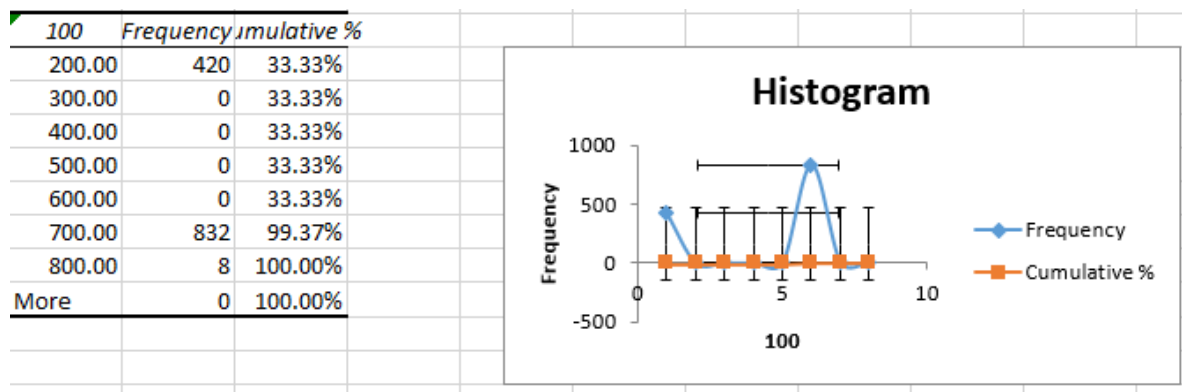
- vii) Select the top five counties with the highest income. Plot a graph showing their basic income and overtime payments.

To select the top five counties with the highest income;





- viii) Plot a histogram of the data for math, English and Read using a suitable bin range.
Is the data normally distributed?



According to the histogram, the data is normally distributed since it is bale-shaped and has only one peak. It is symmetric around the mean.

b)For the Performance Data fit, a multiple regression model for predicting average performance .

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	1							
R Square	1							
Adjusted R Square	1							
Standard Error	4.13E-14							
Observations	420							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	3	41379.67	13793.22	8.1E+30	0			
Residual	416	7.09E-25	1.7E-27					
Total	419	41379.67						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3.98E-13	9.29E-14	4.280944	2.31E-05	2.15E-13	5.81E-13	2.15E-13	5.81E-13
English	0.333333	1.57E-16	2.12E+15	0	0.333333	0.333333	0.333333	0.333333
Read	0.333333	3.05E-16	1.09E+15	0	0.333333	0.333333	0.333333	0.333333
Math	0.333333	2.88E-16	1.16E+15	0	0.333333	0.333333	0.333333	0.333333

$$Y = 3.98E-13 + 0.333333\text{English} + 0.333333\text{Read} + 0.333333\text{Math}$$

- i) By testing an appropriate hypothesis, determine whether the regression model is adequate?

$$H_0 : B_1 = B_2 = B_3 = 0$$

H_a : at least one B_i is not 0

$$\alpha = 0.05$$

Since the p-values of the three independent variables is zero, it suggests that the model is significant/adequate

- ii) Which variables significantly affect the average performance?

English, Read and Math

- iii) How accurate is the model obtained?

R-squared is equal to 1. This indicates a perfect fit of the model to the data.

- iv) Perform a diagnostic test for the fitted regression equation?

c) Use the performance Data. By filtering, obtain the data on computers for three countries:

Humboldt ,Kern,Los Angeles.

county	computer
Kern	66.00
Kern	100.00
Kern	50.00
Los Angeles	960.00
Kern	139.00
Kern	169.00
Kern	269.00
Los Angeles	721.00
Los Angeles	177.00
Kern	275.00
Kern	78.00
Kern	571.00
Los Angeles	175.00
Kern	85.00
Kern	3324.00
Los Angeles	786.00
Los Angeles	560.00
Los Angeles	202.00
Los Angeles	480.00
Kern	287.00
Los Angeles	284.00
Kern	13.00
Los Angeles	273.00
Humboldt	37.00
Los Angeles	1015.00
Kern	1261.00
Los Angeles	315.00
Los Angeles	383.00
Kern	28.00
Kern	134.00
Los Angeles	1182.00

Kern	397.00
Los Angeles	1321.00
Los Angeles	680.00
Kern	31.00
Humboldt	30.00
Humboldt	48.00
Humboldt	25.00
Los Angeles	1058.00
Kern	60.00
Humboldt	59.00
Humboldt	75.00
Humboldt	134.00
Kern	75.00
Kern	49.00
Humboldt	30.00
Los Angeles	374.00
Kern	164.00
Humboldt	37.00
Los Angeles	122.00
Humboldt	56.00
Los Angeles	224.00
Los Angeles	496.00
Kern	1671.00
Los Angeles	50.00
Los Angeles	576.00
Kern	335.00
Humboldt	58.00
Humboldt	114.00
Humboldt	30.00
Kern	259.00
Kern	15.00
Los Angeles	379.00
Los Angeles	540.00
Humboldt	17.00
Kern	249.00
Humboldt	23.00
Los Angeles	834.00

Humboldt	75.00
Humboldt	49.00
Los Angeles	310.00

Perform an analysis of variance to compare the number of computers used in four counties.

d) The data set contains 205 rows and 20 columns(features) of which are independent features. (CAR DATA).

i) Create a pivot table for car name by engine type for count of door numbers. Represent this table in a pivot chart

Row Labels	Count of doornumber
dohc	12
alfa-romero giulia	1
alfa-romero stelvio	1
jaguar xf	1
jaguar xj	1
saab 99e	1
saab 99gle	1
toyota celica gt liftback	1
toyota corolla liftback	1
toyota corolla tercel	1
toyota corona	1
toyota starlet	1
toyouta tercel	1
dohcv	1
porsche cayenne	1
l	12
chevrolet impala	1
peugeot 304	1
peugeot 504	6
peugeot 504 (sw)	1
peugeot 505s turbo diesel	1
peugeot 604sl	2
ohc	148
audi 100 ls	1
audi 100ls	2
audi 4000	1
audi 5000	1
audi 5000s (diesel)	1
audi fox	1
bmw 320i	2
bmw x1	1

bmw x3	2
bmw x4	1
bmw x5	1
bmw z4	1
buick century	1
buick century luxury (sw)	1
buick electra 225 custom	1
buick skyhawk	1
chevrolet monte carlo	1
chevrolet vega 2300	1
dodge challenger se	1
dodge colt (sw)	1
dodge colt hardtop	1
dodge coronet custom	1
dodge coronet custom (sw)	1
dodge d200	1
dodge dart custom	1
dodge monaco (sw)	1
dodge rampage	1
honda accord	2
honda accord cvcc	1
honda accord lx	1
honda civic	3
honda civic (auto)	1
honda civic 1300	1
honda civic 1500 gl	1
honda civic cvcc	2
honda prelude	1
isuzu D-Max	2
isuzu D-Max V-Cross	1
isuzu MU-X	1
maxda glc deluxe	1
maxda rx3	1
mazda 626	2
mazda glc	1
mazda glc custom	1
mazda glc custom l	1
mazda glc deluxe	2
mazda rx2 coupe	1
mazda rx-4	2
mazda rx-7 gs	1
mercury cougar	1
mitsubishi g4	3
mitsubishi lancer	1
mitsubishi mirage	1
mitsubishi mirage g4	3
mitsubishi montero	1
mitsubishi outlander	3

mitsubishi pajero	1
nissan clipper	1
nissan gt-r	1
nissan juke	1
nissan latio	2
nissan leaf	1
nissan note	1
nissan nv200	1
nissan rogue	2
nissan titan	1
Nissan versa	1
plymouth cricket	1
plymouth duster	1
plymouth fury gran sedan	1
plymouth fury iii	2
plymouth satellite custom (sw)	1
plymouth valiant	1
porsche macan	1
renault 12tl	1
renault 5 gtl	1
saab 99e	1
saab 99gle	1
saab 99le	2
toyota carina	1
toyota celica gt	1
toyota corolla	6
toyota corolla 1200	2
toyota corolla 1600 (sw)	1
toyota corolla liftback	1
toyota corona	5
toyota corona hardtop	1
toyota corona liftback	1
toyota corona mark ii	1
toyota cressida	1
toyota mark ii	3
toyota starlet	1
toyota tercel	1
volkswagen rabbit	1
volkswagen 1131 deluxe sedan	1
volkswagen 411 (sw)	1
volkswagen dasher	2
volkswagen model 111	1
volkswagen rabbit	1
volkswagen rabbit custom	1
volkswagen super beetle	1
volkswagen type 3	1
volvo 144ea	2
volvo 145e (sw)	2

volvo 244dl	1
volvo 245	1
volvo 246	1
volvo 264gl	2
volvo diesel	1
vw dasher	1
vw rabbit	1
ohcf	15
porcshce panamera	1
porsche boxter	1
porsche cayenne	1
subaru	2
subaru baja	1
subaru brz	1
subaru dl	4
subaru r1	1
subaru r2	1
subaru trezia	1
subaru tribeca	1
ohcv	13
alfa-romero Quadrifoglio	1
buick century special	1
buick opel isuzu deluxe	1
buick regal sport coupe (turbo)	1
buick skylark	1
jaguar xk	1
nissan clipper	1
nissan dayz	1
nissan fuga	1
nissan kicks	1
nissan otti	1
nissan teana	1
volvo 244dl	1
rotor	4
mazda 626	1
mazda glc	1
mazda glc 4	1
mazda rx-7 gs	1
Grand Total	205

ii) Create a pivot table for fuel system by car body for sum of prices. Represent this information in a pivot chart.

Row	Sum of
-----	--------

Labels	price
convertible	131343
mpfi	131343
hardtop	177668
2bbl	8249
idi	28176
mpfi	141243
hatchback	726365.667
1bbl	49381
2bbl	195431
4bbl	36435
idi	7788
mfi	12964
mpfi	332962.667
spdi	80356
spfi	11048
sedan	1377050
1bbl	26435
2bbl	217618
idi	221616
mpfi	892823
spdi	18558
wagon	309299
1bbl	7295
2bbl	72260
idi	59183
mpfi	170561
Grand Total	2721725.667

iii)Obtain a pivot table using engine location as a slicer. Show the cars with Rear.

Row Labels
rear
porcshce panamera
porsche boxter
porsche cayenne
Grand Total

iv)By filtering, show a show a table with audi 100, Saab 99e, vw dasher, rabbit, (select a fifth make of your choice).

car_ID	symbol	CarName	aspirator	doornumber	carbody	price
4	2	audi 100 l	std	four	sedan	13950.0
5	2	audi 100 l	std	four	sedan	17450.0
7	1	audi 100 l	std	four	sedan	17710.0
109	0	peugeot 3	turbo	four	sedan	13200.0
133	3	saab 99e	std	two	hatchback	11850.0
134	2	saab 99le	std	four	sedan	12170.0
135	3	saab 99le	std	two	hatchback	15040.0
138	2	saab 99e	turbo	four	sedan	18620.0
190	3	vw dasher	std	two	convertible	11595.0
191	3	vw rabbit	std	two	hatchback	9980

e) The data below show prices of a certain stock

Day	Prices
1	16.7
2	15.85
3	14.6
4	14.65
5	15.115
6	15.1
7	14.6
8	14.65
9	14.2
10	14.1
11	13.9
12	13.85

- i) Using exponential smoothing constant $\alpha=0.1, 0.15, 0.20$ and 0.25 , obtain the mean absolute deviations of the forecasts.

Day	Prices	alpha=0.1	Absolute Error	alpha=0.15	Absolute Error	alpha=0.20	Absolute Error
1	16.7	#N/A		#N/A		#N/A	
2	15.85	16.7	0.85	16.7	0.85	16.7	0.85
3	14.6	16.615	2.015	16.5725	1.9725	16.53	1.93
4	14.65	16.4135	1.7635	16.276625	1.626625	16.144	1.494
5	15.115	16.23715	1.12215	16.03263125	0.91763125	15.8452	0.7302
6	15.1	16.124935	1.024935	15.89498656	0.794986562	15.69916	0.59916
7	14.6	16.0224415	1.4224415	15.77573858	1.175738578	15.579328	0.979328
8	14.65	15.88019735	1.23019735	15.59937779	0.949377791	15.3834624	0.7334624
9	14.2	15.75717762	1.557177615	15.45697112	1.256971123	15.23676992	1.03676992
10	14.1	15.60145985	1.501459854	15.26842545	1.168425454	15.02941594	0.929415936

11	13.9	15.45131387	1.551313868	15.09316164	1.193161636	14.84353275	0.943532749
12	13.85	15.29618248	1.446182481	14.91418739	1.064187391	14.6548262	0.804826199
		MAD	1.407668879	MAD	1.179054981	MAD	1.002790473
alpha=0.25		bsolute Error					
#N/A							
	16.7	0.85					
	16.4875	1.8875					
	16.015625	1.365625					
	15.67421875	0.55921875					
	15.53441406	0.434414062					
	15.42581055	0.825810547					
	15.21935791	0.56935791					
	15.07701843	0.877018433					
	14.85776382	0.757763824					
	14.66832287	0.768322868					
	14.47624215	0.626242151					
		0.86557032					

MAD

Where: Absolute error is the difference between the actual value and the forecasts

MAD-Mean Absolute Deviation is the average of the Error.

- ii) Which alpha gives the best forecasting model. Use it to forecast for day 13, 14,15.

The alpha that gives the best forecasting model is 0.25 because it has the smallest mean absolute deviation.

alpha=0.25

#N/A
16.7
16.4875
16.015625
15.67421875
15.53441406
15.42581055
15.21935791
15.07701843
14.85776382
14.66832287
14.47624215
14.31968161
10.73976121
8.054820908

Question 3

A company, organizes the vehicles it manufactures into three families: a family of trucks, a family of small cars, and a family of midsized and luxury cars. One plant outside Detroit, MI, assembles two models from the family of midsized and luxury cars. The first model, the Family Thrillseeker, is a four-door sedan with vinyl seats, plastic interior, standard features, and excellent gas mileage. It is marketed as a smart buy for middle-class families with tight budgets, and each Family Thrillseeker sold generates a modest profit of \$3,600 for the company. The second model, the Classy Cruiser, is a two-door luxury sedan with leather seats, wooden interior, custom features, and navigational capabilities. It is marketed as a privilege of affluence for upper-middle-class families, and each Classy Cruiser sold generates a healthy profit of \$5,400 for the company. Rachel Rosencrantz, the manager of the assembly plant, is currently deciding the production schedule for the next month. Specifically, she must decide how many Family Thrillseekers and how many Classy Cruisers to assemble in the plant to maximize profit for the company. She knows that the plant possesses a capacity of 48,000 labor-hours during the month. She also knows that it takes 6 labor-hours to assemble one Family Thrillseeker and 10.5 labor-hours to assemble one Classy Cruiser. Because the plant is simply an assembly plant, the parts required to assemble the two models are not produced at the plant. They are instead shipped from other plants around the Michigan area to the assembly plant. For example, tires, steering wheels, windows, seats, and doors all arrive from various supplier plants. For the next month, Rachel knows that she will be able to obtain only 20,000 doors (10,000 left-hand doors and 10,000 right-hand doors) from the door supplier. A recent labor strike forced the shutdown of that particular supplier plant for several days, and that plant will not be able to meet its production schedule for the next month. Both the Family Thrillseeker and the Classy Cruiser use the same door part. In addition, a recent company forecast of the monthly demands for different automobile models suggests that the demand for the Classy Cruiser is limited to 3,500 cars. There is no limit on the demand for the Family Thrillseeker within the capacity limits of the assembly plant.

i) Formulate and solve a linear programming problem to determine the number of Family Thrillseekers and the number of Classy Cruisers that should be assembled.

Before she makes her final production decisions, Rachel plans to explore the following questions independently except where otherwise indicated.

iii) The marketing department knows that it can pursue a targeted \$500,000 advertising campaign that will raise the demand for the Classy Cruiser next month by 20 percent. Should the campaign be undertaken?

(iv) Rachel knows that she can increase next month's plant capacity by using overtime labor. She can increase the plant's labor-hour capacity by 25 percent. With the new assembly plant capacity, how many Family Thrillseekers and how many Classy Cruisers should be assembled?

Question 3

i) Formulate and solve a linear programming problem to determine the number of Family Thrillseekers and the number of Classy Cruisers that should be assembled.

Before she makes her final production decisions, Rachel plans to explore the following questions independently except where otherwise indicated.

Let:

- x be the number of Family Thrillseekers to be assembled.
- y be the number of Classy Cruisers to be assembled.

Maximizing profit, which is given by:

$$Z = 3600x + 5400y$$

Subject to the following constraints:

$$\text{Labor-hour constraint: } 6x + 10.5y \leq 48000$$

$$\text{Door constraint: } x + y \leq 10000$$

$$\text{Demand constraint for Classy Cruisers: } y \leq 3500$$

$$\text{Non-negativity constraint: } x, y \geq 0$$

Intersection of $(6x + 10.5y = 48000)$ and $(x + y = 10000)$:

from $(x + y = 10000)$, we get:

$$y = 10000 - x$$

Substitute (y) into $(6x + 10.5(10000 - x) = 48000)$:

$$6x + 105000 - 10.5x = 48000$$

$$-4.5x + 105000 = 48000$$

$$-4.5x = -57000$$

$$x = 12667 \text{ text } \{(\text{not feasible as it exceeds door constraint})\}$$

2. Intersection of $(6x + 10.5y = 48000)$ and $(y = 3500)$

Substitute $y = 3500$

$$6x + 10.5(3500) = 48000$$

$$6x + 36750 = 48000$$

$$6x = 11250$$

$$x = 1875 \text{ Point: } ((1875, 3500))$$

Intersection of $(x + y = 10000)$ and $(y = 3500)$:

Substitute $(y = 3500)$:

$$x + 3500 = 10000$$

$$x = 6500$$

$$\text{Point: } ((6500, 3500))$$

iii) The marketing department knows that it can pursue a targeted \$500,000 advertising campaign that will raise the demand for the Classy Cruiser next month by 20 percent. Should the campaign be undertaken?

A 20% increase in demand for the Classy Cruiser increases the demand limit to:

$$3500 \text{ times } 1.2 = 4200$$

The new constraints are:

$$6x + 10.5y = 48000$$

$$x + y = 10000$$

$$y = 4200$$

Re-evaluating the intersections and the profit:

1. Intersection of $6x + 10.5y = 48000$ and $y = 4200$

$$6x + 10.5(4200) = 48000$$

$$6x + 44100 = 48000$$

$$6x = 3900$$

$$x = 650$$

Point: (650, 4200) \)

2. Intersection of $x + y = 10000$ and $y = 4200$

$$x + 4200 = 10000$$

$$x = 5800$$

Point: (5800, 4200)

Evaluating New Objective Function:

1. At (0, 0): $P = 3600(0) + 5400(0) =$

2. At (650, 4200): $P = 3600(650) + 5400(4200) = 26010000$

3. At (5800, 4200): $(P = 3600(5800) + 5400(4200) = 43920000$

The new optimal solution is $x = 5800$ and $y = 4200$, yielding a profit of \$43,920,000

Impact of Advertising:

Comparing with the previous maximum profit of \$47,700,000, the new profit of \$43,920,000 is lower. Therefore, the advertising campaign should not be undertaken as it reduces the overall profit.

(iv) Rachel knows that she can increase next month's plant capacity by using overtime labor. She can increase the plant's labor-hour capacity by 25 percent. With the new assembly plant capacity, how many Family Thrillseekers and how many Classy Cruisers should be assembled?

Increasing the plant's labor-hour capacity by 25%:

$$48000 \text{ times } 1.25 = 60000$$

The new constraints are:

$$6x + 10.5y = 60000$$

$$x + y = 10000$$

$$y = 3500$$

Re-evaluating the intersections and profit:

1. Intersection of $6x + 10.5y = 60000$ and $y = 3500$

$$6x + 10.5(3500) = 60000$$

$$6x + 36750 = 60000$$

$$6x = 23250$$

$$x = 3875 \quad \text{Point: } (3875, 3500)$$

Evaluating Objective Function at New Points:

1. At $(0, 0)$: $P = 3600(0) + 5400(0) = 0$

2. At $(3875, 3500)$: $P = 3600(3875) + 5400(3500) = 47325000$

- The new optimal solution is $x = 3875$ and $y = 3500$, yielding a profit of \$47,325,000

Conclusion:

- Rachel should produce 6,500 Family Thrillseekers and 3,500 Classy Cruisers under the current capacity for maximum profit.

- The advertising campaign should not be undertaken.

- With increased plant capacity, she should produce 3,875 Family Thrillseekers and 3,500 Classy Cruisers.