Assignment No 3A

```
import pandas as pd
import numpy as np
import io
import statistics
import seaborn as sns


from google.colab import files
uploaded=files.upload()
```

```
<IPython.core.display.HTML object>
```

```
Saving Mall_Customers.csv to Mall_Customers.csv
```

```
df=pd.read_csv(io.BytesIO(uploaded['Mall_Customers.csv']))


print(df)
```

```
     CustomerID   Genre  Age  Annual Income (k$)  Spending Score (1-100)
0             1    Male   19                  15                      39
1             2    Male   21                  15                      81
2             3  Female   20                  16                       6
3             4  Female   23                  16                      77
4             5  Female   31                  17                      40
..          ...     ...  ...                 ...                     ...
195         196  Female   35                 120                      79
196         197  Female   45                 126                      28
197         198    Male   32                 126                      74
198         199    Male   32                 137                      18
199         200    Male   30                 137                      83

[200 rows x 5 columns]
```

```
df.describe()
```

```
       CustomerID         Age  Annual Income (k$)  Spending Score (1-100)
count  200.000000  200.000000          200.000000              200.000000
mean   100.500000   38.850000           60.560000               50.200000
std     57.879185   13.969007           26.264721               25.823522
min      1.000000   18.000000           15.000000                1.000000
25%     50.750000   28.750000           41.500000               34.750000
50%    100.500000   36.000000           61.500000               50.000000
75%    150.250000   49.000000           78.000000               73.000000
max    200.000000   70.000000          137.000000               99.000000
```

```
statistics.mode(df['Age'])
```

```
32
```

```
statistics.mean(df['Annual Income (k$)'])
```

```
60.56
```

```
statistics.median(df['Age'])
```

```
36.0
```

```
df[['Age', 'Annual Income (k$)']].groupby('Age').describe()
```

```
    Annual Income (k$)                                                    \
                 count        mean        std   min     25%    50%     75%
Age
18                 4.0   51.250000  14.056434  33.0   44.25   53.5   60.50
19                 8.0   57.000000  20.632845  15.0   47.50   63.5   67.25
20                 5.0   41.600000  24.815318  16.0   21.00   37.0   61.00
21                 5.0   38.800000  19.018412  15.0   30.00   33.0   54.00
22                 3.0   31.333333  22.278540  17.0   18.50   20.0   38.50
23                 6.0   41.500000  23.441416  16.0   20.75   41.5   60.00
24                 4.0   39.250000  16.357975  20.0   33.50   38.5   44.25
25                 3.0   57.666667  29.263174  24.0   48.00   72.0   74.50
26                 2.0   58.000000   5.656854  54.0   56.00   58.0   60.00
27                 6.0   63.166667  18.400181  40.0   49.50   63.5   75.25
28                 4.0   85.250000  11.615363  76.0   76.75   82.0   90.50
29                 5.0   63.600000  28.866936  28.0   40.00   73.0   79.00
30                 7.0   76.142857  39.612408  19.0   56.00   78.0   93.50
31                 8.0   48.375000  23.323425  17.0   35.50   41.5   70.50
32                11.0   87.181818  26.809768  48.0   74.00   77.0  100.00
33                 3.0   80.333333  35.837597  42.0   64.00   86.0   99.50
34                 5.0   79.000000  15.968719  58.0   78.00   78.0   78.00
35                 9.0   46.666667  38.632888  18.0   21.00   24.0   74.00
36                 6.0   81.000000  22.556595  37.0   85.50   87.0   87.00
37                 3.0   65.000000  40.112342  20.0   49.00   78.0   87.50
38                 6.0   74.500000  20.462160  54.0   64.75   69.0   76.25
39                 3.0   72.666667   4.725816  69.0   70.00   71.0   74.50
40                 6.0   61.666667  19.551641  29.0   55.50   64.5   70.50
41                 2.0  101.000000   2.828427  99.0  100.00  101.0  102.00
42                 2.0   60.000000  36.769553  34.0   47.00   60.0   73.00
43                 3.0   65.666667  15.695010  48.0   59.50   71.0   74.50
44                 2.0   75.500000   3.535534  73.0   74.25   75.5   76.75
45                 3.0   69.333333  50.767444  28.0   41.00   54.0   90.00
46                 3.0   59.000000  36.755952  25.0   39.50   54.0   76.00
47                 6.0   70.166667  27.694163  43.0   51.75   65.5   76.25
48                 5.0   58.200000  13.700365  39.0   54.00   60.0   61.00
49                 7.0   51.000000  12.884099  33.0   40.50   54.0   62.00
50                 5.0   58.600000  18.420098  40.0   43.00   58.0   67.00
```

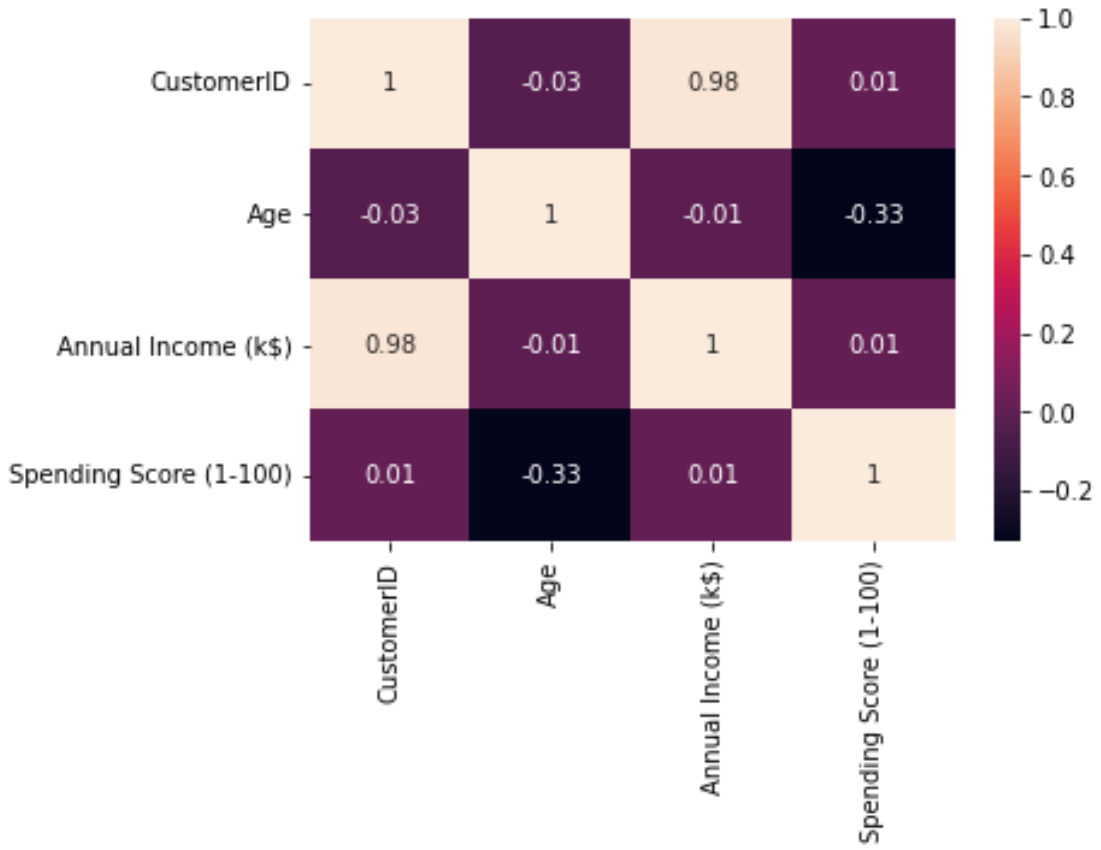
51	2.0	55.500000	16.263456	44.0	49.75	55.5	61.25
52	2.0	55.500000	45.961941	23.0	39.25	55.5	71.75
53	2.0	39.500000	9.192388	33.0	36.25	39.5	42.75
54	4.0	59.750000	30.998656	28.0	42.25	55.0	72.50
55	1.0	57.000000	NaN	57.0	57.00	57.0	57.00
56	1.0	79.000000	NaN	79.0	79.00	79.0	79.00
57	2.0	64.500000	14.849242	54.0	59.25	64.5	69.75
58	2.0	54.000000	48.083261	20.0	37.00	54.0	71.00
59	4.0	65.250000	21.792583	43.0	51.25	62.5	76.50
60	3.0	43.333333	11.547005	30.0	40.00	50.0	50.00
63	2.0	56.500000	12.020815	48.0	52.25	56.5	60.75
64	1.0	19.000000	NaN	19.0	19.00	19.0	19.00
65	2.0	50.500000	17.677670	38.0	44.25	50.5	56.75
66	2.0	63.000000	0.000000	63.0	63.00	63.0	63.00
67	4.0	45.500000	18.699376	19.0	40.00	50.5	56.00
68	3.0	56.666667	7.767453	48.0	53.50	59.0	61.00
69	1.0	44.000000	NaN	44.0	44.00	44.0	44.00
70	2.0	47.500000	2.121320	46.0	46.75	47.5	48.25

Age	max
18	65.0
19	81.0
20	73.0
21	62.0
22	57.0
23	70.0
24	60.0
25	77.0
26	62.0
27	88.0
28	101.0
29	98.0
30	137.0
31	81.0
32	137.0
33	113.0
34	103.0
35	120.0
36	103.0
37	97.0
38	113.0
39	78.0
40	87.0
41	103.0
42	86.0
43	78.0
44	78.0
45	126.0

```
46    98.0
47   120.0
48    77.0
49    65.0
50    85.0
51    67.0
52    88.0
53    46.0
54   101.0
55    57.0
56    79.0
57    75.0
58    88.0
59    93.0
60    50.0
63    65.0
64    19.0
65    63.0
66    63.0
67    62.0
68    63.0
69    44.0
70    49.0
```

```
my_var=df.corr().round(2)
sns.heatmap(data=my_var,annot=True)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4842b09250>
```




```
df.groupby('Age').agg({'Annual Income (k$)':['mean','min','max']})
```

Age	Annual Income (k$)		
	mean	min	max
18	51.250000	33	65
19	57.000000	15	81
20	41.600000	16	73
21	38.800000	15	62
22	31.333333	17	57
23	41.500000	16	70
24	39.250000	20	60
25	57.666667	24	77
26	58.000000	54	62
27	63.166667	40	88
28	85.250000	76	101
29	63.600000	28	98
30	76.142857	19	137
31	48.375000	17	81
32	87.181818	48	137
33	80.333333	42	113
34	79.000000	58	103
35	46.666667	18	120
36	81.000000	37	103

37	65.000000	20	97
38	74.500000	54	113
39	72.666667	69	78
40	61.666667	29	87
41	101.000000	99	103
42	60.000000	34	86
43	65.666667	48	78
44	75.500000	73	78
45	69.333333	28	126
46	59.000000	25	98
47	70.166667	43	120
48	58.200000	39	77
49	51.000000	33	65
50	58.600000	40	85
51	55.500000	44	67
52	55.500000	23	88
53	39.500000	33	46
54	59.750000	28	101
55	57.000000	57	57
56	79.000000	79	79
57	64.500000	54	75
58	54.000000	20	88
59	65.250000	43	93
60	43.333333	30	50
63	56.500000	48	65
64	19.000000	19	19
65	50.500000	38	63
66	63.000000	63	63
67	45.500000	19	62
68	56.666667	48	63
69	44.000000	44	44
70	47.500000	46	49