UNIVERSITY ADMIT ELIGIBILITY PREDICTOR

ASSIGNMENT - 4

Date	4th October 2022
Team ID	PNT2022TMID27839
Student Name	Akash S (311519104007)
Domain Name	Education
Project Name	University Admit Eligibility Predictor
Maximum Marks	2 Marks

1.)IMPORT THE REQUIRED LIBRARIES

2.)DOWNLOAD AND UPLOAD THE DATASET

3.)HANDLE MISSING VALUES AND DEAL WITH THEM

4.) PERFORM THE DESCRIPTIVE STATISTICS ON THE DATASET

4.)PERFORM DESCRIPTIVE STATISTICS ON THE DATASET

```
df.describe()
```

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

```
df.info()
```

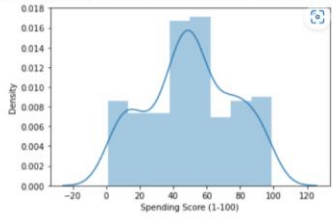
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 4 columns):
 #   Column                  Non-Null Count  Dtype 
---  ------                  --------------  ----- 
 0   Gender                  200 non-null    object
 1   Age                     200 non-null    int64 
 2   Annual Income (k$)      200 non-null    int64 
 3   Spending Score (1-100)  200 non-null    int64 
dtypes: int64(3), object(1)
memory usage: 6.4+ KB
```

5.) PERFORM VARIOUS VISUALISATIONS

a.) UNIVARIANTE ANALYSIS

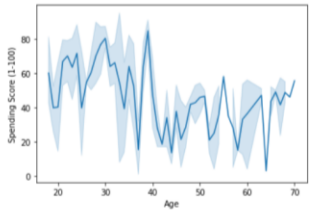
```
sns.distplot(df["Spending Score (1-100)"])
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt y
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7fd2b1900290>
```



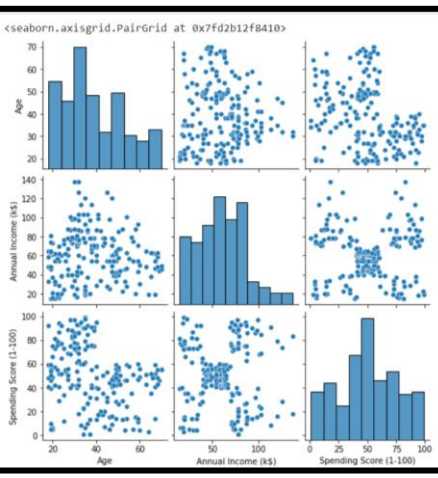

```
[7] sns.lineplot(df['Age'],df["Spending Score (1-100)"])
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variables as keyword args: x, y. From version 0.12, the only valid positiona
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7fd2b178dd90>
```



b.) MULTI - VARIANTE ANALYSIS

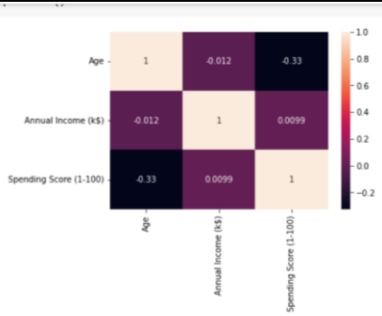
```
[8] <seaborn.axisgrid.PairGrid at 0x7fd2b12f8410>
```




```
[9]
```

	Age	Annual Income (k$)	Spending Score (1-100)
Age	1.000000	-0.012398	-0.327227
Annual Income (k$)	-0.012398	1.000000	0.009903
Spending Score (1-100)	-0.327227	0.009903	1.000000

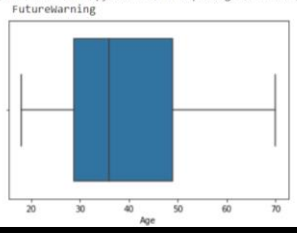
```
[10]
```



6.) FIND AND REPLACE THE OUTLIERS

```
[11] for i in df.columns.drop("Gender"):
         sns.boxplot(df[i])
         plt.show()
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional a
  FutureWarning
```



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[11] /usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional ar
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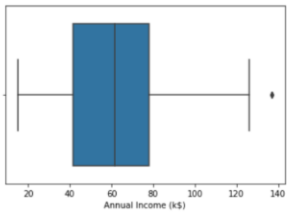


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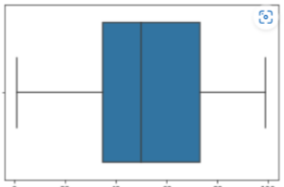


```
[12] for i in df.columns.drop('Gender'):
         Q1 = df[i].quantile(0.25)
         Q3 = df[i].quantile(0.75)
         IQR = Q3-Q1
         upper_limit = Q3 + (1.5*IQR)
         lower_limit = Q1 - (1.5*IQR)
         df[i] = np.where(df[i]>=upper_limit,Q3 + (1.5*IQR),df[i])
         df[i] = np.where(df[i]<=lower_limit,Q1 - (1.5*IQR),df[i])

[13] for i in  df.columns.drop('Gender'):
         sns.boxplot(df[i])
         plt.show()

/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional ar
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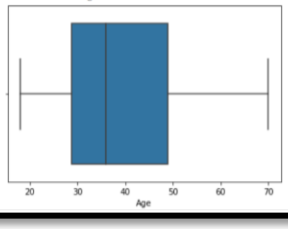
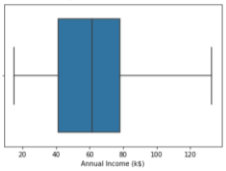



```
[13] /usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other argume
     FutureWarning
```

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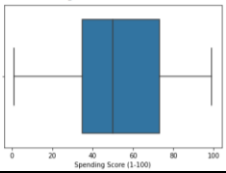


7.) CHECK FOR CATEGORICAL COLUMNS AND ENCODE THEM

7.)CHECK FOR CATEGORICAL COLUMNS AND PERFORM ENCODING

```
[14] from sklearn.preprocessing import LabelEncoder
     le = LabelEncoder()
     df.Gender = le.fit_transform(df.Gender)
```

```
[15] df.head()
```

	Gender	Age	Annual Income (k$)	Spending Score (1-100)
0	1	19.0	15.0	39.0
1	1	21.0	15.0	81.0
2	0	20.0	16.0	6.0
3	0	23.0	16.0	77.0
4	0	31.0	17.0	40.0

8.) SCALING THE DATA

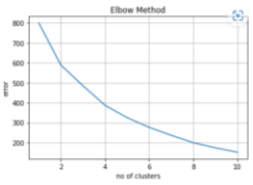
8.)SCALING THE DATA

```
[16] from sklearn.preprocessing import StandardScaler
     scale = StandardScaler()
     df = pd.DataFrame(scale.fit_transform(df),columns=df.columns)
     df.head()
```

	Gender	Age	Annual Income (k$)	Spending Score (1-100)
0	1.128152	-1.424569	-1.745429	-0.434801
1	1.128152	-1.281035	-1.745429	1.195704
2	-0.886405	-1.352802	-1.707083	-1.715913
3	-0.886405	-1.137502	-1.707083	1.040418
4	-0.886405	-0.563369	-1.668737	-0.395980

9.) PERFORMING ANY OF THE CLUSTERING ALGORITHMS

```
[17] from sklearn.cluster import KMeans
     error = []
     for k in range(1,11):
       kmeans = KMeans(n_clusters=k,init='k-means++')
       kmeans.fit(df)
       error.append(kmeans.inertia_)
     plt.plot(range(1,11),error)
     plt.title('Elbow Method')
     plt.xlabel('no of clusters')
     plt.ylabel('error')
     plt.grid()
     plt.show()
```

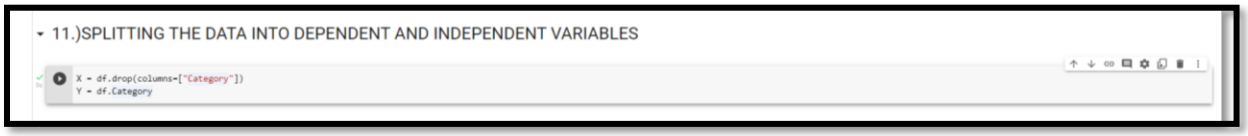



```
[18] km = KMeans(n_clusters=8)
     Category = km.fit_predict(df)
     Category
```

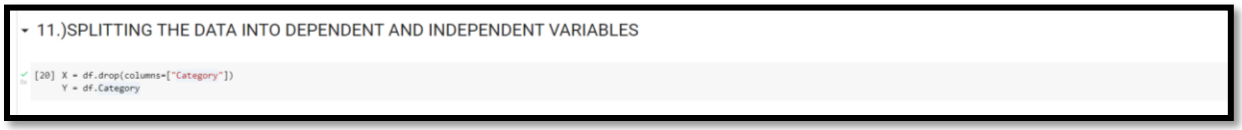
```
array([0, 0, 4, 4, 4, 4, 2, 4, 3, 4, 3, 4, 2, 4, 0, 0, 4, 0, 3, 4, 0, 0,
       2, 0, 2, 0, 2, 0, 2, 4, 3, 4, 3, 0, 2, 4, 2, 4, 2, 4, 2, 0, 3, 4,
       2, 4, 2, 4, 4, 4, 2, 0, 4, 3, 2, 3, 2, 3, 4, 3, 3, 0, 2, 2, 3, 0,
       2, 2, 2, 0, 4, 3, 2, 2, 2, 3, 0, 2, 0, 4, 2, 3, 0, 3, 2, 4, 3, 2, 4,
       4, 2, 2, 0, 3, 2, 4, 0, 2, 4, 3, 0, 4, 2, 3, 0, 3, 4, 2, 3, 3, 3,
       3, 4, 1, 0, 4, 4, 2, 2, 2, 2, 0, 1, 5, 6, 1, 5, 7, 6, 3, 6, 7, 6,
       1, 5, 7, 5, 1, 6, 7, 5, 1, 6, 1, 5, 7, 6, 7, 5, 1, 6, 7, 6, 1, 5,
       1, 5, 7, 5, 7, 5, 1, 5, 7, 5, 7, 5, 7, 5, 1, 6, 7, 6, 7, 6, 1, 5,
       7, 6, 7, 6, 1, 5, 7, 5, 1, 6, 1, 6, 1, 5, 1, 5, 7, 5, 1, 5, 1, 6,
       7, 6], dtype=int32)
```

10.) ADD THE CLUSTER DATA WITH THE PRIMARY DATASET

11.)SPLITTING THE DATA INTO DEPENDENT AND INDEPENDENT VARIABLES



12.)SPLIT THE DATA INTO TRAINING AND TESTING DATA



13.) BUILD THE MODEL

14.) TRAIN THE MODEL

15.) TEST THE MODEL

13.)TEST THE MODEL

+ Code + Text

```
[ ] y_predict = model.predict(x_test)
```

```
[ ] pd.DataFrame({"Actual":y_test,"Predicted":y_predict.round(0)})
```

	Actual	Predicted
18	3	3
170	7	7
107	3	3
98	3	3
177	6	6
182	7	7
5	4	4
146	7	7
12	2	2
152	1	1
61	0	0
125	5	5
180	1	1
154	1	1
80	3	3
7	4	4
33	0	0

16.) MEASURE THE PERFORMANCE USING METRICS

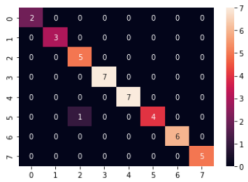
14.)MEASURE THE PERFORMANCE USING METRICS

```
[ ] from sklearn import metrics
    metrics.accuracy_score(y_test,y_predict)
```

```
0.975
```

```
sns.heatmap(metrics.confusion_matrix(y_test,y_predict),annot=True)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fd2abee7d50>
```




```
[ ] print(metrics.classification_report(y_test,y_predict))
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00         2
           1       1.00      1.00      1.00         3
           2       0.83      1.00      0.91         5
           3       1.00      1.00      1.00         7
           4       1.00      1.00      1.00         7
           5       1.00      0.80      0.89         5
           6       1.00      1.00      1.00         6
           7       1.00      1.00      1.00         5

    accuracy                           0.97        40
   macro avg       0.98      0.97      0.97        40
weighted avg       0.98      0.97      0.97        40
```