# UNIVERSITY ADMIT ELIGIBILITY PREDICTOR

# ASSIGNMENT - 2

| | |
|---|---|
| Date | 26th September 2022 |
| Team ID | PNT2022TMID27839 |
| Student Name | Chandan Kumar A K (311519104010) |
| Domain Name | Education |
| Project Name | University Admit Eligibility Predictor |
| Maximum Marks | 2 Marks |

## 1.)IMPORT THE REQUIRED LIBRARIES

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

## 2.)DOWNLOAD AND UPLOAD THE DATASET

Download and Upload the Dataset

```
[ ] df = pd.read_csv('Churn_Modelling.csv')
    df.head()
```

| | RowNumber | CustomerId | Surname | CreditScore | Geography | Gender | Age | Tenure | Balance | NumOfProducts | HasCrCard | IsActiveMember | EstimatedSalary | Exited |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 15634602 | Hargrave | 619 | France | Female | 42 | 2 | 0.00 | 1 | 1 | 1 | 101348.88 | 1 |
| 1 | 2 | 15647311 | Hill | 608 | Spain | Female | 41 | 1 | 83807.86 | 1 | 0 | 1 | 112542.58 | 0 |
| 2 | 3 | 15619304 | Onio | 502 | France | Female | 42 | 8 | 159660.80 | 3 | 1 | 0 | 113931.57 | 1 |
| 3 | 4 | 15701354 | Boni | 699 | France | Female | 39 | 1 | 0.00 | 2 | 0 | 0 | 93826.63 | 0 |
| 4 | 5 | 15737888 | Mitchell | 850 | Spain | Female | 43 | 2 | 125510.82 | 1 | 1 | 1 | 79084.10 | 0 |

## 3.)HANDLE MISSING VALUES IN THE DATASET

### Handle the Missing Values in the Dataset

```
[ ]  #Removing Unwanted Values
     df = df.drop(columns=['RowNumber','CustomerId','Surname'])
```

```
[ ]  df.isnull().sum()
```

```
CreditScore        0
Geography          0
Gender             0
Age                0
Tenure             0
Balance            0
NumOfProducts      0
HasCrCard          0
IsActiveMember     0
EstimatedSalary    0
Exited             0
dtype: int64
```

## 4.) PERFORM THE DESCRIPTIVE STATISTICS ON THE DATASET

### Perform Descriptive Statistics on the Dataset

```
[ ]  df.describe()
```

| | CreditScore | Age | Tenure | Balance | NumOfProducts | HasCrCard | IsActiveMember | EstimatedSalary | Exited |
|---|---|---|---|---|---|---|---|---|---|
| count | 10000.000000 | 10000.000000 | 10000.000000 | 10000.000000 | 10000.000000 | 10000.00000 | 10000.000000 | 10000.000000 | 10000.000000 |
| mean | 650.528800 | 38.921800 | 5.012800 | 76485.889288 | 1.530200 | 0.70550 | 0.515100 | 100090.239881 | 0.203700 |
| std | 96.653299 | 10.487806 | 2.892174 | 62397.405202 | 0.581654 | 0.45584 | 0.499797 | 57510.492818 | 0.402769 |
| min | 350.000000 | 18.000000 | 0.000000 | 0.000000 | 1.000000 | 0.00000 | 0.000000 | 11.580000 | 0.000000 |
| 25% | 584.000000 | 32.000000 | 3.000000 | 0.000000 | 1.000000 | 0.00000 | 0.000000 | 51002.110000 | 0.000000 |
| 50% | 652.000000 | 37.000000 | 5.000000 | 97198.540000 | 1.000000 | 1.00000 | 1.000000 | 100193.915000 | 0.000000 |
| 75% | 718.000000 | 44.000000 | 7.000000 | 127644.240000 | 2.000000 | 1.00000 | 1.000000 | 149388.247500 | 0.000000 |
| max | 850.000000 | 92.000000 | 10.000000 | 250898.090000 | 4.000000 | 1.00000 | 1.000000 | 199992.480000 | 1.000000 |

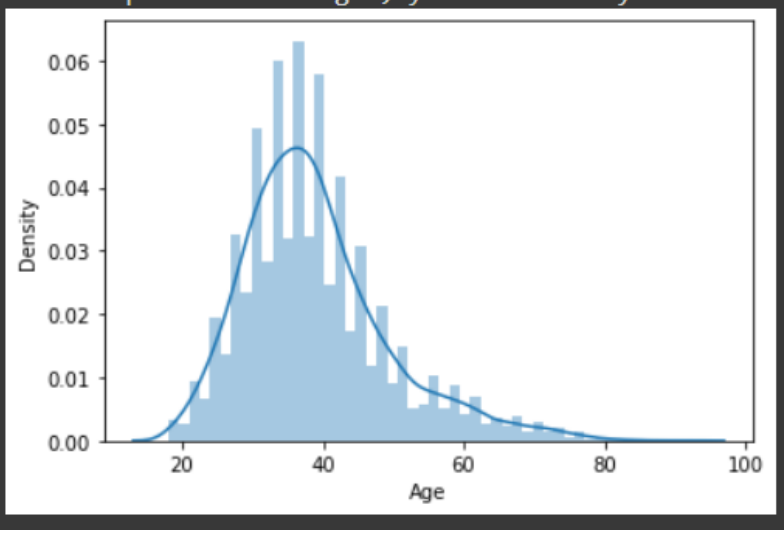
## 5.) PERFORM VARIOUS VISUALISATIONS

## a.) UNIVARIANTE ANALYSIS

Univariante Analysis

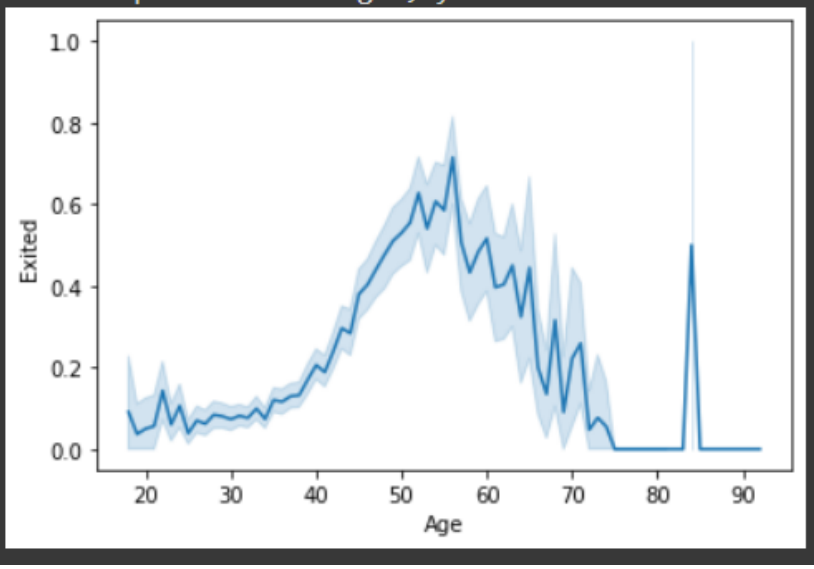
```
[ ]  sns.distplot(df.Age)
```

```
C:\Users\Prem\anaconda3\lib\site-packages\seaborn\distributions.py:2619:
  warnings.warn(msg, FutureWarning)
<AxesSubplot:xlabel='Age', ylabel='Density'>
```

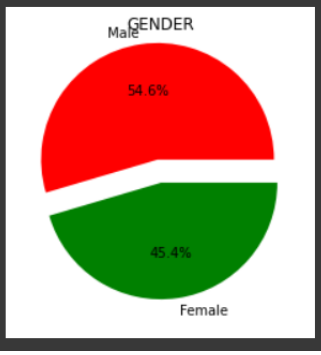


```
[ ]  sns.lineplot(df.Age,df.Exited)
```

```
C:\Users\Prem\anaconda3\lib\site-packages\seaborn\_decorators.py:36:
  warnings.warn(
<AxesSubplot:xlabel='Age', ylabel='Exited'>
```

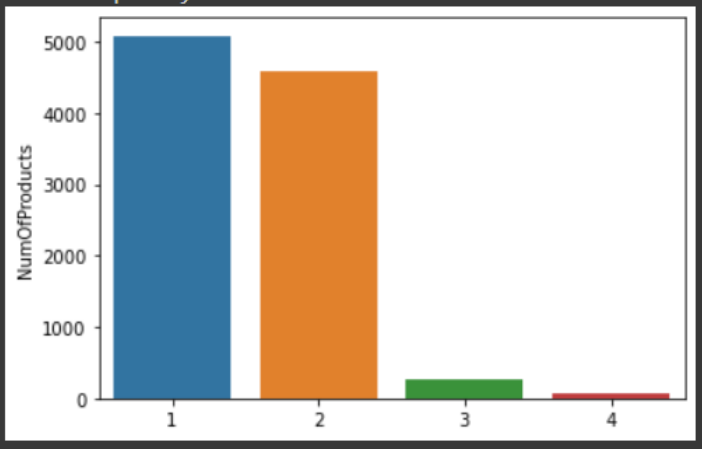



```
[ ]  plt.pie(df.Gender.value_counts(),[0.2,0],colors=['red','green'],labels=['Male','Female'],autopct='%1.1f%%')
     plt.title('GENDER')
     plt.show()
```



```
[ ]  sns.barplot(df.NumOfProducts.value_counts().index,df.NumOfProducts.value_counts())
```

```
C:\Users\Prem\anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning:
  warnings.warn(
<AxesSubplot:ylabel='NumOfProducts'>
```



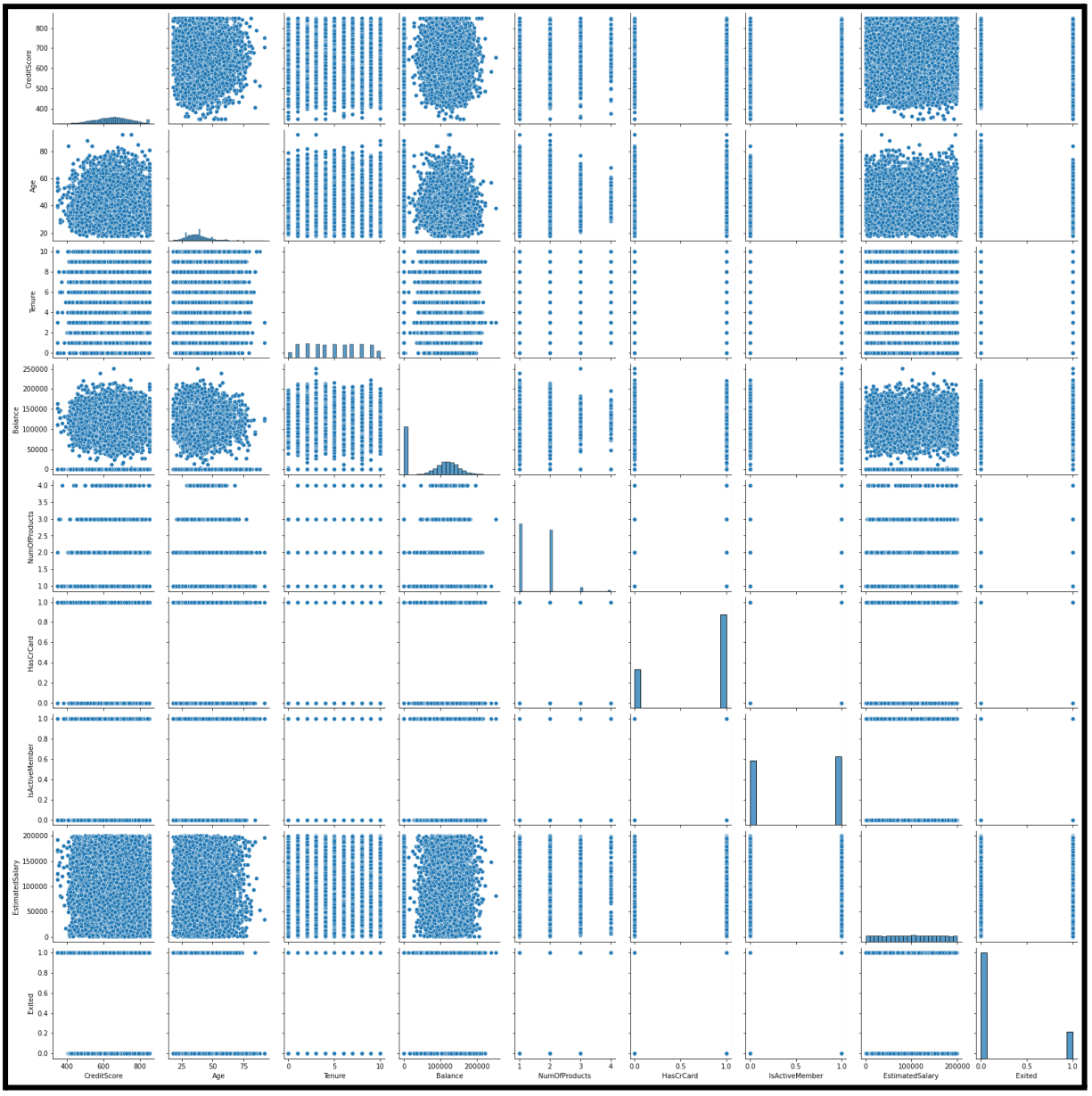

## b.) BI - VARIANTE ANALYSIS

### Bi - Variante Analysis

```
[ ]  def countplot_2(x,hue,title=None,figsize=(6,5)):
       plt.figure(figsize=figsize)
       sns.countplot(data=df[[x,hue]],x=x,hue=hue)
       plt.title(title)
       plt.show()
```

```
[ ]  countplot_2('IsActiveMember','NumOfProducts','Credit Card Holders Product Details')
```

# c.) MULTI - VARIANTE ANALYSIS

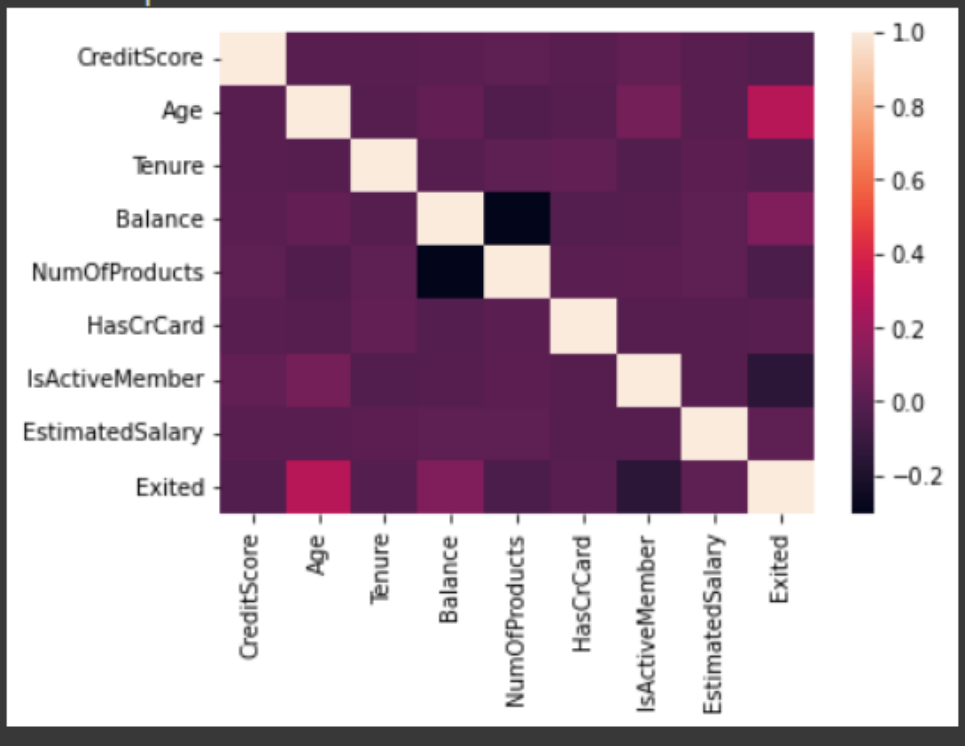


```
[ ] df.corr()
```

| | CreditScore | Age | Tenure | Balance | NumOfProducts | HasCrCard | IsActiveMember | EstimatedSalary | Exited |
|---|---|---|---|---|---|---|---|---|---|
| **CreditScore** | 1.000000 | -0.003965 | 0.000842 | 0.006268 | 0.012238 | -0.005458 | 0.025651 | -0.001384 | -0.027094 |
| **Age** | -0.003965 | 1.000000 | -0.009997 | 0.028308 | -0.030680 | -0.011721 | 0.085472 | -0.007201 | 0.285323 |
| **Tenure** | 0.000842 | -0.009997 | 1.000000 | -0.012254 | 0.013444 | 0.022583 | -0.028362 | 0.007784 | -0.014001 |
| **Balance** | 0.006268 | 0.028308 | -0.012254 | 1.000000 | -0.304180 | -0.014858 | -0.010084 | 0.012797 | 0.118533 |
| **NumOfProducts** | 0.012238 | -0.030680 | 0.013444 | -0.304180 | 1.000000 | 0.003183 | 0.009612 | 0.014204 | -0.047820 |
| **HasCrCard** | -0.005458 | -0.011721 | 0.022583 | -0.014858 | 0.003183 | 1.000000 | -0.011866 | -0.009933 | -0.007138 |
| **IsActiveMember** | 0.025651 | 0.085472 | -0.028362 | -0.010084 | 0.009612 | -0.011866 | 1.000000 | -0.011421 | -0.156128 |
| **EstimatedSalary** | -0.001384 | -0.007201 | 0.007784 | 0.012797 | 0.014204 | -0.009933 | -0.011421 | 1.000000 | 0.012097 |
| **Exited** | -0.027094 | 0.285323 | -0.014001 | 0.118533 | -0.047820 | -0.007138 | -0.156128 | 0.012097 | 1.000000 |

```
[ ] sns.heatmap(df.corr())
```

```
<AxesSubplot:>
```

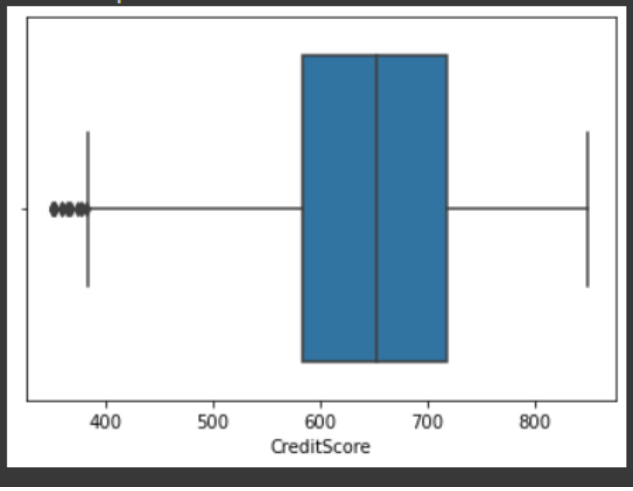


## 6.) FIND AND REPLACE THE OUTLIERS

### Find the Outliers

```
[ ]  sns.boxplot(df.CreditScore)
```

```
C:\Users\Prem\anaconda3\lib\site-packages\seaborn\_decorators.py:36:
  warnings.warn(
<AxesSubplot:xlabel='CreditScore'>
```

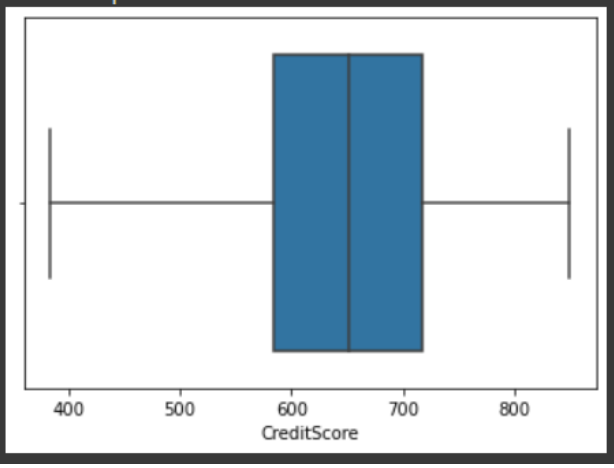



### Replace the Outliers

```
[ ]  Q1 = df.CreditScore.quantile(0.25)
     Q3 = df.CreditScore.quantile(0.75)
     IQR = Q3-Q1
     upper_limit = Q3 + (1.5*IQR)
     lower_limit = Q1 - (1.5*IQR)
```

```
[ ]  df['CreditScore'] = np.where(df['CreditScore']<lower_limit,650,df['CreditScore'])
     sns.boxplot(df.CreditScore)
```

```
C:\Users\Prem\anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning:
  warnings.warn(
<AxesSubplot:xlabel='CreditScore'>
```



## 7.) CHECK FOR CATEGORICAL COLUMNS AND ENCODE THEM

Check for Categorical Columns and Perform Encoding

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

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

| | CreditScore | Geography | Gender | Age | Tenure | Balance | NumOfProducts | HasCrCard | IsActiveMember | EstimatedSalary | Exited |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 619 | 0 | 0 | 42 | 2 | 0.00 | 1 | 1 | 1 | 101348.88 | 1 |
| 1 | 608 | 2 | 0 | 41 | 1 | 83807.86 | 1 | 0 | 1 | 112542.58 | 0 |
| 2 | 502 | 0 | 0 | 42 | 8 | 159660.80 | 3 | 1 | 0 | 113931.57 | 1 |
| 3 | 699 | 0 | 0 | 39 | 1 | 0.00 | 2 | 0 | 0 | 93826.63 | 0 |
| 4 | 850 | 2 | 0 | 43 | 2 | 125510.82 | 1 | 1 | 1 | 79084.10 | 0 |

## 8.)SPLIT DATA INTO DEPENDENT AND INDEPENDENT VARIABLES

Split the data into Dependent and Independent Variables

```
[ ] X = df.drop(columns=['Exited'])
    X.head()
```

| | CreditScore | Geography | Gender | Age | Tenure | Balance | NumOfProducts | HasCrCard | IsActiveMember | EstimatedSalary |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 619 | 0 | 0 | 42 | 2 | 0.00 | 1 | 1 | 1 | 101348.88 |
| 1 | 608 | 2 | 0 | 41 | 1 | 83807.86 | 1 | 0 | 1 | 112542.58 |
| 2 | 502 | 0 | 0 | 42 | 8 | 159660.80 | 3 | 1 | 0 | 113931.57 |
| 3 | 699 | 0 | 0 | 39 | 1 | 0.00 | 2 | 0 | 0 | 93826.63 |
| 4 | 850 | 2 | 0 | 43 | 2 | 125510.82 | 1 | 1 | 1 | 79084.10 |

```
[ ] Y = df.Exited
    Y.head()
```

```
0    1
1    0
2    1
3    0
4    0
Name: Exited, dtype: int64
```

## 9.) SCALE THE INDEPENDENT VARIABLES

Scale the Independent Variables

```
[ ] from sklearn.preprocessing import MinMaxScaler
    scale = MinMaxScaler()
    X_scaled = pd.DataFrame(scale.fit_transform(X),columns=X.columns)
```

## 10.)SPLIT THE DATA INTO TRAINING AND TESTING