Name : ELANKUMARAN R

REG.NO : 613519106020

Domain : AI

Project Tittle: Emerging Methods For Early Detection Of Forest Fires

ASSIGNMENT NO. : 2

Importing Necessary Libraries

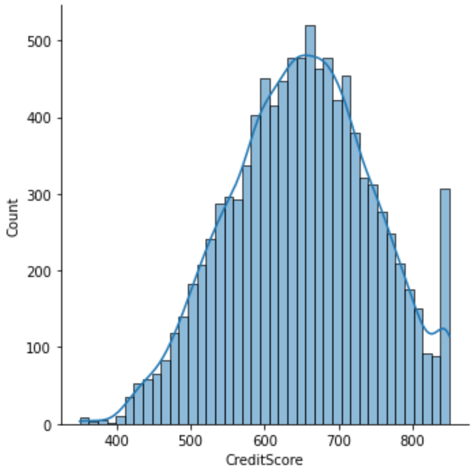
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as pltimport
seaborn as sns
from sklearn.compose import ColumnTransformer

from sklearn.preprocessing import OneHotEncoder from
sklearn.preprocessing import StandardScaler
```

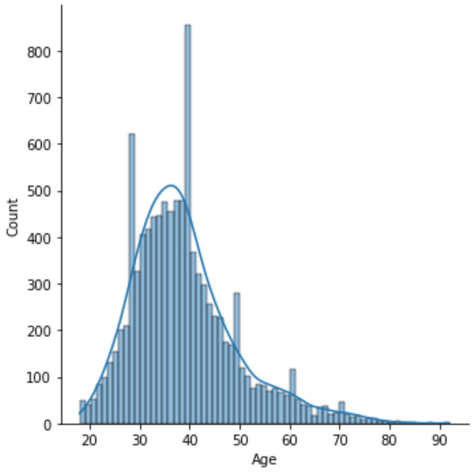
2. Load the dataset

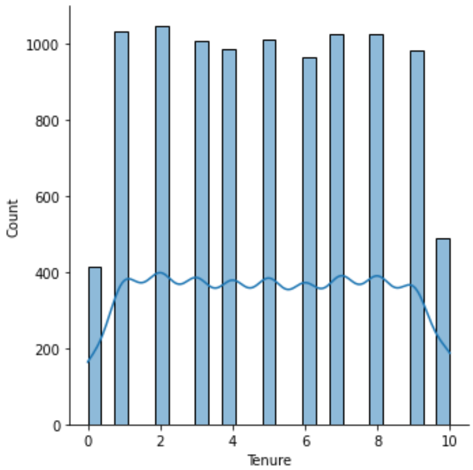
```
data = pd.read_csv('/content/Churn_Modelling.csv')
```

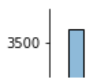
3. Perform Below Visualizations. UNIVARIATE ANALYSIS

```
l=['CreditScore','Age', 'Tenure','Balance','NumOfProducts','EstimatedSalary']for i in l:
    sns.displot(data=data[i],kde=True)
```

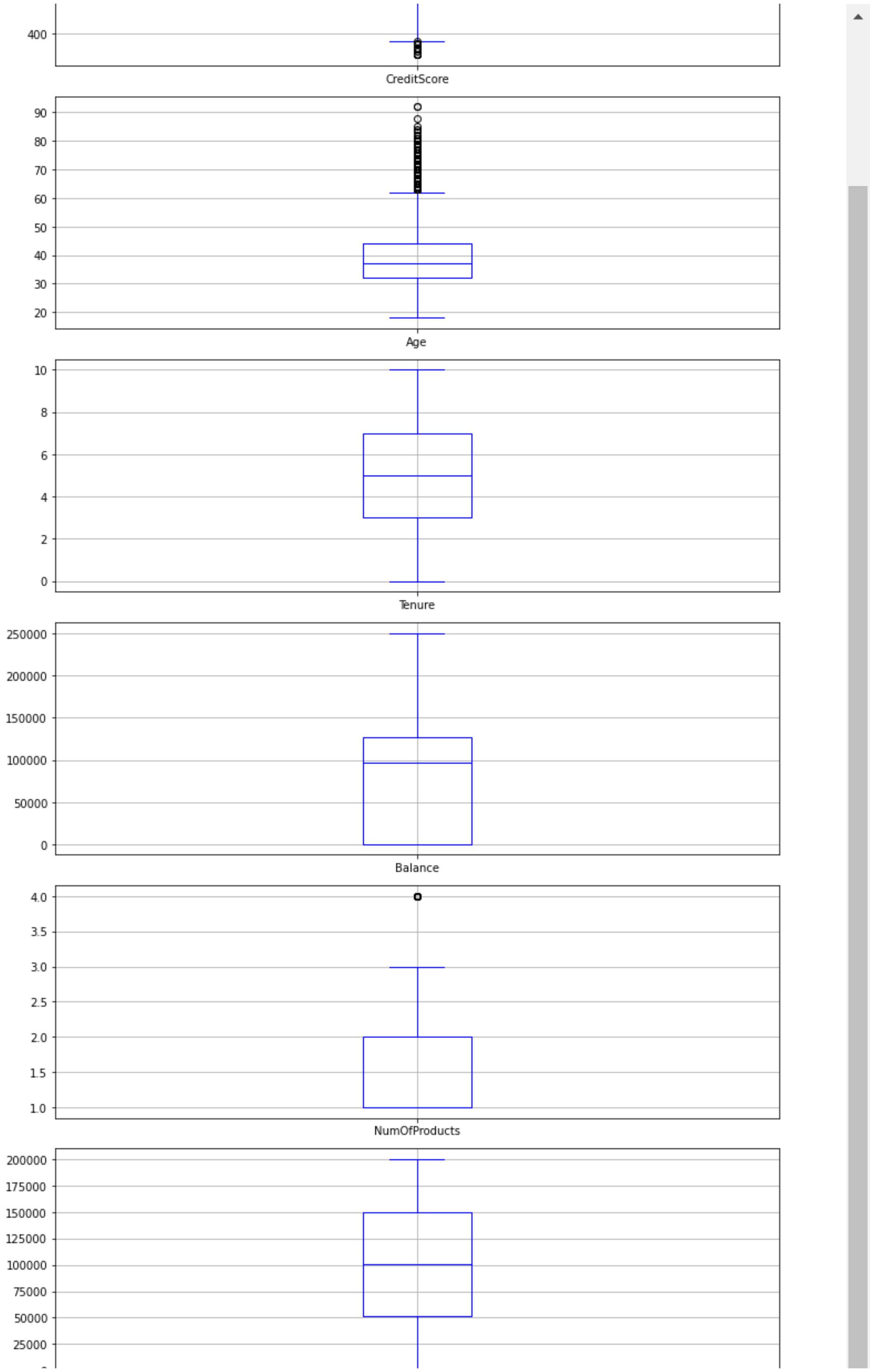




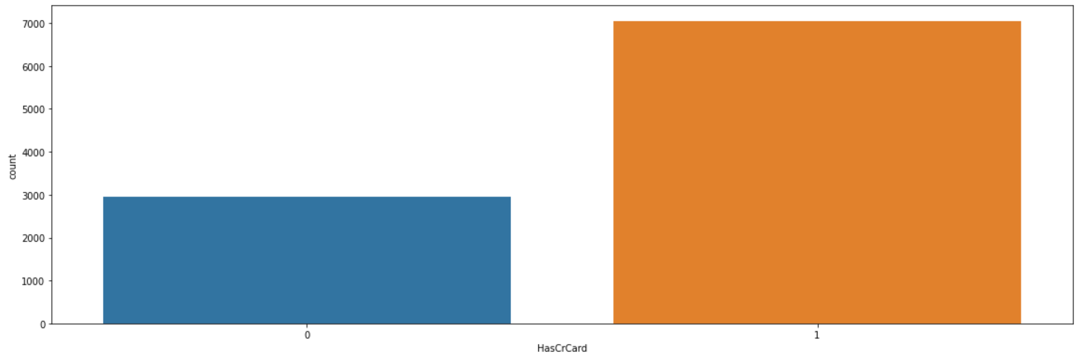


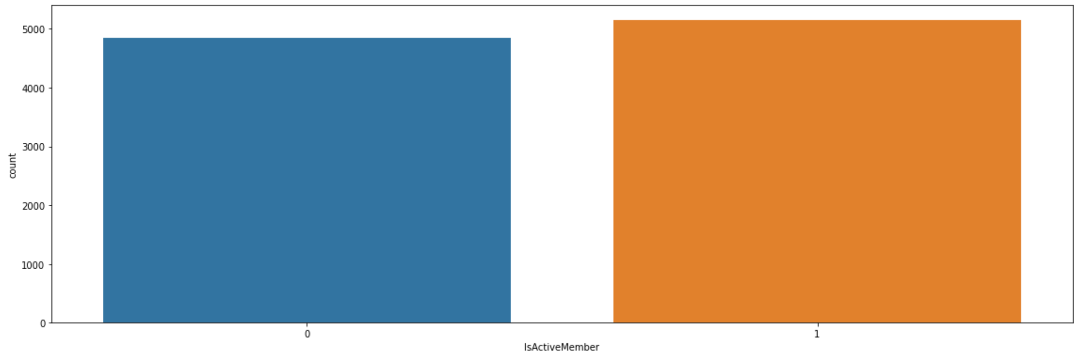


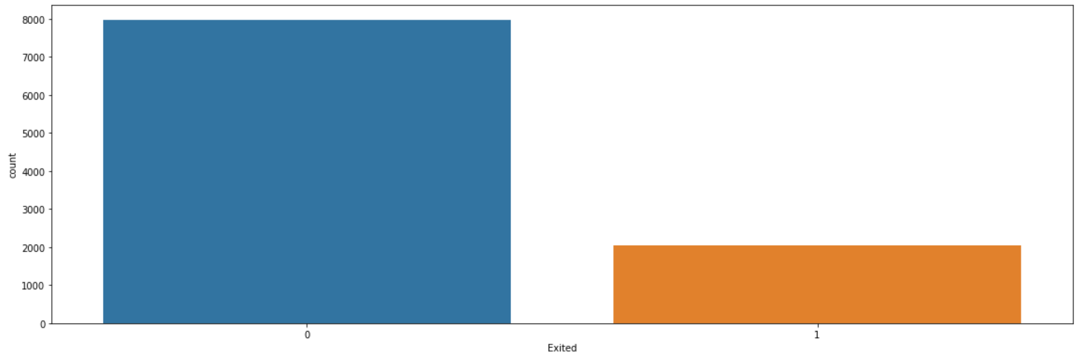

```
l=['CreditScore','Age',   'Tenure','Balance','NumOfProducts','EstimatedSalary']
fig,   (ax1,   ax2,   ax3,   ax4,   ax5,   ax6)   =   plt.subplots(nrows=6,   ncols=1,   figsize=(10,20))
data.boxplot(column=[l[0]],grid='False',color='blue',ax=ax1)
data.boxplot(column=[l[1]],grid='False',color='blue',ax          =          ax2)
data.boxplot(column=[l[2]],grid='False',color='blue',ax          =          ax3)
data.boxplot(column=[l[3]],grid='False',color='blue',ax          =          ax4)
data.boxplot(column=[l[4]],grid='False',color='blue',ax          =          ax5)
data.boxplot(column=[l[5]],grid='False',color='blue',ax = ax6) plt.tight_layout()
```




```
import warnings
warnings.filterwarnings("ignore")
fig, (ax1, ax2, ax3) = plt.subplots(nrows=3, ncols=1, figsize=(16,16))
sns.countplot(data.HasCrCard,ax=ax1)
sns.countplot(data.IsActiveMember,ax=ax2)
sns.countplot(data.Exited,ax=ax3)
plt.tight_layout()
```

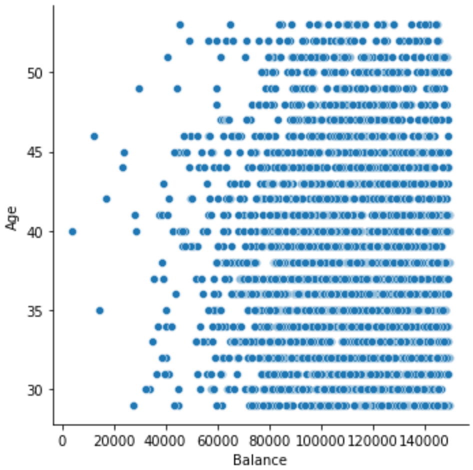


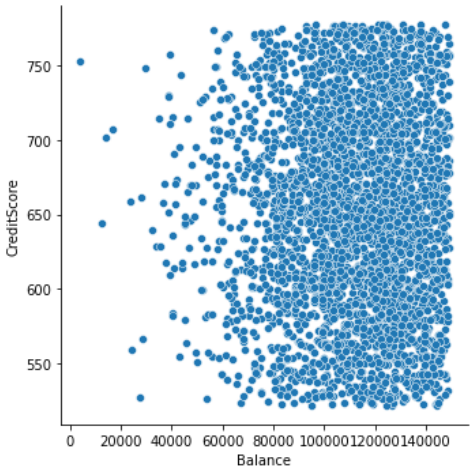




BI - VARIATE ANALYSIS

```
for i in range(len(l)-1):
    for j in range(i+1,len(l)):
        sns.relplot(x = l[i],y = l[j],data = data)
```

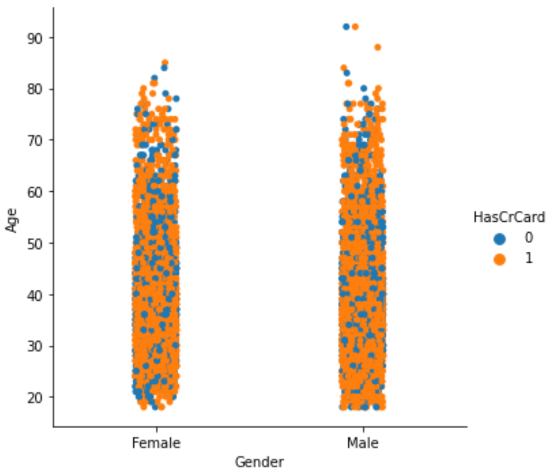




MULTI - VARIATE ANALYSIS

```
sns.catplot(x='Gender', y='Age', hue='HasCrCard', data=data)
```

<seaborn.axisgrid.FacetGrid at 0x7f086b124bd0>




```
sns.pairplot(data = data,hue='Exited')
```

<seaborn.axisgrid.PairGrid at 0x7f086b136e90>

4. Perform descriptive statistics on the dataset

data.head()

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance	NumOfProduc
0	1	15634602	Hargrave	619	France	Female	42	2	0.00	
1	2	15647311	Hill	608	Spain	Female	41	1	83807.86	
2	3	15619304	Onio	502	France	Female	42	8	159660.80	
3	4	15701354	Boni	699	France	Female	39	1	0.00	
4	5	15737888	Mitchell	850	Spain	Female	43	2	125510.82	

data.describe()

	RowNumber	CustomerId	CreditScore	Age	Tenure	Balance	NumOfProducts
count	10000.00000	1.000000e+04	10000.000000	10000.000000	10000.000000	10000.000000	10000.000000
mean	5000.50000	1.569094e+07	650.528800	38.921800	5.012800	76485.889288	1.530200
std	2886.89568	7.193619e+04	96.653299	10.487806	2.892174	62397.405202	0.581654
min	1.00000	1.556570e+07	350.000000	18.000000	0.000000	0.000000	1.000000
25%	2500.75000	1.562853e+07	584.000000	32.000000	3.000000	0.000000	1.000000
50%	5000.50000	1.569074e+07	652.000000	37.000000	5.000000	97198.540000	1.000000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

data.dtypes

```
RowNumber            int64
CustomerId           int64
Surname             object
CreditScore          int64
Geography           object
Gender              object
Age                  int64
Tenure               int64
Balance            float64
NumOfProducts        int64
HasCrCard            int64
IsActiveMember         int64
EstimatedSalary    float64   Exited
                     int64
dtype: object
```

data.skew()

```
RowNumber          0.000000
CustomerId         0.001149
CreditScore       -0.071607
Age                1.011320
Tenure             0.010991
Balance           -0.141109
NumOfProducts      0.745568
HasCrCard         -0.901812
IsActiveMember    -0.060437
EstimatedSalary    0.002085
Exited             1.471611
dtype: float64
```

5. Handle the Missing values.

data.isnull().any()

```
RowNumber          False
CustomerId         False
Surname            False
CreditScore        False
Geography          False
Gender             False
Age                False
Tenure             False
Balance            False
NumOfProducts      False
HasCrCard          False
IsActiveMember       False
EstimatedSalary    False   Exited
                   False
dtype: bool
```

6. Find the outliers and replace the outliers

data['CreditScore'].describe()

```
count    10000.000000
mean       650.528800
std         96.653299
min        350.000000
25%        584.000000
50%        652.000000
75%        718.000000
max        850.000000
Name: CreditScore, dtype: float64
```

```
data['Age'].describe()
```

```
count    10000.000000
mean        38.921800
std         10.487806
min         18.000000
25%         32.000000
50%         37.000000
75%         44.000000
max         92.000000
Name: Age, dtype: float64
```

```
data['Balance'].describe()
```

```
count     10000.000000
mean      76485.889288
std       62397.405202
min           0.000000
25%           0.000000
50%       97198.540000
75%      127644.240000
max      250898.090000
Name: Balance, dtype: float64
```

```
l=['Balance','Age','CreditScore']for i in l:
    percentile_least = data[i].quantile(0.1)percentile90 =
    data[i].quantile(0.9)
    data = data[(data[i]<percentile90)& (data[i]>percentile_least)]data['CreditScore'].describe()
```

```
count    3354.000000
mean      651.885808
std        66.341508
min       522.000000
25%       601.000000
50%       652.000000
75%       705.000000
max       777.000000
Name: CreditScore, dtype: float64
```

```
data['Age'].describe()
```

```
count    3354.000000
mean       38.594812
std         6.171482
min        29.000000
25%        34.000000
50%        38.000000
75%        43.000000
max        53.000000
Name: Age, dtype: float64
```

```
data['Balance'].describe()
```

```
count       3354.000000
mean      111127.251270
std        23930.791436
min         3768.690000
25%        96579.825000
50%       113904.805000
75%       129621.140000
max       149238.970000
Name: Balance, dtype: float64
```

7. Check for Categorical columns and perform encoding.

```
from sklearn.preprocessing import LabelEncoder
encoder=LabelEncoder()
for i in data:
    if data[i].dtype=='object':
        data[i]=encoder.fit_transform(data[i])data.head()
```

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance	NumOfProduc
1	2	15647311	645	608	2	0	41	1	83807.86	
5	6	15574012	302	645	2	1	44	8	113755.78	
26	27	15736816	1605	756	1	1	36	2	136815.64	

8. Split the data into dependent and independent variables.

```
data.shape(3354,
14)
x = data.iloc[:,:13]y =
data.iloc[:,13] y.head()
```

```
1     0
5     1
10    0
15    0
26    0
Name: Exited, dtype: int64
```

```
x.head()
```

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance	NumOfProduc
1	2	15647311	645	608	2	0	41	1	83807.86	
5	6	15574012	302	645	2	1	44	8	113755.78	
10	11	15767821	109	528	0	1	31	6	102016.72	
15	16	15643966	561	616	1	1	45	3	143129.41	
26	27	15736816	1605	756	1	1	36	2	136815.64	

9. Scale the independent variables

```
from sklearn.preprocessing import StandardScalersc =
StandardScaler()
x = sc.fit_transform(x)
```

10. Split the data into training and testing

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.2, random_state=0)x_train.shape
```

```
(2683, 13)
```

```
y_train.shape
```

```
(2683,)
```

```
x_test.shape
```

```
(671, 13)
```

```
y_test.shape
```

```
(671,)
```