```
1.Download the dataset:
2. Load the dataset.
```

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

```
url =
'https://drive.google.com/file/d/1_HcM0K8wt4b7FMLkc1V1dv0y6I_9ULzy/
view?usp=sharing'
path = 'https://drive.google.com/uc?
export=download&id='+url.split('/')[-2]
df = pd.read_csv(path)
```

```
df.sample(20)
```

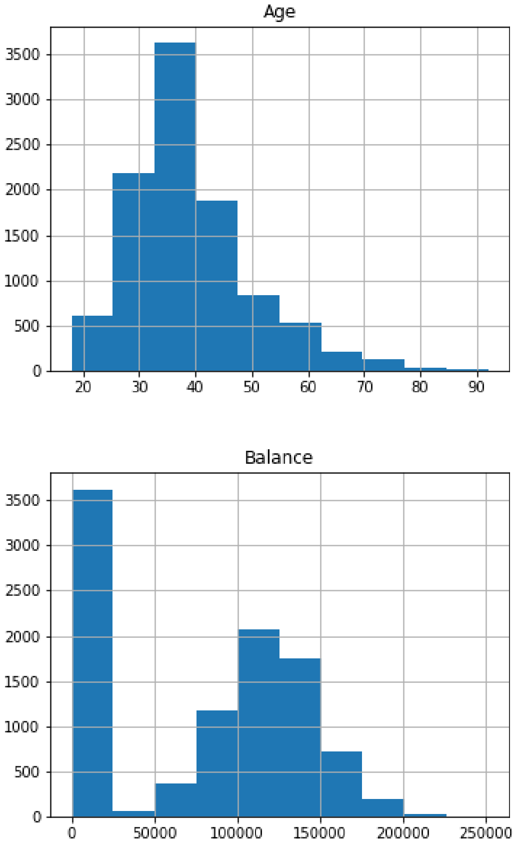
```
      RowNumber  CustomerId     Surname  CreditScore Geography  Gender
Age  \
8075       8076    15745250     Simpson          850    France    Male
58
4957       4958    15600478      Watson          752    France    Male
39
6841       6842    15793491  Cherkasova          714   Germany    Male
26
4965       4966    15729515    McCarthy          782    France    Male
36
2828       2829    15716449      Fraser          527     Spain    Male
33
4732       4733    15653937    McIntyre          638   Germany  Female
53
6210       6211    15592197     Simmons          522     Spain    Male
30
5505       5506    15802466   Donaldson          534    France  Female
53
6450       6451    15781409     Lazarev          834    France  Female
28
5407       5408    15714431         Yeh          561    France    Male
37
7529       7530    15575430      Robson          579    France  Female
33
1887       1888    15680918     Freeman          613     Spain    Male
34
1590       1591    15651802         Day          632     Spain  Female
39
7578       7579    15656417       Marsh          582    France  Female
39
2692       2693    15736274  Prokhorova          751    France    Male
31
7031       7032    15580914   Okechukwu          478     Spain    Male
48
2158       2159    15685706        Bird          731    France  Female
```

```
40
3549       3550    15647725  Napolitano          675    France  Female
61
3772       3773    15699486     Johnson          745     Spain    Male
34
5328       5329    15680234        Bray          667   Germany    Male
27

      Tenure    Balance  NumOfProducts  HasCrCard  IsActiveMember  \
8075       8  156652.13              1          0               0
4957       3       0.00              1          1               0
6841       3  119545.48              2          1               0
4965       1  148795.17              2          1               1
2828       9  132168.28              1          0               0
4732       1  123916.67              1          1               0
6210       3       0.00              2          1               0
5505       7       0.00              2          1               1
6450       6       0.00              1          1               0
5407       1  100443.36              2          0               1
7529       1  118392.75              1          1               1
1887       8  117300.02              1          1               0
1590       5   97854.37              2          1               0
7578       1  132077.48              2          1               0
2692       8       0.00              2          0               0
7031       0   83287.05              2          0               1
2158       7  118991.79              1          1               1
3549       5   62055.17              3          1               0
3772       7  132944.53              1          1               1
5328       2  138032.15              1          1               0

      EstimatedSalary  Exited
8075         25899.21       1
4957        188187.05       0
6841         65482.94       0
4965        195681.43       0
2828         98734.15       0
4732         16657.68       1
6210        145490.85       0
5505         80619.17       0
6450         74287.53       0
5407        101693.73       0
7529        157564.75       0
1887        139410.08       0
1590         93536.38       0
7578        192255.15       0
2692         17550.49       0
7031         44147.95       1
2158        156048.64       0
3549        166305.16       1
```

```
3772         31802.92       0
5328        166317.71       0
```

Perform Below Visualizations
Univariate Analysis

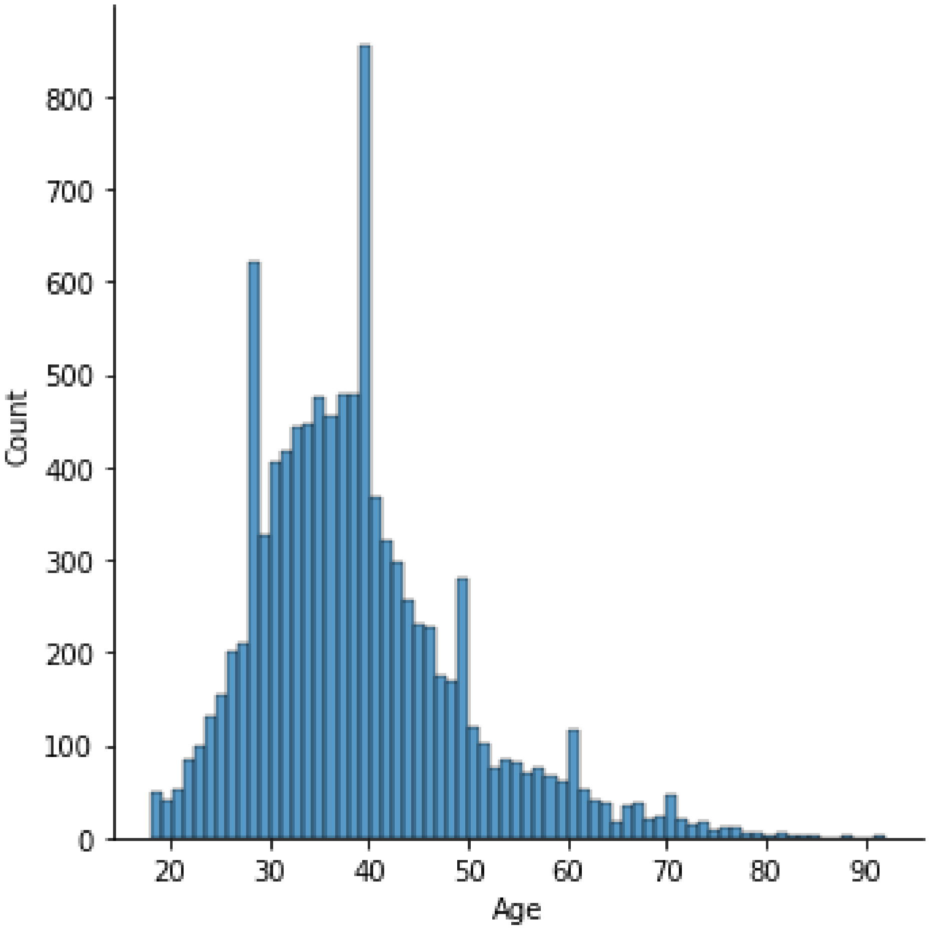
```
features =['Age', 'CreditScore', 'Balance']
df[features].hist(figsize=(13, 10));
```



```
import seaborn as sns
```

```
sns.displot(df["Age"])
```

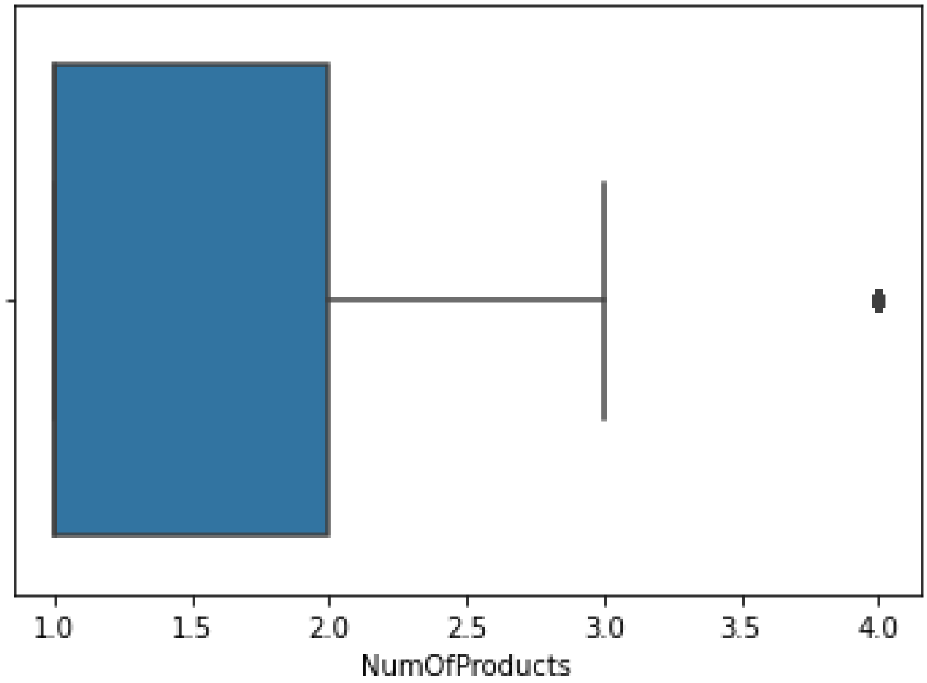
```
<seaborn.axisgrid.FacetGrid at 0x7fc07c40a350>
```



```
sns.boxplot(df["NumOfProducts"])
```

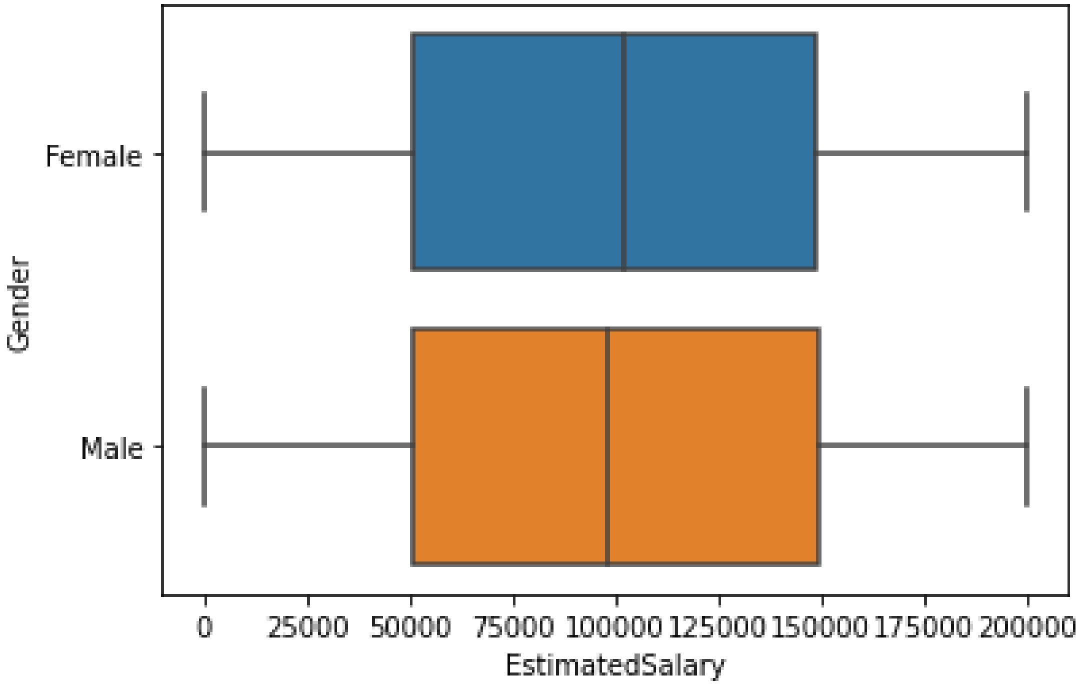
```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43:
FutureWarning: Pass the following variable as a keyword arg: x. From
version 0.12, the only valid positional argument will be `data`, and
passing other arguments without an explicit keyword will result in an
error or misinterpretation.
  FutureWarning
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc0889c6a90>
```

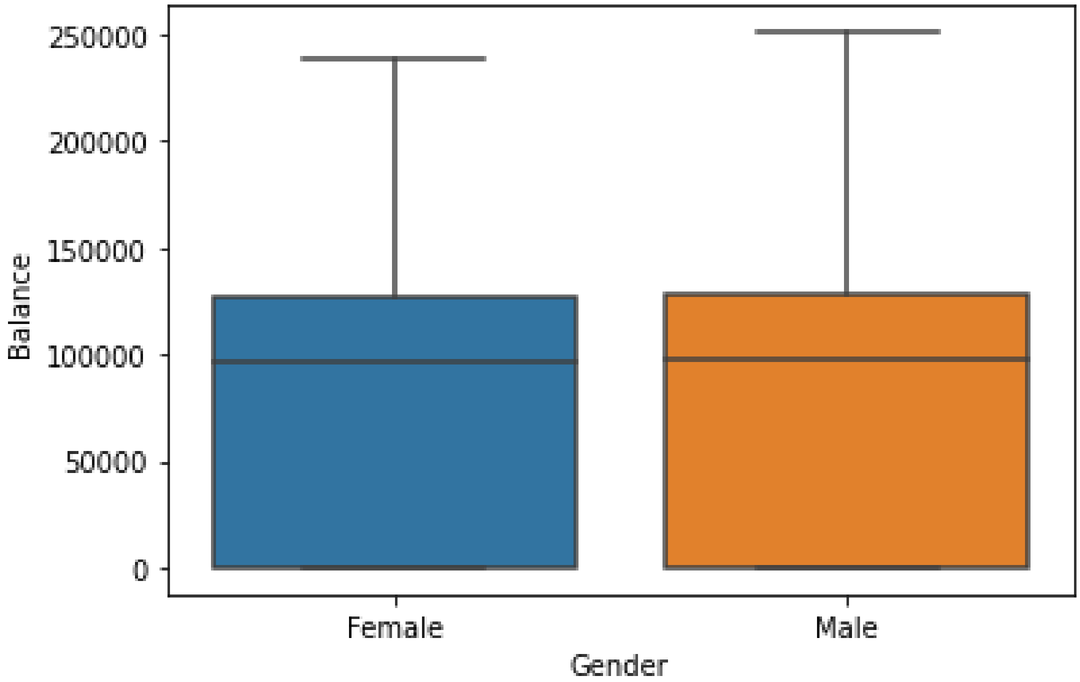


Bivariate Analysis

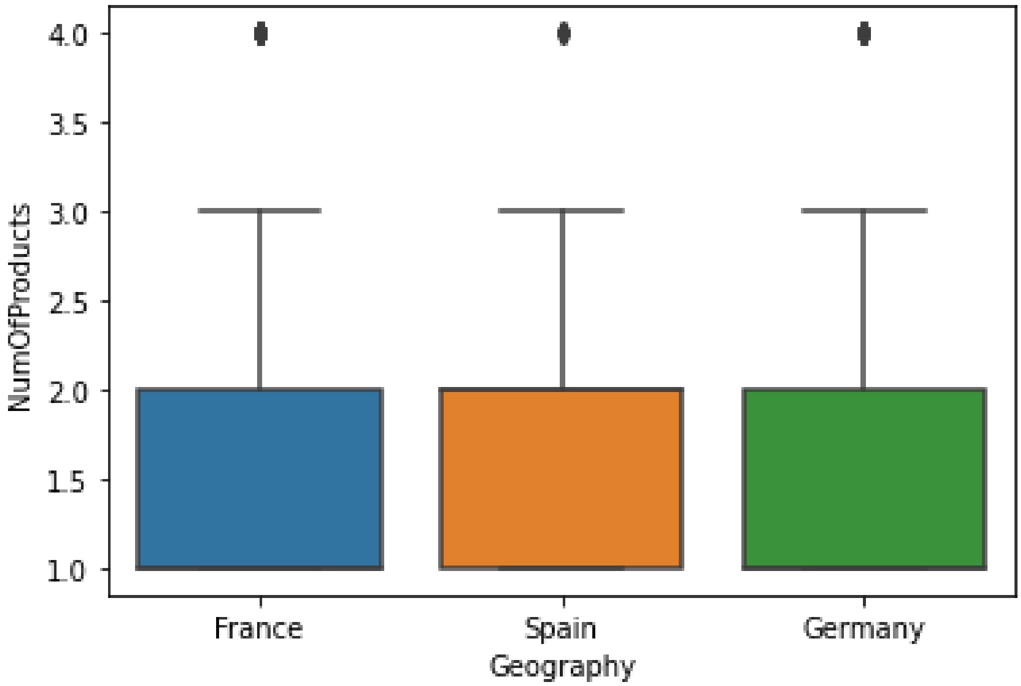
```
import seaborn as sns
sns.boxplot(x = df['EstimatedSalary'], y = df['Gender'] );
```



```
sns.boxplot(x=df['Gender'],y=df['Balance']);
```



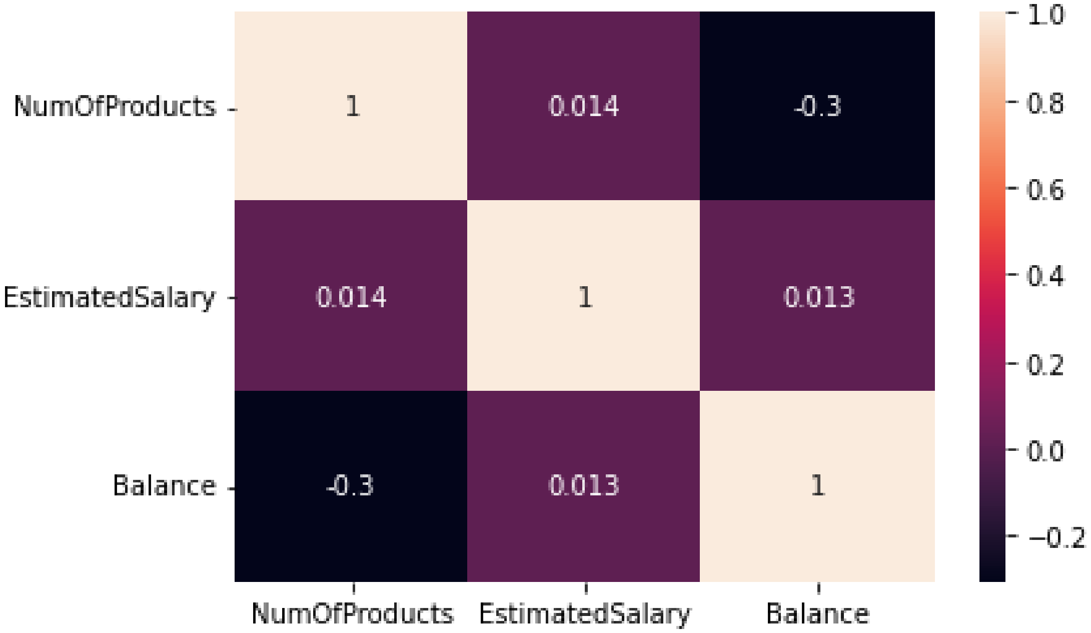
```
sns.boxplot(x=df['Geography'],y=df['NumOfProducts']);
```



Multivariate Analysis

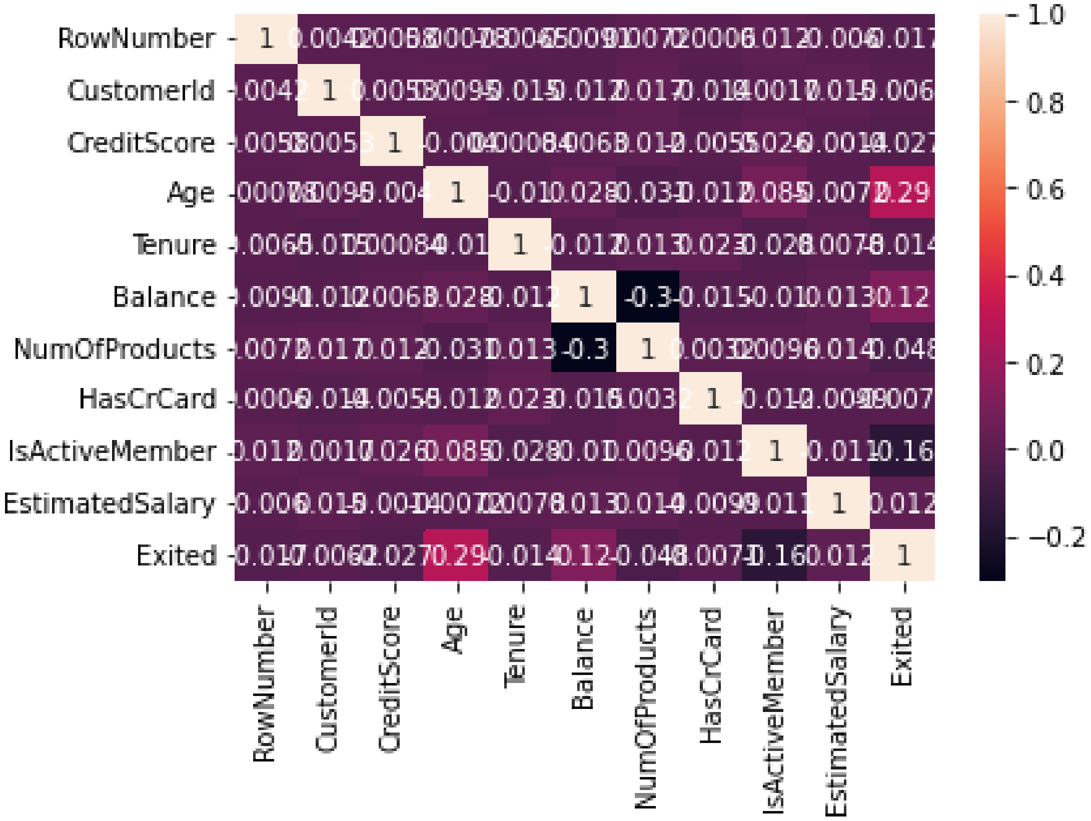
```
df_1 =
pd.DataFrame(df,columns=['NumOfProducts','EstimatedSalary','Balance'])
corrMatrix = df_1.corr()
```

```
sns.heatmap(corrMatrix, annot=True)
plt.show()
```



```
sns.heatmap(df.corr(),annot = True)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc079668750>
```



4. Perform descriptive statistics on the dataset.

```
df.describe(include=['object'])
```

```
       Surname Geography Gender
count    10000     10000  10000
unique    2932         3      2
top      Smith    France   Male
freq        32      5014   5457
```

```
df['CreditScore'].value_counts()
df['CreditScore'].value_counts().to_frame()
df['Geography'].value_counts()
```

```
France     5014
Germany    2509
Spain      2477
Name: Geography, dtype: int64
```

```
geography_counts=df['Geography'].value_counts().to_frame()
geography_counts.rename(columns={'Geography':'value_counts'},inplace=True)
geography_counts
```

```
         value_counts
France           5014
```

```
Germany          2509
Spain            2477
```

5. Handle the Missing values.

```
df.shape
```

```
(10000, 14)
```

```
df.isnull()
```

```
      RowNumber  CustomerId  Surname  CreditScore  Geography  Gender 
Age  \
0         False       False    False        False      False   False 
False
1         False       False    False        False      False   False 
False
2         False       False    False        False      False   False 
False
3         False       False    False        False      False   False 
False
4         False       False    False        False      False   False 
False
...         ...         ...      ...          ...        ...     ... 
...
9995      False       False    False        False      False   False 
False
9996      False       False    False        False      False   False 
False
9997      False       False    False        False      False   False 
False
9998      False       False    False        False      False   False 
False
9999      False       False    False        False      False   False 
False

      Tenure  Balance  NumOfProducts  HasCrCard  IsActiveMember  \
0      False    False          False      False           False   
1      False    False          False      False           False   
2      False    False          False      False           False   
3      False    False          False      False           False   
4      False    False          False      False           False   
...      ...      ...            ...        ...             ...   
9995   False    False          False      False           False   
9996   False    False          False      False           False   
9997   False    False          False      False           False   
9998   False    False          False      False           False   
9999   False    False          False      False           False   

      EstimatedSalary  Exited  
0               False   False  
```

```
1               False   False
2               False   False
3               False   False
4               False   False
...               ...     ...
9995            False   False
9996            False   False
9997            False   False
9998            False   False
9999            False   False

[10000 rows x 14 columns]
```

```
df.notnull()
```

```
      RowNumber  CustomerId  Surname  CreditScore  Geography  Gender
Age  \
0          True        True     True         True       True    True
True
1          True        True     True         True       True    True
True
2          True        True     True         True       True    True
True
3          True        True     True         True       True    True
True
4          True        True     True         True       True    True
True
...         ...         ...      ...          ...        ...     ...
...
9995       True        True     True         True       True    True
True
9996       True        True     True         True       True    True
True
9997       True        True     True         True       True    True
True
9998       True        True     True         True       True    True
True
9999       True        True     True         True       True    True
True

      Tenure  Balance  NumOfProducts  HasCrCard  IsActiveMember  \
0       True     True           True       True            True
1       True     True           True       True            True
2       True     True           True       True            True
3       True     True           True       True            True
4       True     True           True       True            True
...      ...      ...            ...        ...             ...
9995    True     True           True       True            True
9996    True     True           True       True            True
9997    True     True           True       True            True
```

```
9998    True     True           True       True            True
9999    True     True           True       True            True

      EstimatedSalary  Exited
0                True    True
1                True    True
2                True    True
3                True    True
4                True    True
...               ...     ...
9995             True    True
9996             True    True
9997             True    True
9998             True    True
9999             True    True

[10000 rows x 14 columns]
```

```
df.fillna(df.mean())
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1:
FutureWarning: Dropping of nuisance columns in DataFrame reductions
(with 'numeric_only=None') is deprecated; in a future version this
will raise TypeError.  Select only valid columns before calling the
reduction.
  """Entry point for launching an IPython kernel.

      RowNumber  CustomerId    Surname  CreditScore Geography  Gender
Age  \
0             1    15634602   Hargrave          619    France  Female
42
1             2    15647311       Hill          608     Spain  Female
41
2             3    15619304       Onio          502    France  Female
42
3             4    15701354       Boni          699    France  Female
39
4             5    15737888   Mitchell          850     Spain  Female
43
...         ...         ...        ...          ...       ...     ...
...
9995       9996    15606229   Obijiaku          771    France    Male
39
9996       9997    15569892  Johnstone          516    France    Male
35
9997       9998    15584532        Liu          709    France  Female
36
9998       9999    15682355  Sabbatini          772   Germany    Male
42
9999      10000    15628319     Walker          792    France  Female
28
```

```
      Tenure    Balance  NumOfProducts  HasCrCard  IsActiveMember  \
0          2       0.00              1          1               1
1          1   83807.86              1          0               1
2          8  159660.80              3          1               0
3          1       0.00              2          0               0
4          2  125510.82              1          1               1
...      ...        ...            ...        ...             ...
9995       5       0.00              2          1               0
9996      10   57369.61              1          1               1
9997       7       0.00              1          0               1
9998       3   75075.31              2          1               0
9999       4  130142.79              1          1               0

      EstimatedSalary  Exited
0           101348.88       1
1           112542.58       0
2           113931.57       1
3            93826.63       0
4            79084.10       0
...               ...     ...
9995         96270.64       0
9996        101699.77       0
9997         42085.58       1
9998         92888.52       1
9999         38190.78       0

[10000 rows x 14 columns]
```

```
df.fillna(df.median())
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: 
FutureWarning: Dropping of nuisance columns in DataFrame reductions 
(with 'numeric_only=None') is deprecated; in a future version this 
will raise TypeError.  Select only valid columns before calling the 
reduction.
  """Entry point for launching an IPython kernel.
```

```
      RowNumber  CustomerId    Surname  CreditScore Geography  Gender  
Age  \
0             1    15634602   Hargrave          619    France  Female   
42   
1             2    15647311       Hill          608     Spain  Female   
41   
2             3    15619304       Onio          502    France  Female   
42   
3             4    15701354       Boni          699    France  Female   
39   
4             5    15737888   Mitchell          850     Spain  Female   
43   
```

```
...         ...         ...        ...          ...       ...     ...
...
9995       9996    15606229   Obijiaku          771    France    Male
39
9996       9997    15569892  Johnstone          516    France    Male
35
9997       9998    15584532        Liu          709    France  Female
36
9998       9999    15682355  Sabbatini          772   Germany    Male
42
9999      10000    15628319     Walker          792    France  Female
28

      Tenure    Balance  NumOfProducts  HasCrCard  IsActiveMember  \
0          2       0.00              1          1               1
1          1   83807.86              1          0               1
2          8  159660.80              3          1               0
3          1       0.00              2          0               0
4          2  125510.82              1          1               1
...      ...        ...            ...        ...             ...
9995       5       0.00              2          1               0
9996      10   57369.61              1          1               1
9997       7       0.00              1          0               1
9998       3   75075.31              2          1               0
9999       4  130142.79              1          1               0

      EstimatedSalary  Exited
0           101348.88       1
1           112542.58       0
2           113931.57       1
3            93826.63       0
4            79084.10       0
...               ...     ...
9995         96270.64       0
9996        101699.77       0
9997         42085.58       1
9998         92888.52       1
9999         38190.78       0

[10000 rows x 14 columns]
```

```
df.isnull().sum
```

```
<bound method NDFrame._add_numeric_operations.<locals>.sum of
RowNumber  CustomerId  Surname  CreditScore  Geography  Gender    Age
\
0         False       False    False        False      False   False
False
1         False       False    False        False      False   False
False
```

```
2         False       False    False        False      False   False
False
3         False       False    False        False      False   False
False
4         False       False    False        False      False   False
False
...         ...         ...      ...          ...        ...     ...
...
9995      False       False    False        False      False   False
False
9996      False       False    False        False      False   False
False
9997      False       False    False        False      False   False
False
9998      False       False    False        False      False   False
False
9999      False       False    False        False      False   False
False

      Tenure  Balance  NumOfProducts  HasCrCard  IsActiveMember  \
0      False    False          False      False           False
1      False    False          False      False           False
2      False    False          False      False           False
3      False    False          False      False           False
4      False    False          False      False           False
...      ...      ...            ...        ...             ...
9995   False    False          False      False           False
9996   False    False          False      False           False
9997   False    False          False      False           False
9998   False    False          False      False           False
9999   False    False          False      False           False

      EstimatedSalary  Exited
0               False   False
1               False   False
2               False   False
3               False   False
4               False   False
...               ...     ...
9995            False   False
9996            False   False
9997            False   False
9998            False   False
9999            False   False

[10000 rows x 14 columns]>
```

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

```
Empty DataFrame
Columns: [RowNumber, CustomerId, Surname, CreditScore, Geography,
Gender, Age, Tenure, Balance, NumOfProducts, HasCrCard,
IsActiveMember, EstimatedSalary, Exited]
Index: []
```

```
df.dropna(how='any').shape
```

```
(10000, 14)
```

```
df.dropna(subset=['CreditScore','Tenure'],how='any').shape
```

```
(10000, 14)
```

```
df.dropna(subset=['CreditScore','Tenure'],how='any')
```

```
      RowNumber  CustomerId    Surname  CreditScore Geography  Gender
Age  \
0             1    15634602   Hargrave          619    France  Female
42
1             2    15647311       Hill          608     Spain  Female
41
2             3    15619304       Onio          502    France  Female
42
3             4    15701354       Boni          699    France  Female
39
4             5    15737888   Mitchell          850     Spain  Female
43
...         ...         ...        ...          ...       ...     ...
...
9995       9996    15606229   Obijiaku          771    France    Male
39
9996       9997    15569892  Johnstone          516    France    Male
35
9997       9998    15584532        Liu          709    France  Female
36
9998       9999    15682355  Sabbatini          772   Germany    Male
42
9999      10000    15628319     Walker          792    France  Female
28

      Tenure    Balance  NumOfProducts  HasCrCard  IsActiveMember  \
0          2       0.00              1          1               1
1          1   83807.86              1          0               1
2          8  159660.80              3          1               0
3          1       0.00              2          0               0
4          2  125510.82              1          1               1
...      ...        ...            ...        ...             ...
9995       5       0.00              2          1               0
9996      10   57369.61              1          1               1
9997       7       0.00              1          0               1
```

```
9998       3   75075.31              2          1              0
9999       4  130142.79              1          1              0

      EstimatedSalary  Exited
0           101348.88       1
1           112542.58       0
2           113931.57       1
3            93826.63       0
4            79084.10       0
...               ...     ...
9995         96270.64       0
9996        101699.77       0
9997         42085.58       1
9998         92888.52       1
9999         38190.78       0

[10000 rows x 14 columns]
```

```
df.dropna(subset=['CreditScore','Tenure'],how='all').shape
```

```
(10000, 14)
```

```
df.dropna(subset=['CreditScore','Tenure'],how='all')
```

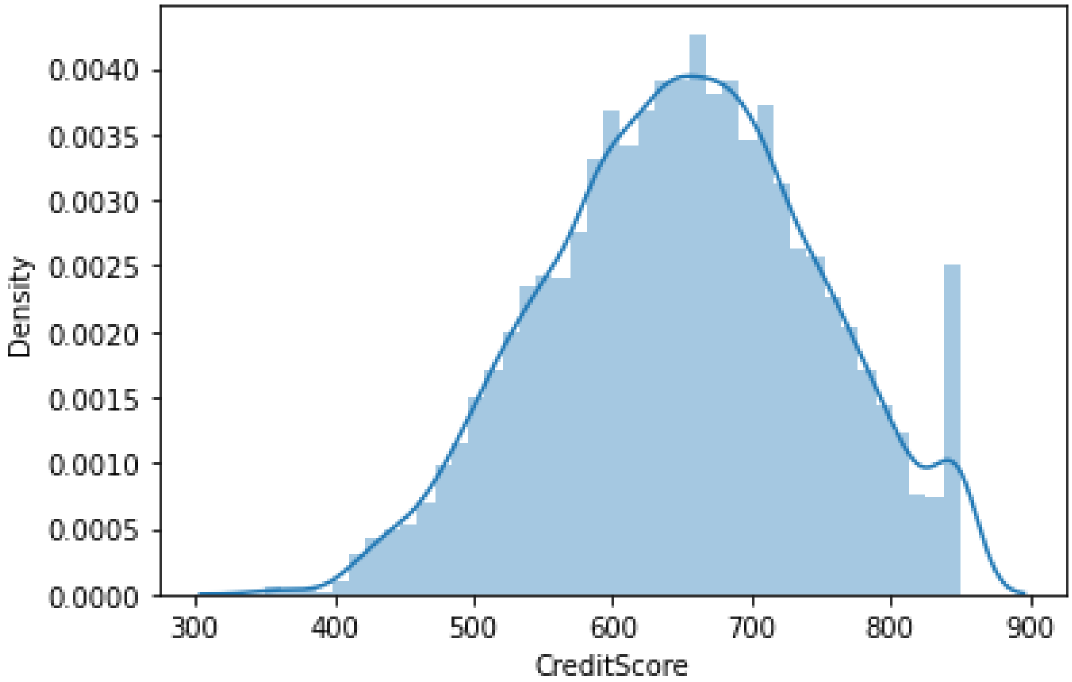
```
      RowNumber  CustomerId    Surname  CreditScore Geography  Gender
Age  \
0             1    15634602   Hargrave          619    France  Female
42
1             2    15647311       Hill          608     Spain  Female
41
2             3    15619304       Onio          502    France  Female
42
3             4    15701354       Boni          699    France  Female
39
4             5    15737888   Mitchell          850     Spain  Female
43
...         ...         ...        ...          ...       ...     ...
...
9995       9996    15606229   Obijiaku          771    France    Male
39
9996       9997    15569892  Johnstone          516    France    Male
35
9997       9998    15584532        Liu          709    France  Female
36
9998       9999    15682355  Sabbatini          772   Germany    Male
42
9999      10000    15628319     Walker          792    France  Female
28

      Tenure    Balance  NumOfProducts  HasCrCard  IsActiveMember  \
0          2       0.00              1          1               1
```

```
1          1   83807.86              1          0               1
2          8  159660.80              3          1               0
3          1       0.00              2          0               0
4          2  125510.82              1          1               1
...      ...        ...            ...        ...             ...
9995       5       0.00              2          1               0
9996      10   57369.61              1          1               1
9997       7       0.00              1          0               1
9998       3   75075.31              2          1               0
9999       4  130142.79              1          1               0

      EstimatedSalary  Exited
0           101348.88       1
1           112542.58       0
2           113931.57       1
3            93826.63       0
4            79084.10       0
...               ...     ...
9995         96270.64       0
9996        101699.77       0
9997         42085.58       1
9998         92888.52       1
9999         38190.78       0

[10000 rows x 14 columns]
```

6. Find the outliers and replace the outliers

```
sns.distplot(df['CreditScore'])
```

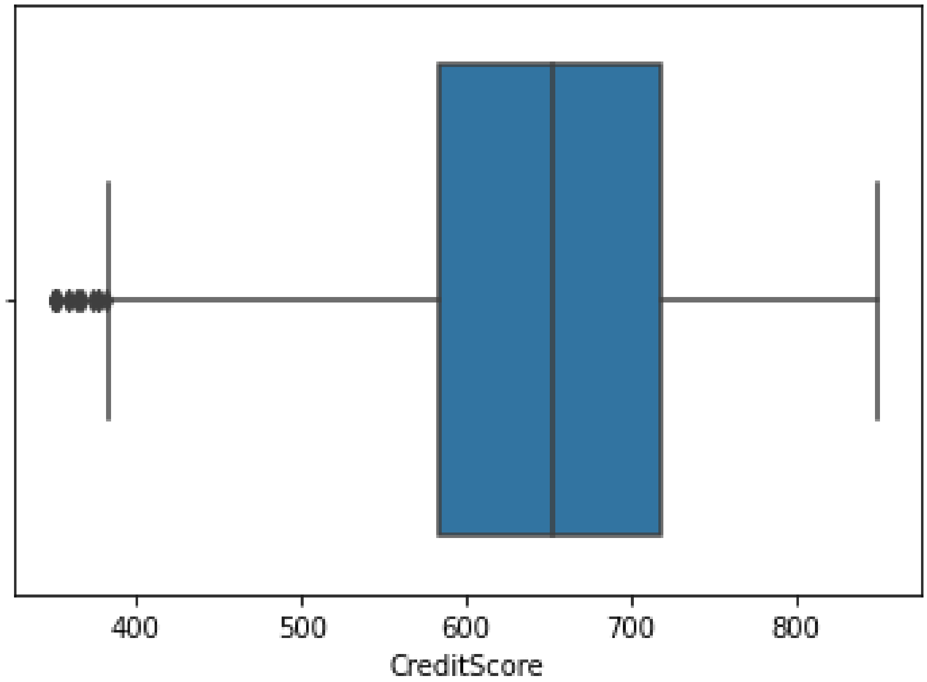
```
/usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2619: 
FutureWarning: `distplot` is a deprecated function and will be removed 
in a future version. Please adapt your code to use either `displot` (a 
figure-level function with similar flexibility) or `histplot` (an 
axes-level function for histograms).
  warnings.warn(msg, FutureWarning)

<matplotlib.axes._subplots.AxesSubplot at 0x7fc0797203d0>
```



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

```
/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 arguments without an explicit keyword will result in an
error or misinterpretation.
  FutureWarning
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc07989acd0>
```



```
upper_limit = df['CreditScore'].mean() + 3*df['CreditScore'].std()
lower_limit = df['CreditScore'].mean() - 3*df['CreditScore'].std()
print('upper limit:', upper_limit)
print('lower limit:', lower_limit)
```

```
upper limit: 940.488696208391
lower limit: 360.568903791609
```

```
df.loc[(df['CreditScore'] > upper_limit) | (df['CreditScore'] <
lower_limit)]
```

```
      RowNumber  CustomerId    Surname  CreditScore Geography  Gender
Age  \
1405       1406    15612494  Panicucci          359    France  Female
44
1631       1632    15685372   Azubuike          350     Spain    Male
54
1838       1839    15758813   Campbell          350   Germany    Male
39
1962       1963    15692416  Aikenhead          358     Spain  Female
52
2473       2474    15679249       Chou          351   Germany  Female
57
8723       8724    15803202  Onyekachi          350    France    Male
51
8762       8763    15765173        Lin          350    France  Female
```

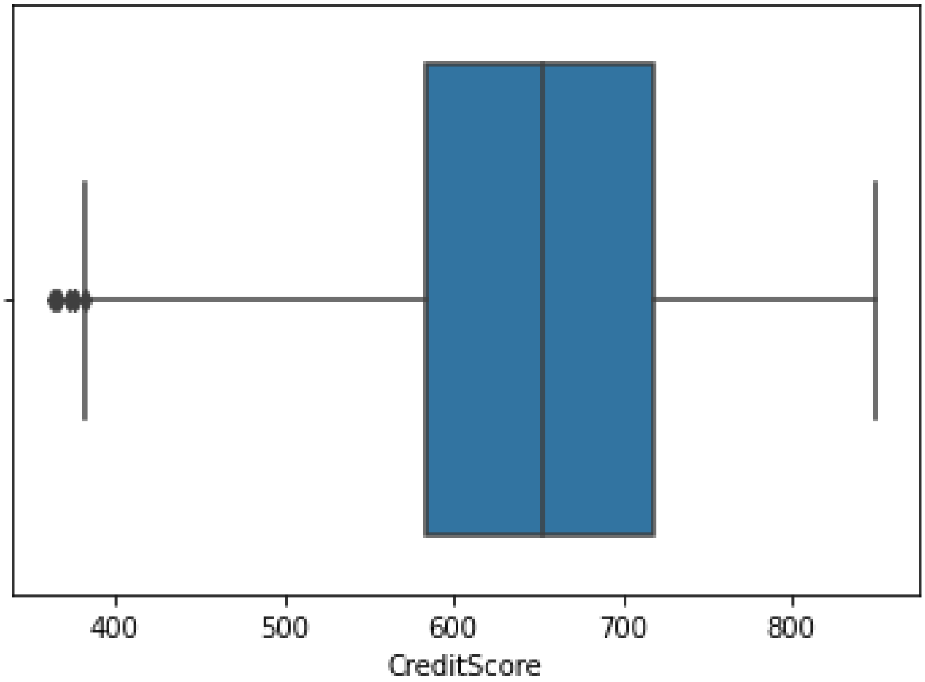
```
60
9624       9625    15668309     Maslow          350    France  Female
40

      Tenure    Balance  NumOfProducts  HasCrCard  IsActiveMember  \
1405       6  128747.69              1          1               0
1631       1  152677.48              1          1               1
1838       0  109733.20              2          0               0
1962       8  143542.36              3          1               0
2473       4  163146.46              1          1               0
8723      10       0.00              1          1               1
8762       3       0.00              1          0               0
9624       0  111098.85              1          1               1

      EstimatedSalary  Exited
1405        146955.71       1
1631        191973.49       1
1838        123602.11       1
1962        141959.11       1
2473        169621.69       1
8723        125823.79       1
8762        113796.15       1
9624        172321.21       1
```

```
new_df = df.loc[(df['CreditScore'] <= upper_limit) &
(df['CreditScore'] >= lower_limit)]
print('before removing outliers:', len(df))
print('after removing outliers:',len(new_df))
print('outliers:', len(df)-len(new_df))
```

```
before removing outliers: 10000
after removing outliers: 9992
outliers: 8
```

```
sns.boxplot(new_df['CreditScore'])
```

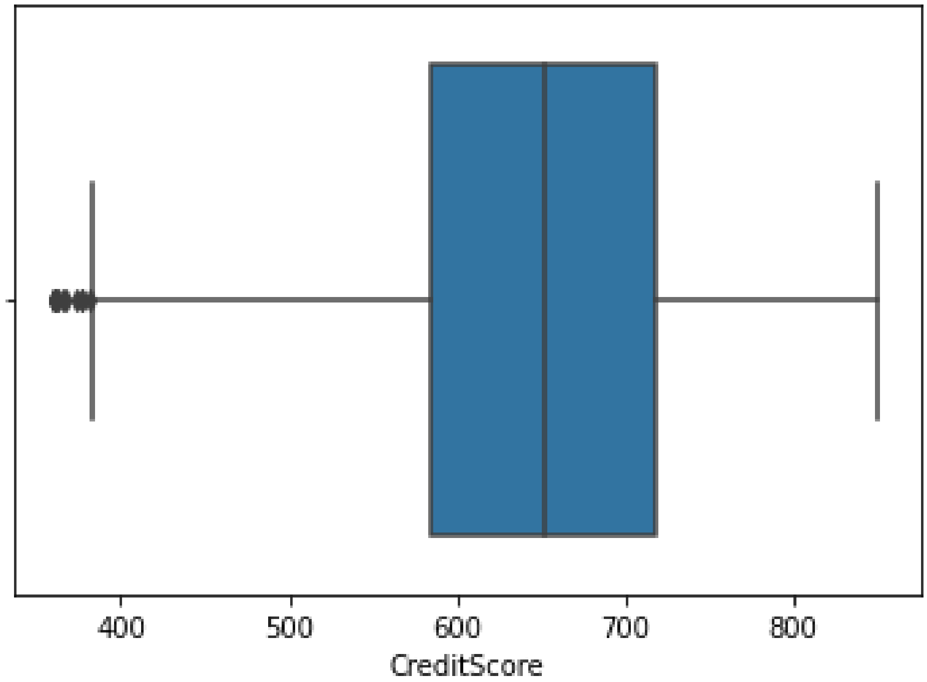
```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43:
FutureWarning: Pass the following variable as a keyword arg: x. From
version 0.12, the only valid positional argument will be `data`, and
passing other arguments without an explicit keyword will result in an
error or misinterpretation.
  FutureWarning

<matplotlib.axes._subplots.AxesSubplot at 0x7fc0797e5310>
```



```
new_df = df.copy()
new_df.loc[(new_df['CreditScore']>=upper_limit), 'CreditScore'] =
upper_limit
new_df.loc[(new_df['CreditScore']<=lower_limit), 'CreditScore'] =
lower_limit
sns.boxplot(new_df['CreditScore'])
```

```
/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 arguments without an explicit keyword will result in an
error or misinterpretation.
  FutureWarning
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc077c76a50>
```



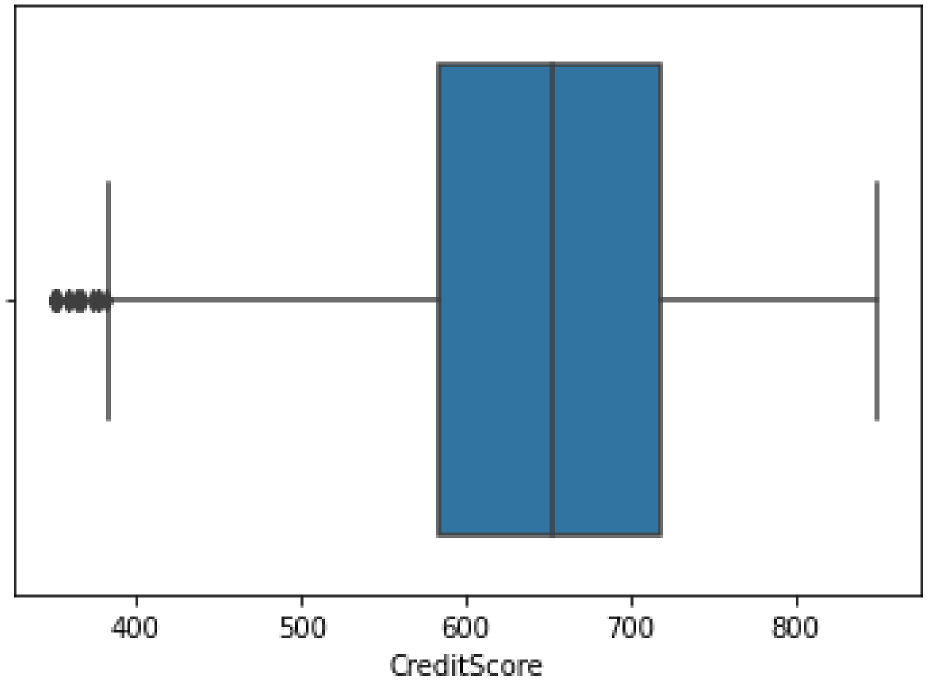
```
upper_limit = df['CreditScore'].quantile(0.99)
lower_limit = df['CreditScore'].quantile(0.01)
print('upper limit:', upper_limit)
print('lower limit:', lower_limit)
```

```
upper limit: 850.0
lower limit: 432.0
```

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

```
/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 arguments without an explicit keyword will result in an
error or misinterpretation.
  FutureWarning
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc077c4bd90>
```



```
df.loc[(df['CreditScore'] > upper_limit) | (df['CreditScore'] <
lower_limit)]
```

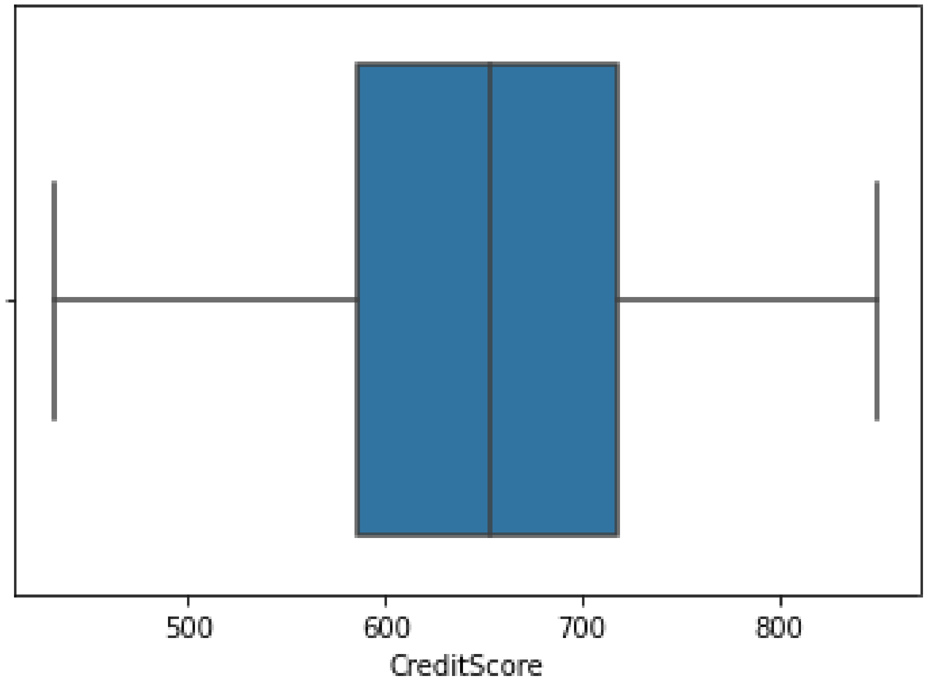
```
      RowNumber  CustomerId     Surname  CreditScore Geography  Gender
Age  \
7             8    15656148      Obinna          376   Germany  Female
29
29           30    15656300    Lucciano          411    France    Male
29
79           80    15803136      Postle          416   Germany  Female
41
99          100    15633059     Fanucci          413    France    Male
34
149         150    15794413      Harris          416    France    Male
32
...         ...         ...         ...          ...       ...     ...
...
9357       9358    15814405  Chesnokova          418    France  Female
46
9407       9408    15652835       Liang          419     Spain  Female
27
9522       9523    15664504       Beede          418    France    Male
35
9624       9625    15668309      Maslow          350    France  Female
40
9930       9931    15713604       Rossi          425   Germany    Male
40

      Tenure    Balance  NumOfProducts  HasCrCard  IsActiveMember  \
7          4  115046.74              4          1               0
29         0   59697.17              2          1               1
79        10  122189.66              2          1               0
99         9       0.00              2          0               0
149        0       0.00              2          0               1
...      ...        ...            ...        ...             ...
9357       9       0.00              1          1               1
9407       2  121580.42              1          0               1
9522       7       0.00              2          1               1
9624       0  111098.85              1          1               1
9930       9  166776.60              2          0               1

      EstimatedSalary  Exited
7           119346.88       1
29           53483.21       0
79           98301.61       0
99            6534.18       0
149            878.87       0
...               ...     ...
9357         81014.50       1
9407        134720.51       0
9522         88878.15       0
9624        172321.21       1
9930        172646.88       0

[99 rows x 14 columns]
```

```
new_df = df.loc[(df['CreditScore'] <= upper_limit) &
(df['CreditScore'] >= lower_limit)]
print('before removing outliers:', len(df))
print('after removing outliers:',len(new_df))
print('outliers:', len(df)-len(new_df))
```

```
before removing outliers: 10000
after removing outliers: 9901
outliers: 99
```

```
sns.boxplot(new_df['CreditScore'])
```

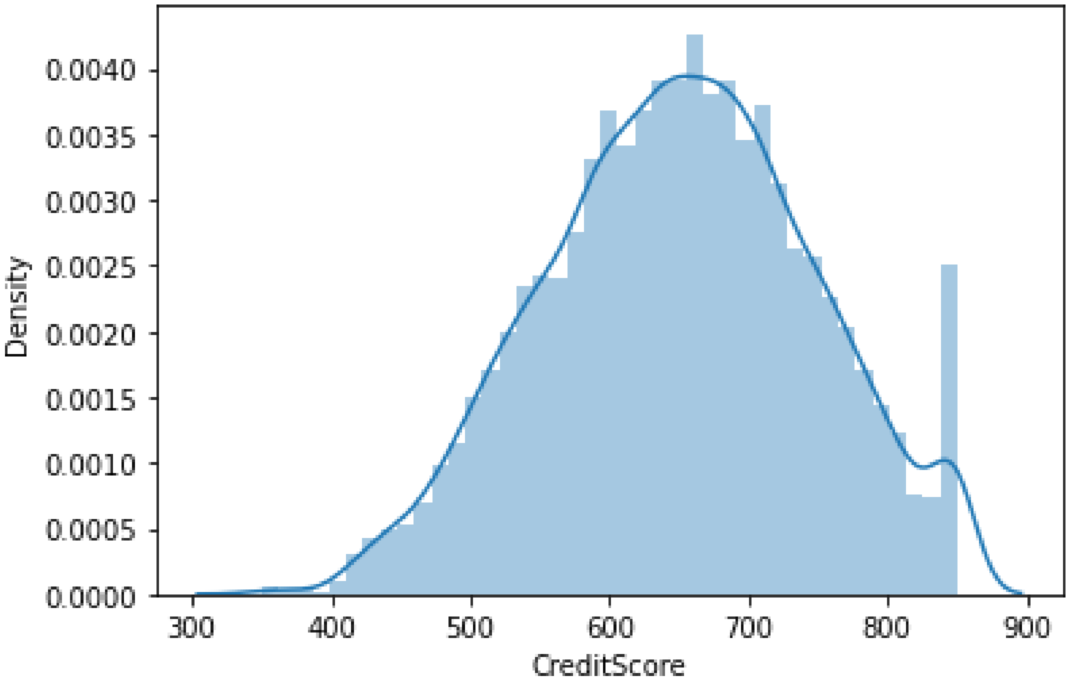
```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43:
FutureWarning: Pass the following variable as a keyword arg: x. From
version 0.12, the only valid positional argument will be `data`, and
passing other arguments without an explicit keyword will result in an
error or misinterpretation.
  FutureWarning

<matplotlib.axes._subplots.AxesSubplot at 0x7fc077bc8550>
```



```
sns.distplot(df['CreditScore'])
```

```
/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 your code to use either `displot` (a
figure-level function with similar flexibility) or `histplot` (an
axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

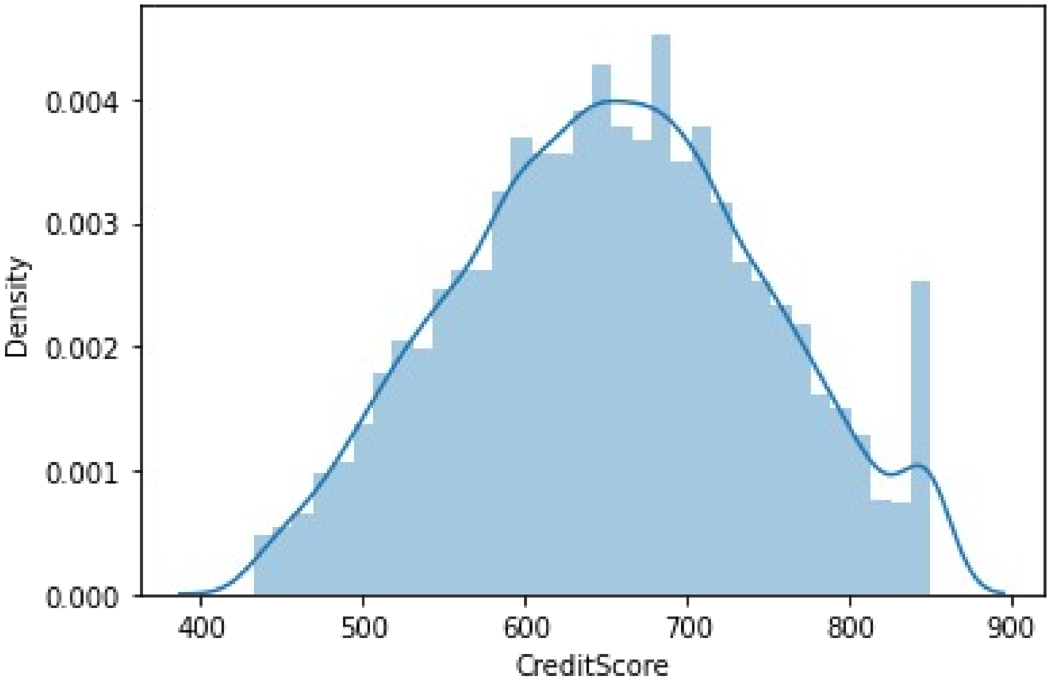
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc077b2d510>
```



```
sns.distplot(new_df['CreditScore'])
```

```
/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 your code to use either `displot` (a
figure-level function with similar flexibility) or `histplot` (an
axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc077c61990>
```



```
7.)Check for Categorical columns and perform encoding.
```

```
df=df.iloc[:,:].values
df
```

```
array([[1, 15634602, 'Hargrave', ..., 1, 101348.88, 1],
       [2, 15647311, 'Hill', ..., 1, 112542.58, 0],
       [3, 15619304, 'Onio', ..., 0, 113931.57, 1],
       ...,
       [9998, 15584532, 'Liu', ..., 1, 42085.58, 1],
       [9999, 15682355, 'Sabbatini', ..., 0, 92888.52, 1],
       [10000, 15628319, 'Walker', ..., 0, 38190.78, 0]],
dtype=object)
```

```
8. Split the data into dependent and independent variables
```

```
url =
'https://drive.google.com/file/d/1_HcM0K8wt4b7FMLkc1V1dv0y6I_9ULzy/
view?usp=sharing'
path = 'https://drive.google.com/uc?
export=download&id='+url.split('/')[-2]
df = pd.read_csv(path)
```

```
x=df.iloc[:,4:7]
x
```

```
     Geography  Gender  Age
0       France  Female   42
1        Spain  Female   41
2       France  Female   42
```

```
3       France  Female   39
4        Spain  Female   43
...        ...     ...  ...
9995    France    Male   39
9996    France    Male   35
9997    France  Female   36
9998   Germany    Male   42
9999    France  Female   28

[10000 rows x 3 columns]
```

```
y=df.iloc[:,7]
y
```

```
0        2
1        1
2        8
3        1
4        2
        ..
9995     5
9996    10
9997     7
9998     3
9999     4
Name: Tenure, Length: 10000, dtype: int64
```

9. Scale the independent variables

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
df
```

```
array([[1, 15634602, 'Hargrave', ..., 1, 101348.88, 1],
       [2, 15647311, 'Hill', ..., 1, 112542.58, 0],
       [3, 15619304, 'Onio', ..., 0, 113931.57, 1],
       ...,
       [9998, 15584532, 'Liu', ..., 1, 42085.58, 1],
       [9999, 15682355, 'Sabbatini', ..., 0, 92888.52, 1],
       [10000, 15628319, 'Walker', ..., 0, 38190.78, 0]],
dtype=object)
```

```
from sklearn.preprocessing import scale
x= scale(X)
x
```

```
names=X.columns
names
```

10.Splitting the data into Training andTesting

```
x=np.array(df['CreditScore']).reshape(-1,1)
x.shape
```

```
(10000, 1)
```

```
print(x)
```

```
[[619]
 [608]
 [502]
 ...
 [709]
 [772]
 [792]]
```

```
y.shape
```

```
(10000,)
```

```
print(y)
```

```
0        2
1        1
2        8
3        1
4        2
        ..
9995     5
9996    10
9997     7
9998     3
9999     4
Name: Tenure, Length: 10000, dtype: int64
```

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test=train_test_split(x,y,test_size=0.30)
x_train.shape
```

```
(7000, 1)
```

```
y_train.shape
```

```
(7000,)
```

```
y_test.shape
```

```
(3000,)
```

```
print(y_train.shape)
```

```
(7000,)
```

```
print(y_test.shape)
```

```
(3000,)
```