Analysis of statistical Data:

1. Customers who have left the bank

Figure 1. Descriptive statistic

```
df_exited.describe()
```

	Unnamed: 0	Customer_ID	Credit Score	Age	Tenure	Balance	NumOfProducts	HasCrCard?	IsActiveMember	Estimated Salary
count	202.000000	2.020000e+02	202.000000	202.000000	202.000000	202.000000	202.000000	202.000000	202.000000	202.000000
mean	492.747525	1.569178e+07	637.138614	45.074257	4.702970	90476.447475	1.465347	0.702970	0.301980	97196.541485
std	288.736104	7.278716e+04	99.719460	10.050095	2.920317	61253.979795	0.767037	0.458085	0.460257	59775.211479
min	0.000000	1.556875e+07	376.000000	2.000000	0.000000	0.000000	1.000000	0.000000	0.000000	417.410000
25%	229.750000	1.562912e+07	564.500000	39.000000	2.000000	0.000000	1.000000	0.000000	0.000000	43913.322500
50%	500.500000	1.569331e+07	643.500000	45.000000	5.000000	112433.965000	1.000000	1.000000	0.000000	100375.400000
75%	740.750000	1.575473e+07	714.750000	51.000000	7.000000	133734.802500	2.000000	1.000000	1.000000	149268.267500
max	989.000000	1.581176e+07	850.000000	69.000000	10.000000	213146.200000	4.000000	1.000000	1.000000	199725.390000

Figure 2. Estimate salary distribution   *Figure 3. Customers by Age distribution*
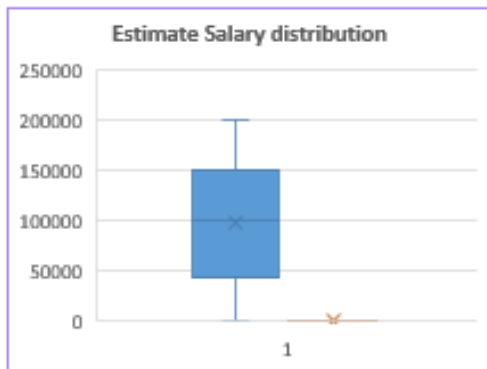

Figure 4. Customers by balance distribution   *Figure 5. Customers by Credit Score distribution*
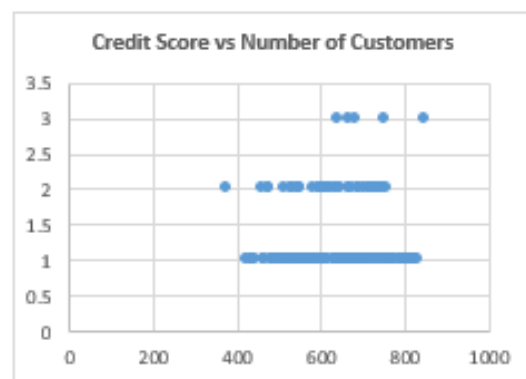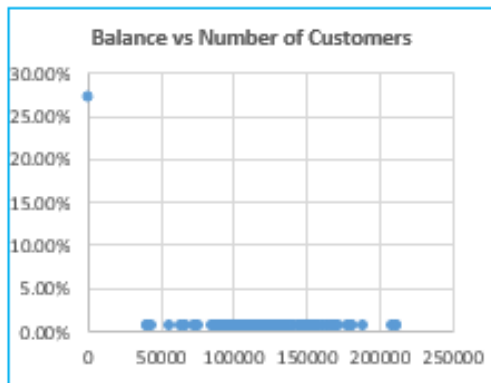
Figure 6. Customer by Gender, Country, Tenure, Member Activity, and Credit Card Accepting distribution :

HasCrcard	Count of Customer_ID
0	29.37%
1	70.63%
Grand Tot	100.00%

Country	Count of Customer_ID
France	51.47%
Germany	23.12%
Spain	25.42%
Grand Total	100.00%

Tenure	Count of Customer_ID
0	2.97%
1	14.85%
2	13.37%
3	9.90%
4	7.92%
5	9.90%
6	10.40%
7	7.43%
8	9.41%
9	10.40%
10	3.47%
Grand Tot	100.00%

Gender	Count of Customer_ID
F	58.91%
M	41.09%
Grand Total	100.00%

Active membe	Count of Customer_ID
0	69.80%
1	30.20%
Grand Total	100.00%

NumOfPro	Count of Customer_ID	%
1	140	69.31%
2	32	15.84%
3	28	13.86%
4	2	0.99%
Grand Tot	202	100%

2.   Customers who didn't leave the bank

Figure 1. Descriptive statistic

```
df_notexiting.describe()
```

	Unnamed: 0	Customer_ID	Credit Score	Age	Tenure	Balance	NumOfProducts	HasCrCard?	IsActiveMember	Estimated Salary
count	783.000000	7.830000e+02	783.000000	783.000000	783.000000	783.000000	783.000000	783.000000	783.000000	783.000000
mean	497.524904	1.569263e+07	651.832695	37.081737	5.160920	74836.448685	1.537676	0.706258	0.564496	98977.650728
std	284.426743	7.206920e+04	97.557322	10.591748	2.930073	62740.870776	0.511553	0.455766	0.496140	56708.051446
min	1.000000	1.556609e+07	411.000000	2.000000	0.000000	0.000000	1.000000	0.000000	0.000000	371.050000
25%	257.500000	1.563177e+07	583.000000	31.000000	3.000000	0.000000	1.000000	0.000000	0.000000	50838.500000
50%	496.000000	1.569267e+07	658.000000	36.000000	5.000000	93147.000000	2.000000	1.000000	1.000000	98368.240000
75%	743.000000	1.575379e+07	723.500000	42.000000	8.000000	127817.875000	2.000000	1.000000	1.000000	145988.865000
max	990.000000	1.581536e+07	850.000000	82.000000	10.000000	197041.800000	3.000000	1.000000	1.000000	199661.500000

Figure 2. Customers by Credit Score distribution

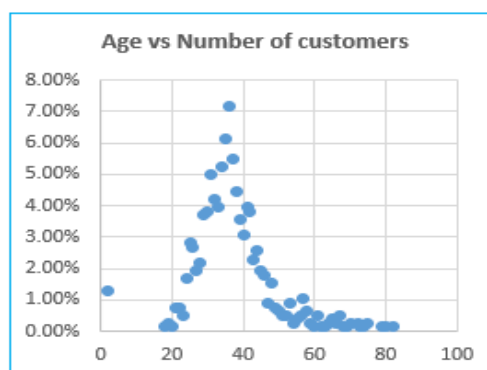*Figure 3. Customers by Age distribution*

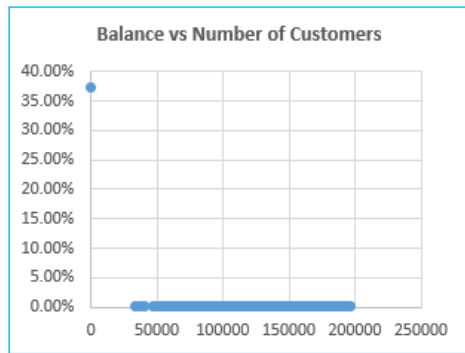*Figure 4. Customers by balance distribution*   *Figure 5. Customers by Credit Score distribution*
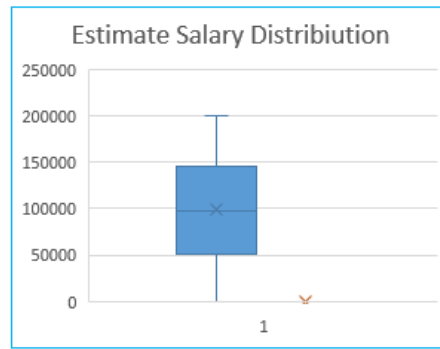

Figure 6. Customer by Gender, Country, Tenure, Member Activity, and Credit Card Accepting distribution :

HasCrCard	Count of Customer_ID
0	29.37%
1	70.63%
Grand Total	100.00%

ActiveMem	Count of Customer_ID
0	43.55%
1	56.45%
Grand Total	100.00%

Gender	Count of Customer_ID
F	43.42%
M	56.58%
Grand Total	100.00%

NumberOfPrc	Count of Customer_ID
1	46.87%
2	52.49%
3	0.64%
Grand Total	100.00%

Country	Count of Customer_ID
France	51.47%
Germany	23.12%
Spain	25.42%
Grand Total	100.00%

Tenure	Count of Customer_ID
0	4.09%
1	9.32%
2	10.60%
3	10.09%
4	8.68%
5	10.22%
6	9.32%
7	9.96%
8	11.11%
9	11.11%
10	5.49%
Grand Total	100.00%

Conclusions:

1) 202 customers left the bank, and 783 Customers didn't. That's **26%**

2) The mean Credit Score is similar for both groups: 637.13 by customers who left and 651.83 by those who didn't. The max Credit Score is the same for both groups, but the min is 8.5% more by customers that stay with the bank: 411.00 vs 376.00. **The customers with Credit Score < 411 leave the Bank.**

3) The mean age of Exited customers is higher: 45 years vs 37 years by NotExited. But the max shows: **the customers > than 69 years old don't leave the bank.**

4) The comparison of Tenure distribution by two groups gives no accentuated insights. But the max for the Exited group is on the 1st year point with a difference of 5% from the NotExiting group at this point. **Customers with a tenure of 1 year are at the highest risk of leaving the bank**.

5) The NumberOdProducts data is significant for understanding customers exiting from the bank. Most left customers had only one product (69.3%). Therefore, **the acquisition of 1 bank product only is a risk factor.**

6) The ActiveMember values show that the ratio of active and non-active users is 54%:46% in the NonExited Group, but in the Excited Group, most of the customers are not involved (30%:70%). Therefore, **inactive customers are more likely to exite from the bank**.

7) The mean balance (and also the max balance) is higher by Exited customers, but the balance values don't show any clear tendency to conclude Exite from the bank reasons.

8) The HaveCrCard, Estimate Salary, Gender, and Country data don't show a clear tendency regarding exit from the bank reasons.

The decision Tree:

```
                    The Credit          YES        Highest risk of
                    Score < 411    ────────────►        exit
                         │
                         │ NO
                         ▼
          NO          Age < 69
        ┌────────────────
        ▼            │ YES
  Smaller risk of    ▼
       exit       Active Member ?
                    │         │
              YES   │         │ NO
              ┌─────┘         └─────┐
              ▼                     ▼
        Smaller risk of        Number of
             exit              Products >1
                                │        │
                          YES   │        │ NO
                          ┌─────┘        └─────┐
                          ▼                    ▼
                    Smaller risk of         Tenure =1
                         exit                │      │
                                        N    │      │ Y
                                        ┌────┘      └────┐
                                        ▼                ▼
                                  High risk of exit   Highest risk of
                                                          exit
```

◄──►

Low risk   High risk