ASSIGNMENT - 2

Data Visualization and Pre - processing

Assignment Date	27 September 2022
Student Name	Ajay.S
Student Roll Number	420619104002
Maximum marks	2 Mark

1.Download the dataset : Dataset

https://drive.google.com/file/d/160K6XcuYDyRBPGj-JsqThkyFoJhCvOWy/view?usp=sharing

2.Load the dataset.

```
In [2]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        import seaborn as sns

In [3]: df = pd.read_csv(r"E:\SB\Dataset\Churn_Modelling.csv")

In [4]: df
```

Out[4]:

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance	NumOfProducts	HasCrCard	IsActiveMember	EstimatedSa
0	1	15634602	Hargrave	619	France	Female	42	2	0.00	1	1	1	10134
1	2	15647311	Hill	608	Spain	Female	41	1	83807.86	1	0	1	11254
2	3	15619304	Onio	502	France	Female	42	8	159660.80	3	1	0	11393
3	4	15701354	Boni	699	France	Female	39	1	0.00	2	0	0	9382
4	5	15737888	Mitchell	850	Spain	Female	43	2	125510.82	1	1	1	7908
...	...	...	...	...	...	...	...	...	...	...	...	...	...
9995	9996	15606229	Obijiaku	771	France	Male	39	5	0.00	2	1	0	9627
9996	9997	15569892	Johnstone	516	France	Male	35	10	57369.61	1	1	1	10169
9997	9998	15584532	Liu	709	France	Female	36	7	0.00	1	0	1	4208
9998	9999	15682355	Sabbatini	772	Germany	Male	42	3	75075.31	2	1	0	9288
9999	10000	15628319	Walker	792	France	Female	28	4	130142.79	1	1	0	3819

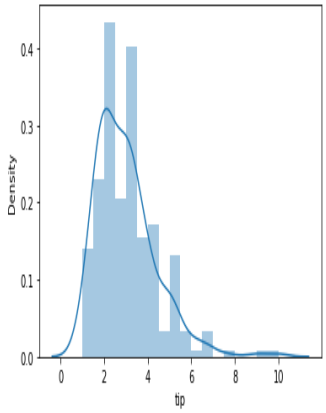
10000 rows × 14 columns

3. Perform Below Visualizations:

* Univariate Analysis

```
sns.distplot(tips['tip'])
```

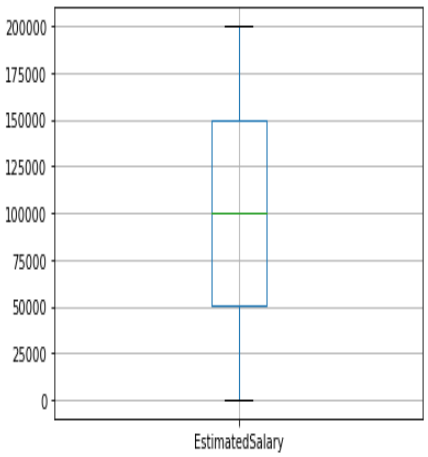
```
/usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a future version.
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f8cd4ef5310>
```



* Bi - Variate Analysis

```
In [11]: df.boxplot(column="EstimatedSalary")
```

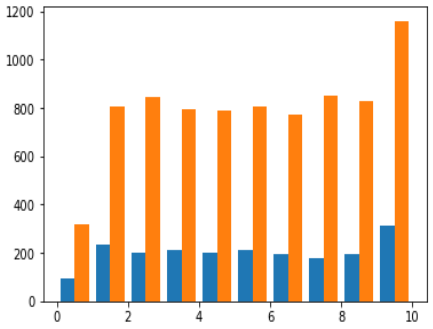
```
Out[11]: <AxesSubplot:>
```



* Multi - Variate Analysis

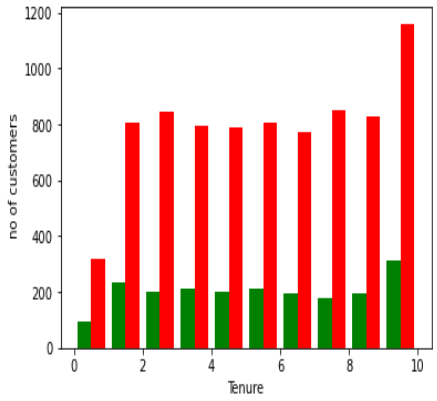
In [20]:
```
plt.hist([chrun_yes,chrun_no])
```

Out[20]:
```
(array([[  95.,  232.,  201.,  213.,  203.,  209.,  196.,  177.,  197.,
         314.],
        [ 318.,  803.,  847.,  796.,  786.,  803.,  771.,  851.,  828.,
        1160.]]),
 array([ 0.,  1.,  2.,  3.,  4.,  5.,  6.,  7.,  8.,  9., 10.]),
 <a list of 2 BarContainer objects>)
```



In [25]:
```
plt.hist([chrun_yes,chrun_no],color=["green","red"])
plt.xlabel("Tenure")
plt.ylabel(" no of customers")
```

Out[25]:
```
Text(0, 0.5, ' no of customers')
```



4. Perform descriptive statistics on the dataset

```
In [11]: df.describe()
```

Out[11]:

	RowNumber	CustomerId	CreditScore	Age	Tenure	Balance	NumOfProducts	HasCrCard	IsActiveMember	EstimatedSalary	
count	10000.00000	1.000000e+04	10000.000000	10000.000000	10000.000000	10000.000000	10000.000000	10000.00000	10000.000000	10000.000000	1(
mean	5000.50000	1.569094e+07	650.528800	38.921800	5.012800	76485.889288	1.530200	0.70550	0.515100	100090.239881	
std	2886.89568	7.193619e+04	96.653299	10.487806	2.892174	62397.405202	0.581654	0.45584	0.499797	57510.492818	
min	1.00000	1.556570e+07	350.000000	18.000000	0.000000	0.000000	1.000000	0.00000	0.000000	11.580000	
25%	2500.75000	1.562853e+07	584.000000	32.000000	3.000000	0.000000	1.000000	0.00000	0.000000	51002.110000	
50%	5000.50000	1.569074e+07	652.000000	37.000000	5.000000	97198.540000	1.000000	1.00000	1.000000	100193.915000	
75%	7500.25000	1.575323e+07	718.000000	44.000000	7.000000	127644.240000	2.000000	1.00000	1.000000	149388.247500	
max	10000.00000	1.581569e+07	850.000000	92.000000	10.000000	250898.090000	4.000000	1.00000	1.000000	199992.480000	

```
In [13]: df["RowNumber"].mean()
Out[13]: 5000.5

In [14]: df["EstimatedSalary"].median()
Out[14]: 100193.915

In [15]: df["Exited"].mode()
Out[15]: 0    0
         Name: Exited, dtype: int64
```

5. Handle the Missing values.

```
In [13]: df.isnull().any()
```

```
Out[13]: 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
```

```
In [14]: df.isnull().sum()
```

```
Out[14]: RowNumber          0
         CustomerId         0
         Surname            0
         CreditScore        0
         Geography          0
         Gender             0
         Age                0
         Tenure             0
         Balance            0
         NumOfProducts      0
         HasCrCard          0
         IsActiveMember     0
         EstimatedSalary    0
         Exited             0
         dtype: int64
```

6. Find the outliers and replace the outliers

```
In [16]: df.skew()
```

```
C:\Users\Rajii\AppData\Local\Temp\ipykernel_3520\1665899112.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.
  df.skew()
```

```
Out[16]: 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
```

7. Check for Categorical columns and perform encoding.

```
In [22]: df.dtypes
```

```
Out[22]: 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
```

```
In [23]: df["Geography"].unique()
```

```
Out[23]: array(['France', 'Spain', 'Germany'], dtype=object)
```

```
In [24]: df["Gender"].unique()
```

```
Out[24]: array(['Female', 'Male'], dtype=object)
```

```
In [20]: from sklearn.compose import ColumnTransformer
```

```
In [21]: from sklearn.preprocessing import OneHotEncoder
```

```
In [22]: ct =  ColumnTransformer([("oh",OneHotEncoder(),[1,2])],remainder ="passthrough")
```

```
In [24]: x = ct.fit_transform(x)
```

```
In [25]: x.shape
```

```
Out[25]: (10000, 15)
```

8. Split the data into dependent and independent variables

```
In [17]: # dependent and indenpendent variables
```

```
In [18]: x = df.iloc[:,3:13].values
         y = df.iloc[:,13:14].values
```

```
In [19]: x.shape
```

```
Out[19]: (10000, 10)
```

```
In [20]: y.shape
```

```
Out[20]: (10000, 1)
```

9. Scale the independent variables

```
In [16]: y = df.iloc[:,13:14].values

In [19]: y.shape

Out[19]: (10000, 1)
```

10. Split the data into training and testing

```
In [27]: from sklearn.model_selection import train_test_split

In [28]: x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.2,random_state=0)

In [29]: x_test.shape

Out[29]: (2000, 15)

In [30]: x_train.shape

Out[30]: (8000, 15)
```