PROJECT 2

NAME- ANURAG MISHRA SIC- 20BCED17

a) By using Logistic Regression Algorithm

Part A: Data Preprocessing

Step1 : importing the libraries

In [3]:

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

step2: import data set

In [4]:

```
dataset=pd.read_csv('Logistic Data.csv')
```

In [5]:

```
dataset
```

Out[5]:

	Age	Salary	Purchased Plot
0	22	22990	0
1	38	24200	0
2	29	52030	0
3	30	68970	0
4	22	91960	0
...	...	...	...
395	49	49610	1
396	54	27830	1
397	53	24200	1
398	39	39930	0
399	52	43560	1

400 rows × 3 columns

step3: to create feature matrix and dependent variable vector

In [6]:

```
a=dataset.iloc[: ,:-1].values
```

```
b=dataset.iloc[:,-1].values
```

In [7]:

```
a
```

Out[7]:

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```

In [8]:

```
b
```

Out[8]:

```
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```

step4: replace the missing data

In [9]:

```
from sklearn.impute import SimpleImputer
imputer=SimpleImputer(missing_values=np.nan,strategy='mean')
imputer.fit(a[:,:])
a[:,:]=imputer.transform(a[:,:])
```

In [10]:

```
a
```

Out[10]:

```
array([[    22,  22990],
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```

In [11]:

```
b
```

Out[11]:

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```

```
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```

Step5: Encoding(not required)

step6 : spiliting of data set into training and testing set

In [12]:

```
from sklearn.model_selection import train_test_split
atrain,atest,btrain,btest=train_test_split(a,b,test_size=0.2,random_state=1)
```

In [13]:

```
atrain
```

Out[13]:

```
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```

step7 : Feature scaling

In [14]:

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

```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
atrain=sc.fit_transform(atrain)
atest=sc.fit_transform(atest)
```

In [15]:

```
atrain
```

Out[15]:

```
array([[-0.80330081, -1.19121795],
       [ 0.75697997, -1.36859801],
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```

Part B: build my first linear model

step 1: training the classification model

In [16]:

```
from sklearn.linear_model import LogisticRegression
LoR=LogisticRegression(random_state=0)
LoR.fit(atrain,btrain)
```

Out[16]:

```
LogisticRegression(random_state=0)
```

step 2: testing the linear model

In [17]:

```
bestimated=LoR.predict(atest)
print(np.concatenate((bestimated.reshape(len(bestimated),1),btest.reshape(len(btest),1))
,1))
```

```
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```

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```

step C: performance matrix

In [19]:

```
from sklearn.metrics import confusion_matrix,accuracy_score,precision_score
cm=confusion_matrix(btest,bestimated)
print(cm)
print(accuracy_score(btest,bestimated))
print(precision_score(btest,bestimated))
```

```
[[43  5]
 [10 22]]
0.8125
0.8148148148148148
```

In [49]:

```
np.mean((True,True,False))
```

Out[49]:

```
0.6666666666666666
```

In [50]:

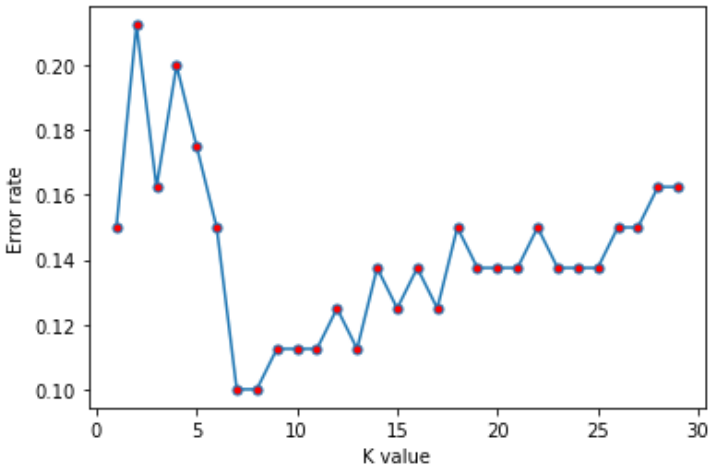
```
error_rate=[]
for i in range(1,30):
    KC=KNeighborsClassifier(n_neighbors=i)
    KC.fit(atrain,btrain)
    bpred_i=KC.predict(atest)
    error_rate.append(np.mean(bpred_i!=btest))
```

In [51]:

```
plt.plot(range(1,30),error_rate,marker='o',markerfacecolor='red',markersize=5)
plt.xlabel('K value')
plt.ylabel('Error rate')
```

Out[51]:

```
Text(0, 0.5, 'Error rate')
```



b) By using KNN Algorithm

Part A: Data Preprocessing

Step1 : importing the libraries

In [20]:

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

step2: import data set

In [22]:

```
dataset=pd.read_csv('Logistic Data.csv')
```

In [23]:

```
dataset
```

Out[23]:

	Age	Salary	Purchased Plot
0	22	22990	0
1	38	24200	0
2	29	52030	0
3	30	68970	0
4	22	91960	0
...	...	...	...
395	49	49610	1
396	54	27830	1
397	53	24200	1
398	39	39930	0
399	52	43560	1

400 rows × 3 columns

step3: to create feature matrix and dependent variable vector

In [24]:

```
a=dataset.iloc[:,:-1].values
b=dataset.iloc[:,-1].values
```

In [25]:

```
a
```

Out[25]:

```
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```

In [26]:

```
b
```

Out[26]:

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```

step4: replace the missing data

In [33]:

```
from sklearn.impute import SimpleImputer
imputer=SimpleImputer(missing_values=np.nan,strategy='mean')
imputer.fit(a[:,:])
a[:,:]=imputer.transform(a[:,:])
```

In [34]:

```
a
```

Out[34]:

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```

Step5: Encoding(not required)

step6 : spiliting of data set into training and testing set

In [35]:

```
from sklearn.model_selection import train_test_split
atrain,atest,btrain,btest=train_test_split(a,b,test_size=0.2,random_state=1)
```

In [36]:

```
atrain
```

Out[36]:

```
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```

step7 : Feature scaling

In [37]:

```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
atrain=sc.fit_transform(atrain)
atest=sc.fit_transform(atest)
```

In [38]:

```
atrain
```

Out[38]:

```
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```
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```

Part B: build my KNN classification model

step 1: training the classification model

In [42]:

```
from sklearn.neighbors import KNeighborsClassifier
KC=KNeighborsClassifier(n_neighbors=7,weights='uniform',p=2)
KC.fit(atrain,btrain)
```

Out[42]:

```
KNeighborsClassifier(n_neighbors=7)
```

step 2: testing the linear model

In [43]:

```
bestimated=KC.predict(atest)
```

step C: performance matrix

In [45]:

```
from sklearn.metrics import confusion_matrix,accuracy_score,precision_score
cm=confusion_matrix(btest,bestimated)
print(cm)
print(accuracy_score(btest,bestimated))
print(precision_score(btest,bestimated))
```

```
[[42  6]
 [ 2 30]]
0.9
0.8333333333333334
```

In [46]:

```
np.mean((True,True,False))
```

Out[46]:

```
0.6666666666666666
```

In [47]:

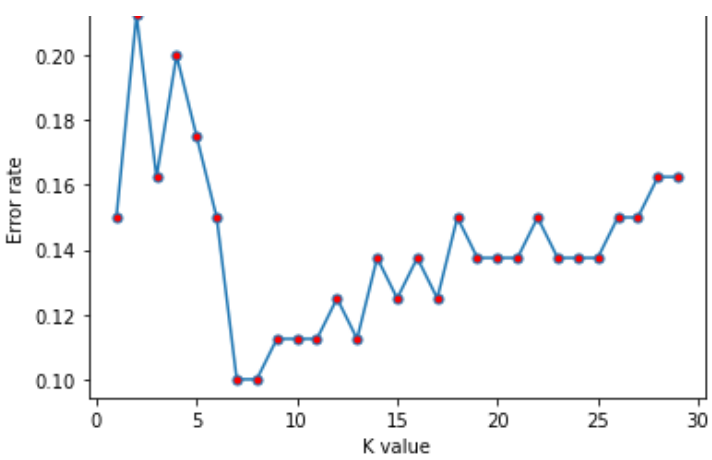
```
error_rate=[]
for i in range(1,30):
    KC=KNeighborsClassifier(n_neighbors=i)
    KC.fit(atrain,btrain)
    bpred_i=KC.predict(atest)
    error_rate.append(np.mean(bpred_i!=btest))
```

In [48]:

```
plt.plot(range(1,30),error_rate,marker='o',markerfacecolor='red',markersize=5)
plt.xlabel('K value')
plt.ylabel('Error rate')
```

Out[48]:

```
Text(0, 0.5, 'Error rate')
```



In [ ]: