### **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

```
uacabee. ± ± 0 0 [ • / •   ± ] • va ± a = 0
b=dataset.iloc[:,-1].values
In [7]:
а
Out[7]:
array([[
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In [8]:
Out[8]:
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```

# step4: replace the missing data

[

32 1004301

```
In [9]:
from sklearn.impute import SimpleImputer
imputer=SimpleImputer(missing values=np.nan, strategy='mean')
imputer.fit(a[:,:])
a[:,:]=imputer.transform(a[:,:])
In [10]:
Out[10]:
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b

# 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
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[
[
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[
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          27830],
     49,
[
           95590],
[
     33,
           59290]], dtype=int64)
```

# step7: Feature scaling

```
sc=StandardScaler()
atrain=sc.fit_transform(atrain)
atest=sc.fit_transform(atest)
```

#### In [15]:

```
atrain
```

```
Out[15]:
```

```
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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]:
```

out[10].

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))
```

[0 0]

[0 1] [1 1] [0 0] [0 0] [0 0] [1 1] [0 0] [1 0] [0 0] [0 0] [0 0] [1 1] [1 1] [1 1] [0 0] [0 0] [1 1] [0 0] [1 1] [0 0] [0 1] [0 0] [1 1] [1 0] [1 1] [1 0] [0 0] [0 0] [0 0]
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```
[0 0]
[1 1]
[0 0]
[0 0]
[0 0]
[0 0]]
```

## step C: performance matrix

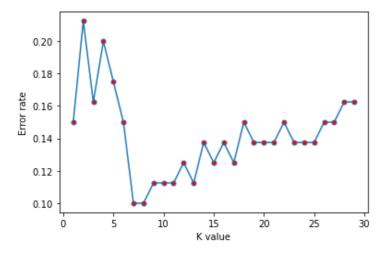
```
In [19]:
```

```
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
0.8148148148148
In [49]:
np.mean((True, True, False))
Out[49]:
0.666666666666666
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

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

# step2: import data set

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

30, 1016401,

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

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```

# step4: replace the missing data

```
In [33]:
```

b

```
from sklearn.impute import SimpleImputer
imputer=SimpleImputer(missing values=np.nan, strategy='mean')
imputer.fit(a[:,:])
a[:,:]=imputer.transform(a[:,:])
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Out[34]:
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```

# Step5: Encoding(not required)

In [35]:

# step6: spiliting of data set into training and testing set

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

In [48]:

Out[48]:

plt.xlabel('K value')
plt.ylabel('Error rate')

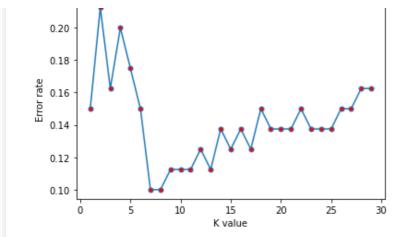
Text(0, 0.5, 'Error rate')

### 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
0.83333333333333334
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))
```

plt.plot(range(1,30),error\_rate,marker='o',markerfacecolor='red',markersize=5)



In [ ]: