In [136…

```python
import pandas as pd
import numpy as np
```

In [137…

```python
data=pd.read_csv('team.csv')
```

In [138…

```python
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
dfle=data
dfle.TEAM=le.fit_transform(dfle.TEAM)
dfle
```

Out[138]:

	TEAM	YEAR
0	0	2000
1	1	2002
2	2	2003
3	3	2004
4	0	2005
5	2	2006
6	1	2007
7	0	2008
8	3	2009

In [139…

```python
from sklearn.preprocessing import OneHotEncoder
```

In [140…

```python
enc=OneHotEncoder()
enc_data=pd.DataFrame(enc.fit_transform(dfle[['TEAM']]).toarray())
enc_data
```

Out[140]:

	0	1	2	3
0	1.0	0.0	0.0	0.0
1	0.0	1.0	0.0	0.0
2	0.0	0.0	1.0	0.0
3	0.0	0.0	0.0	1.0
4	1.0	0.0	0.0	0.0
5	0.0	0.0	1.0	0.0
6	0.0	1.0	0.0	0.0
7	1.0	0.0	0.0	0.0
8	0.0	0.0	0.0	1.0

In [142…

```python
abc=dfle.join(enc_data)
```

In [143…

```python
final=abc.drop(['TEAM'],axis='columns')
final
```

Out[143]:

	YEAR	0	1	2	3
0	2000	1.0	0.0	0.0	0.0
1	2002	0.0	1.0	0.0	0.0
2	2003	0.0	0.0	1.0	0.0
3	2004	0.0	0.0	0.0	1.0
4	2005	1.0	0.0	0.0	0.0
5	2006	0.0	0.0	1.0	0.0
6	2007	0.0	1.0	0.0	0.0
7	2008	1.0	0.0	0.0	0.0
8	2009	0.0	0.0	0.0	1.0

In [ ]:

In [1]:

```
import pandas as pd
import numpy as np
```

In [2]:

```
data=pd.read_csv('abcde.csv')
```

In [4]:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(data[['age']],data.results,test_size=0.5,random_state=10)
```

In [5]:

```
from sklearn.linear_model import LogisticRegression
model=LogisticRegression()
model.fit(x_train,y_train)
```

Out[5]:

```
LogisticRegression()
```

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In [6]:

```
y_pred=model.predict(x_test)
```

In [7]:

```
model.score(x_test,y_test)
```

Out[7]:

```
0.9285714285714286
```

In [ ]:

In [1]:
```
Write Python program to implement classifier using support vector machines.
1) Installation packages , Loading dataset, Show data frame , Create confusion_matrix
2) Describe accuracy_score, precision_score, recall_score, f1_score using confusion matrix
```

In [2]:
```
from sklearn.datasets import load_iris
iris=load_iris()
```

In [7]:
```
df=pd.DataFrame(iris.data,columns=iris.feature_names)
```

In [8]:
```
df['target']=iris.target
df.head()
```

Out[8]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	target
0	5.1	3.5	1.4	0.2	0
1	4.9	3.0	1.4	0.2	0
2	4.7	3.2	1.3	0.2	0
3	4.6	3.1	1.5	0.2	0
4	5.0	3.6	1.4	0.2	0

In [11]:
```
x=df.drop(['target'],axis='columns')
y=df.target
```

In [12]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=0)
```

In [13]:
```
from sklearn.svm import SVC
clr=SVC()
clr.fit(x_train,y_train)
```

Out[13]:
```
SVC()
```

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In [14]:
```
clr.score(x_test,y_test)
```

Out[14]:
```
1.0
```

In [30]:
```
y_pred=clr.predict(x_test)
y_pred
```

Out[30]:
```
array([2, 1, 0, 2, 0, 2, 0, 1, 1, 1, 2, 1, 1, 1, 1, 0, 1, 1, 0, 0, 2, 1,
       0, 0, 2, 0, 0, 1, 1, 0])
```

In [31]:
```
from sklearn.metrics import classification_report
classification_report(y_test,y_pred)
```

Out[31]:
```
'              precision    recall  f1-score   support\n\n           0       1.00      1.00      1.00
11\n           1       1.00      1.00      1.00        13\n           2       1.00      1.00      1.00
6\n\n    accuracy                           1.00        30\n   macro avg       1.00      1.00      1.00
30\nweighted avg       1.00      1.00      1.00        30\n'
```

In [ ]:
```
```

In [1]:

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

In [3]:

```
from sklearn.datasets import load_iris
iris=load_iris()
```

In [4]:

```
df=pd.DataFrame(iris.data,columns=iris.feature_names)
df['target']=iris.target
```

In [5]:

```
x=df.drop(['target'],axis=1)
y=df['target']
```

In [6]:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=2)
```

In [7]:

```
from sklearn.svm import SVC
clr=SVC()
clr.fit(x_train,y_train)
```

Out[7]:

```
SVC()
```

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In [8]:

```
y_train_pred=clr.predict(x_train)
y_test_pred=clr.predict(x_test)
```

In [15]:

```
from sklearn.metrics import confusion_matrix
train_cm=confusion_matrix(y_train,y_train_pred)
train_cm
```

Out[15]:

```
array([[36,  0,  0],
       [ 0, 41,  1],
       [ 0,  2, 40]], dtype=int64)
```

In [17]:

```
test_cm=confusion_matrix(y_test,y_test_pred)
test_cm
```

Out[17]:

```
array([[14,  0,  0],
       [ 0,  7,  1],
       [ 0,  0,  8]], dtype=int64)
```

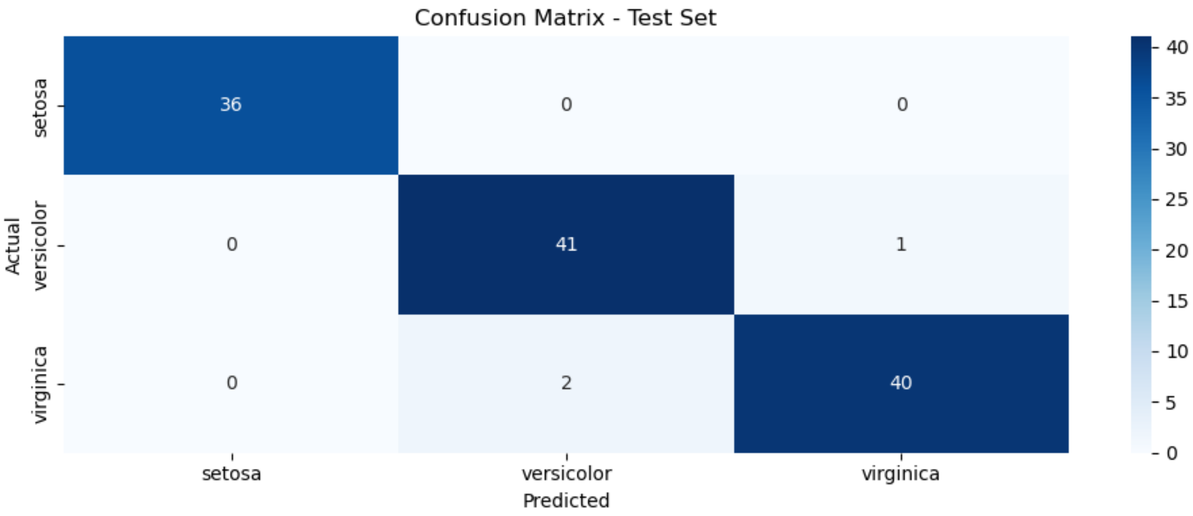
In [31]:

```
#Visualize_Confusion_matrix
import seaborn as sns

plt.figure(figsize=(10,4))
sns.heatmap(train_cm,annot=True,fmt='d',cmap='Blues',
          xticklabels=iris.target_names,
          yticklabels=iris.target_names)

plt.title('Confusion Matrix - Test Set')
plt.xlabel('Predicted')
plt.ylabel('Actual')

plt.tight_layout()
plt.show()
```



In [33]:

```
from sklearn.metrics import classification_report
classification_report(y_test,y_test_pred)
```

Out[33]:

```
'              precision    recall  f1-score   support\n\n           0       1.00      1.00      1.00
14\n           1       1.00      0.88      0.93         8\n           2       0.89      1.00      0.94
8\n\n    accuracy                           0.97        30\n   macro avg       0.96      0.96      0.9
6        30\nweighted avg       0.97      0.97      0.97        30\n'
```

In [ ]:

```
In [2]:  import pandas as pd
         import numpy as np
```

```
In [3]:  from sklearn.datasets import load_iris
         data=load_iris()
```

```
In [4]:  data.feature_names

Out[4]:  ['sepal length (cm)',
          'sepal width (cm)',
          'petal length (cm)',
          'petal width (cm)']
```

```
In [5]:  data.target_names

Out[5]:  array(['setosa', 'versicolor', 'virginica'], dtype='<U10')
```

```
In [7]:  x=data.data
         y=data.target
```

```
In [8]:  from sklearn.model_selection import train_test_split
         x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=10)
```

```
In [9]:  from sklearn.tree import DecisionTreeClassifier
         sc=DecisionTreeClassifier(criterion='entropy')
         sc.fit(x_train,y_train)

Out[9]:  DecisionTreeClassifier(criterion='entropy')
```

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```
In [10]: y_pred=sc.predict(x_test)
```

```
In [16]: from sklearn.metrics import confusion_matrix,accuracy_score,classification_report
         confusion_matrix(y_test,y_pred)

Out[16]: array([[10,  0,  0],
                [ 0, 11,  2],
                [ 0,  0,  7]], dtype=int64)
```

```
In [17]: accuracy_score(y_test,y_pred)

Out[17]: 0.9333333333333333
```

```
In [18]: classification_report(y_test,y_pred)

Out[18]: '              precision    recall  f1-score   support\n\n           0       1.00      1.00      1.00
         10\n           1       1.00      0.85      0.92        13\n           2       0.78      1.00      0.88
         7\n\n    accuracy                           0.93        30\n   macro avg       0.93      0.95      0.93
         30\nweighted avg       0.95      0.93      0.93        30\n'
```

```
In [ ]:
```

In [1]:

```
import numpy as np
import pandas as pd
```

In [2]:

```
from sklearn.datasets import load_breast_cancer
data=load_breast_cancer()
```

In [3]:

```
data.target_names
```

Out[3]:

```
array(['malignant', 'benign'], dtype='<U9')
```

In [6]:

```
df=pd.DataFrame(np.c_[data.data,data.target],columns=[list(data.feature_names)+['target']])
```

In [8]:

```
df.shape
```

Out[8]:

```
(569, 31)
```

In [10]:

```
x=df.iloc[:,0:-1]
y=df.iloc[:,-1]
```

In [13]:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=1)
```

In [14]:

```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
xtrain=sc.fit_transform(x_train)
xtest=sc.transform(x_test)
```

In [15]:

```
from sklearn.naive_bayes import GaussianNB
clr=GaussianNB()
clr.fit(xtrain,y_train)
```

Out[15]:

```
GaussianNB()
```

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In [16]:

```
y_pred=clr.predict(xtest)
```

In [17]:

```
y_pred
```

Out[17]:

```
array([0., 0., 1., 0., 1., 0., 0., 0., 1., 1., 1., 0., 0., 1., 1., 1., 1.,
       1., 1., 0., 1., 1., 0., 1., 0., 1., 1., 0., 0., 0., 0., 1., 0., 0.,
       1., 1., 0., 1., 1., 1., 1., 1., 1., 1., 1., 0., 1., 1., 1., 0., 0.,
       0., 1., 1., 1., 1., 1., 0., 1., 1., 1., 0., 1., 1., 1., 1., 1., 0.,
       1., 1., 1., 1., 1., 0., 1., 0., 0., 1., 1., 0., 1., 0., 1., 0., 1.,
       1., 0., 1., 0., 1., 1., 0., 1., 1., 0., 0., 1., 1., 1., 1., 1., 1.,
       1., 1., 1., 1., 1., 1., 0., 0., 0., 0., 1., 1.])
```

In [19]:

```
from sklearn.metrics import accuracy_score
print('Accuracy :',accuracy_score(y_test,y_pred))
```

```
Accuracy : 0.9473684210526315
```

In [ ]:

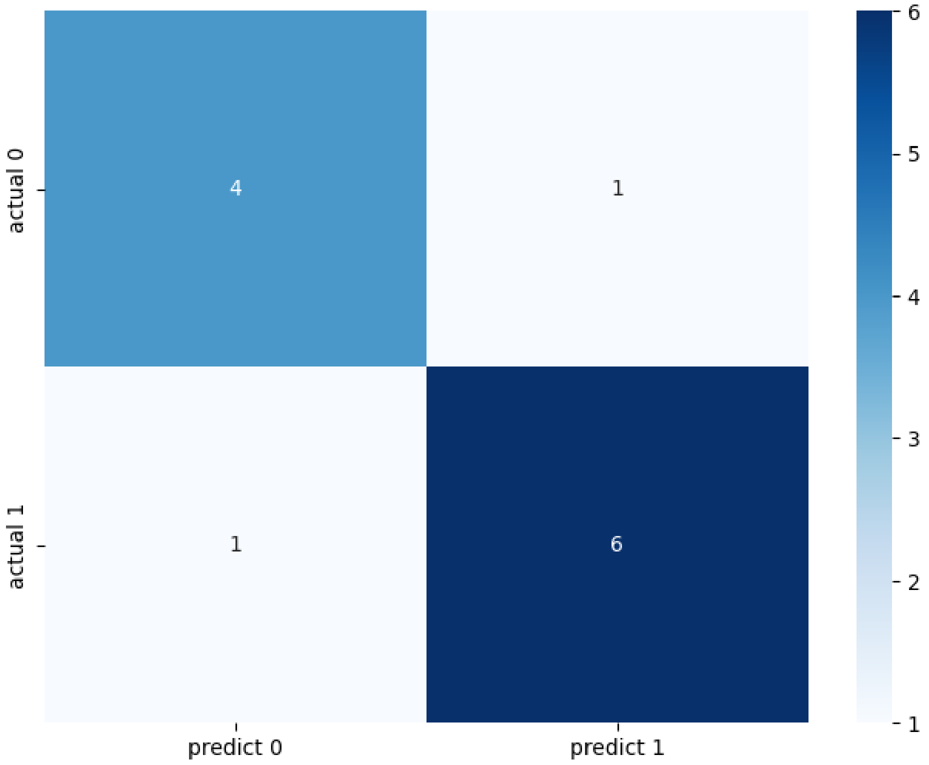
```
In [1]: from sklearn.metrics import confusion_matrix,classification_report
        import matplotlib.pyplot as plt
        import seaborn as sns
```

```
In [2]: actual=[1,0,1,0,1,0,1,0,1,1,1,0]
        predict=[1,0,1,0,1,0,1,1,1,1,0,0]
```

```
In [4]: cm=confusion_matrix(actual,predict)
```

```
In [10]: plt.figure(figsize=(8,6))
         sns.heatmap(cm,annot=True,fmt='d',cmap='Blues',
                    xticklabels=['predict 0','predict 1'],
                    yticklabels=['actual 0','actual 1'])
```

```
Out[10]: <Axes: >
```



```
In [12]: classification_report(actual,predict)
```

```
Out[12]: '              precision    recall  f1-score   support\n\n           0       0.80      0.80      0.80
         5\n           1       0.86      0.86      0.86         7\n\n    accuracy                           0.83
         12\n   macro avg       0.83      0.83      0.83        12\nweighted avg       0.83      0.83      0.83
         12\n'
```

```
In [ ]:
```

In [1]:
```
#Random_Forest
import pandas as pd
import numpy as np
from sklearn import metrics
```

In [2]:
```
data=pd.read_csv('user_data.csv')
```

In [3]:
```
x=data.iloc[:,[2,3]].values
y=data.iloc[:,4].values
```

In [4]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=2)
```

In [5]:
```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
x_train=sc.fit_transform(x_train)
x_test=sc.transform(x_test)
```

In [6]:
```
data
```

Out[6]:

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0
...	...	...	...	...	...
395	15691863	Female	46	41000	1
396	15706071	Male	51	23000	1
397	15654296	Female	50	20000	1
398	15755018	Male	36	33000	0
399	15594041	Female	49	36000	1

400 rows × 5 columns

In [7]:
```
from sklearn.ensemble import RandomForestClassifier
clr=RandomForestClassifier(n_estimators=10,criterion='entropy')
clr.fit(x_train,y_train)
```

Out[7]:
```
RandomForestClassifier(criterion='entropy', n_estimators=10)
```

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In [9]:
```
y_pred=clr.predict(x_test)
y_pred
```

Out[9]:
```
array([0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 1, 1, 0, 0, 0,
       0, 0, 0, 1, 1, 0, 1, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 1,
       0, 1, 0, 1, 1, 0, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 1,
       1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0], dtype=int64)
```

In [12]:
```
from sklearn.metrics import confusion_matrix,classification_report
cm=confusion_matrix(y_test,y_pred)
cm
```

Out[12]:
```
array([[43,  5],
       [ 6, 26]], dtype=int64)
```

```
In [13]: from sklearn.metrics import classification_report
         classification_report(y_test,y_pred)
```

```
Out[13]: '              precision    recall  f1-score   support\n\n           0       0.88      0.90      0.89
         48\n           1       0.84      0.81      0.83        32\n\n    accuracy                           0.
         86        80\n   macro avg       0.86      0.85      0.86        80\nweighted avg       0.86      0.86
         0.86        80\n'
```

```
In [ ]: #Visualization Not Possible The Program Going To Confusion
```

In [1]:

```
import pandas as pd
from sklearn.preprocessing import MinMaxScaler
from matplotlib import pyplot as plt
```

In [2]:

```
df=pd.read_csv('Book1.csv')
df.head()
```

Out[2]:

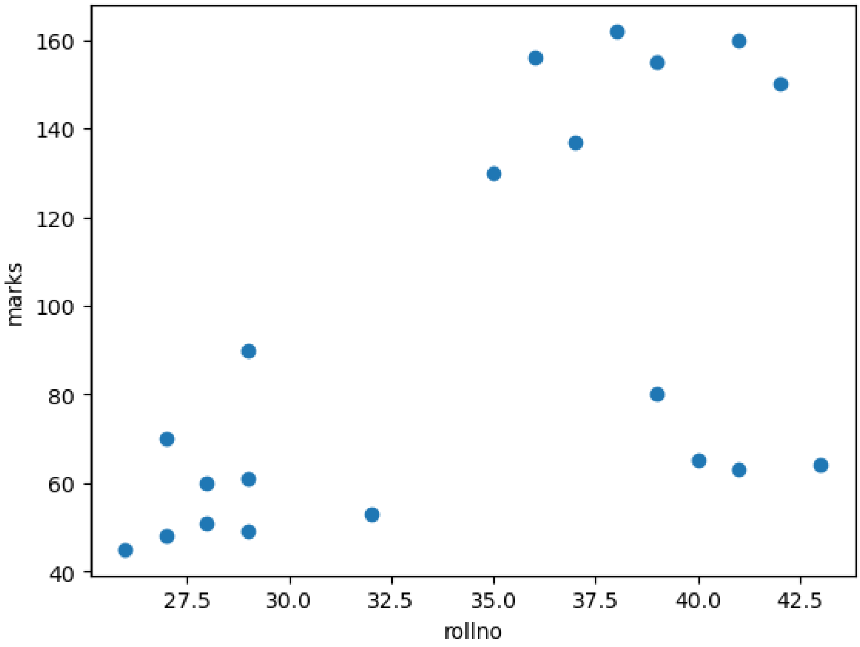
	name	rollno	marks
0	A	40	65
1	B	41	63
2	C	43	64
3	D	39	80
4	E	36	156

In [3]:

```
plt.scatter(df.rollno,df['marks'])
plt.xlabel('rollno')
plt.ylabel('marks')
```

Out[3]:

```
Text(0, 0.5, 'marks')
```



In [5]:

```
from sklearn.cluster import KMeans
km=KMeans(n_clusters=3)
pred=km.fit_predict(df[['rollno','marks']])
pred
```

```
C:\Users\Admin\anaconda3\lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default
value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppre
ss the warning
  warnings.warn(
C:\Users\Admin\anaconda3\lib\site-packages\sklearn\cluster\_kmeans.py:1382: UserWarning: KMeans is kno
wn to have a memory leak on Windows with MKL, when there are less chunks than available threads. You c
an avoid it by setting the environment variable OMP_NUM_THREADS=1.
  warnings.warn(
```

Out[5]:

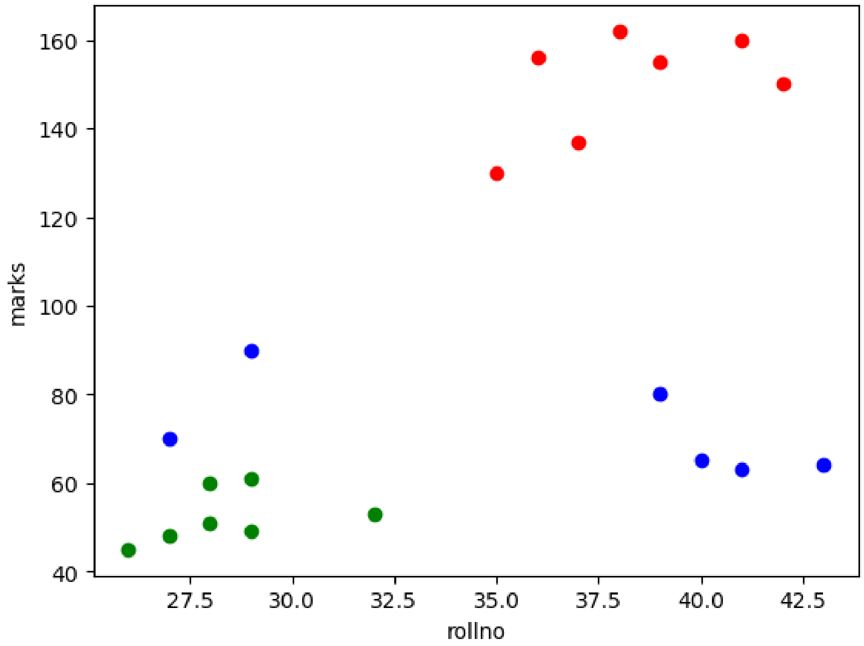
```
array([2, 2, 2, 2, 1, 1, 1, 0, 0, 0, 0, 0, 2, 2, 0, 0, 1, 1, 1, 1])
```

In [7]:

```
df['cluster']=pred
df.head()
df1=df[df.cluster==0]
df2=df[df.cluster==1]
df3=df[df.cluster==2]
plt.scatter(df1.rollno,df1['marks'],color='green')
plt.scatter(df2.rollno,df2['marks'],color='red')
plt.scatter(df3.rollno,df3['marks'],color='blue')
plt.xlabel('rollno')
plt.ylabel('marks')
```

Out[7]:

```
Text(0, 0.5, 'marks')
```



In [9]:

```
scale=MinMaxScaler()
scale.fit(df[['marks']])
df['marks']=scale.transform(df[['marks']])

scale.fit(df[['rollno']])
df['rollno']=scale.transform(df[['rollno']])
```

In [13]:

```
df=df.drop(['cluster'],axis='columns')
df['cluster']=pred
df.head()
```

Out[13]:

	name	rollno	marks	cluster
0	A	0.823529	0.170940	2
1	B	0.882353	0.153846	2
2	C	1.000000	0.162393	2
3	D	0.764706	0.299145	2
4	E	0.588235	0.948718	1

In [14]:

```
km.cluster_centers_
```

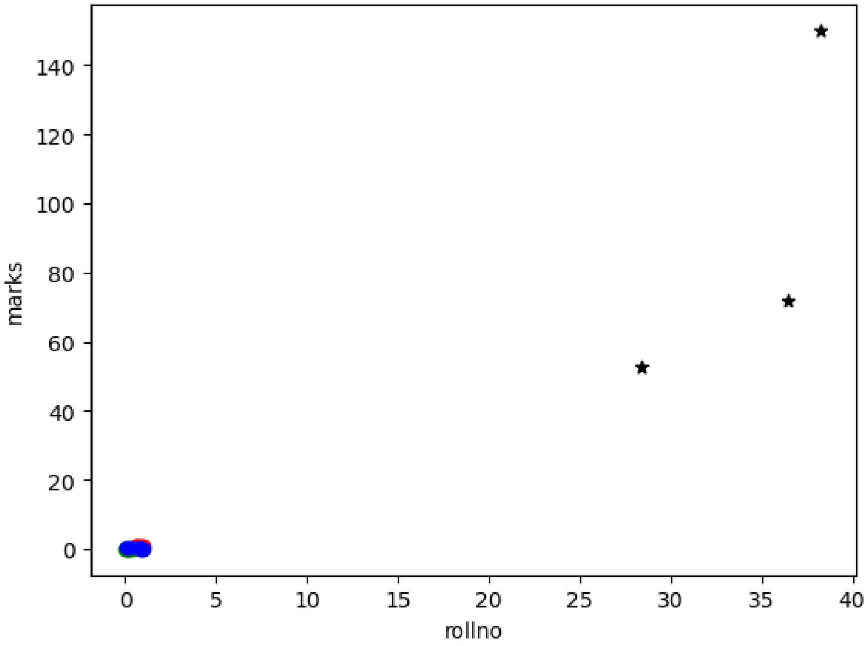
Out[14]:

```
array([[ 28.42857143,  52.42857143],
       [ 38.28571429, 150.        ],
       [ 36.5       ,  72.        ]])
```

In [15]:
```
plt.scatter(df1.rollno,df1['marks'],color='green')
plt.scatter(df2.rollno,df2['marks'],color='red')
plt.scatter(df3.rollno,df3['marks'],color='blue')

plt.scatter(km.cluster_centers_[:,0],km.cluster_centers_[:,1],color='black',marker='*')
plt.xlabel('rollno')
plt.ylabel('marks')
```

Out[15]:
```
Text(0, 0.5, 'marks')
```



In [ ]:

In [1]:
```
#KNN
import pandas as pd
import numpy as np
```

In [2]:
```
data=pd.read_csv('User_Data.csv')
```

In [4]:
```
x=data.iloc[:,[2,3]].values
y=data.iloc[:,4].values
```

In [5]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=2)
```

In [6]:
```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
xtrain=sc.fit_transform(x_train)
xtest=sc.transform(x_test)
```

In [8]:
```
from sklearn.neighbors import KNeighborsClassifier
clr=KNeighborsClassifier(n_neighbors=5)
clr.fit(xtrain,y_train)
```

Out[8]:
```
KNeighborsClassifier()
```

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In [9]:
```
y_pred=clr.predict(xtest)
y_pred
```

Out[9]:
```
array([0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0,
       0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0,
       0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 1,
       1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0], dtype=int64)
```

In [10]:
```
from sklearn.metrics import accuracy_score,confusion_matrix,classification_report
cm=confusion_matrix(y_test,y_pred)
cm
```

Out[10]:
```
array([[46,  2],
       [ 7, 25]], dtype=int64)
```

In [11]:
```
classification_report(y_test,y_pred)
```

Out[11]:
```
'              precision    recall  f1-score   support\n\n           0       0.87      0.96      0.91
48\n           1       0.93      0.78      0.85        32\n\n    accuracy                           0.89
80\n   macro avg       0.90      0.87      0.88        80\nweighted avg       0.89      0.89      0.89
80\n'
```

In [12]:
```
accuracy_score(y_test,y_pred)
```

Out[12]:
```
0.8875
```

In [ ]:
```
#Visualization_Not_Possible
```