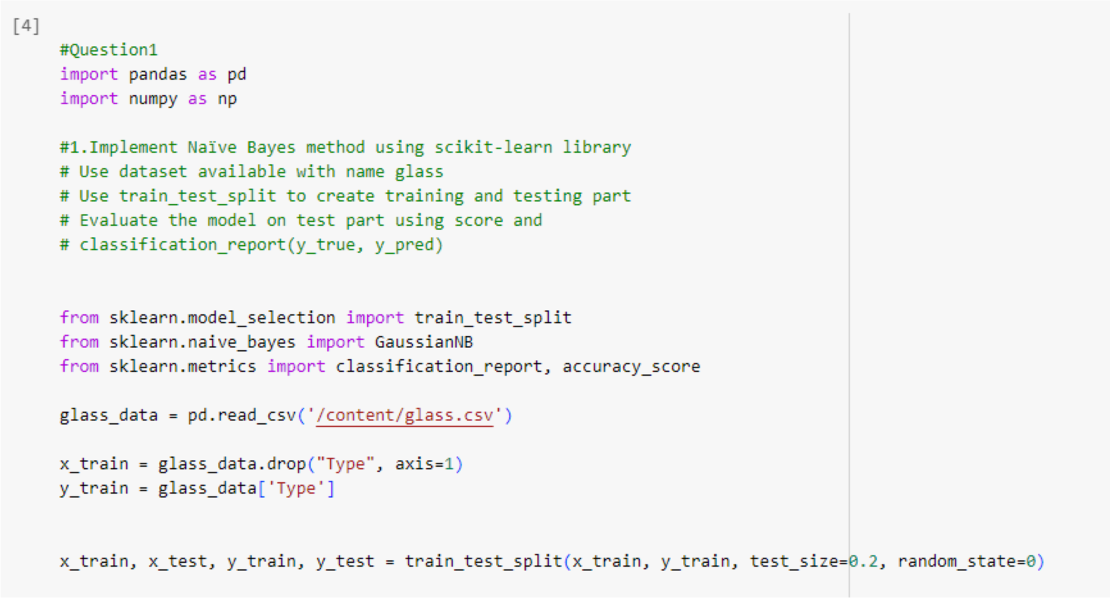
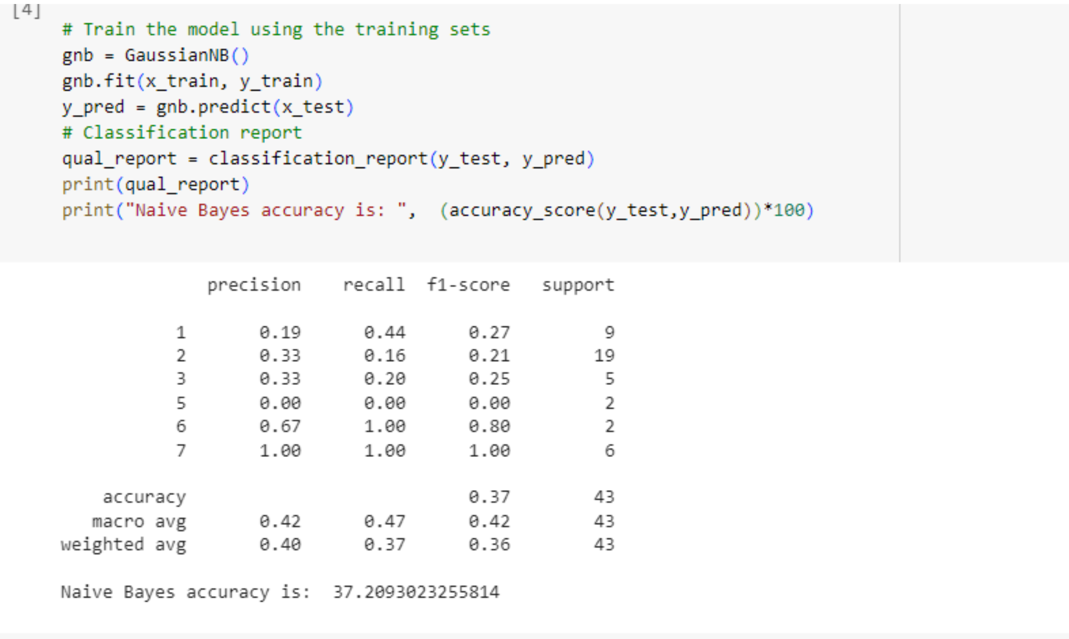
SAI LEELA.O

QUESTION:1



```
[4]
    #Question1
    import pandas as pd
    import numpy as np

    #1.Implement Naïve Bayes method using scikit-learn library
    # Use dataset available with name glass
    # Use train_test_split to create training and testing part
    # Evaluate the model on test part using score and
    # classification_report(y_true, y_pred)


    from sklearn.model_selection import train_test_split
    from sklearn.naive_bayes import GaussianNB
    from sklearn.metrics import classification_report, accuracy_score

    glass_data = pd.read_csv('/content/glass.csv')

    x_train = glass_data.drop("Type", axis=1)
    y_train = glass_data['Type']


    x_train, x_test, y_train, y_test = train_test_split(x_train, y_train, test_size=0.2, random_state=0)
```



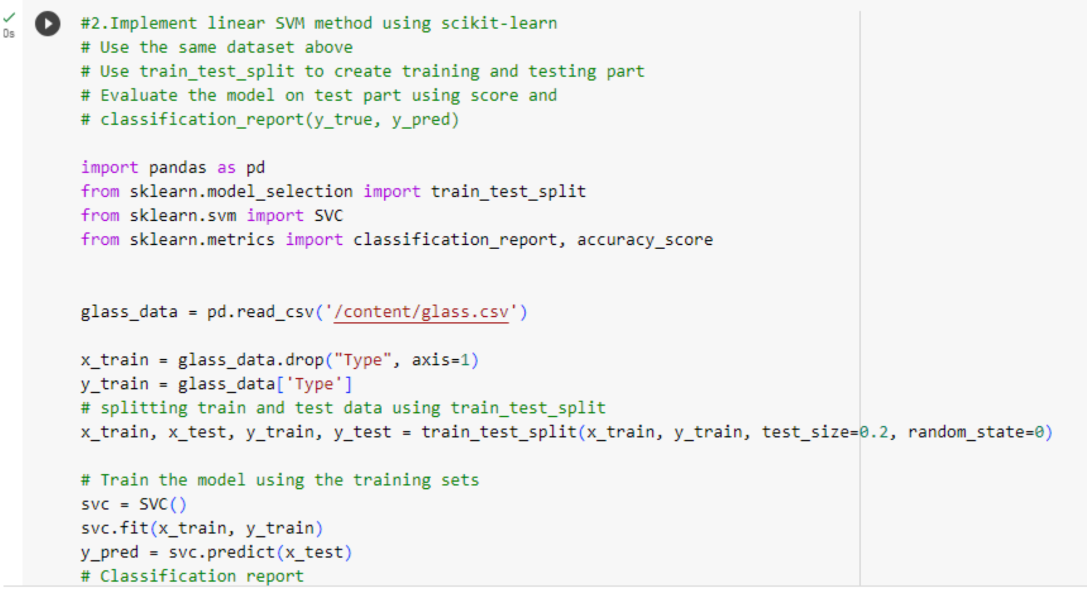
```
[4]
    # Train the model using the training sets
    gnb = GaussianNB()
    gnb.fit(x_train, y_train)
    y_pred = gnb.predict(x_test)
    # Classification report
    qual_report = classification_report(y_test, y_pred)
    print(qual_report)
    print("Naive Bayes accuracy is: ",  (accuracy_score(y_test,y_pred))*100)
```

```
              precision    recall  f1-score   support

           1       0.19      0.44      0.27         9
           2       0.33      0.16      0.21        19
           3       0.33      0.20      0.25         5
           5       0.00      0.00      0.00         2
           6       0.67      1.00      0.80         2
           7       1.00      1.00      1.00         6

    accuracy                           0.37        43
   macro avg       0.42      0.47      0.42        43
weighted avg       0.40      0.37      0.36        43

Naive Bayes accuracy is:  37.2093023255814
```

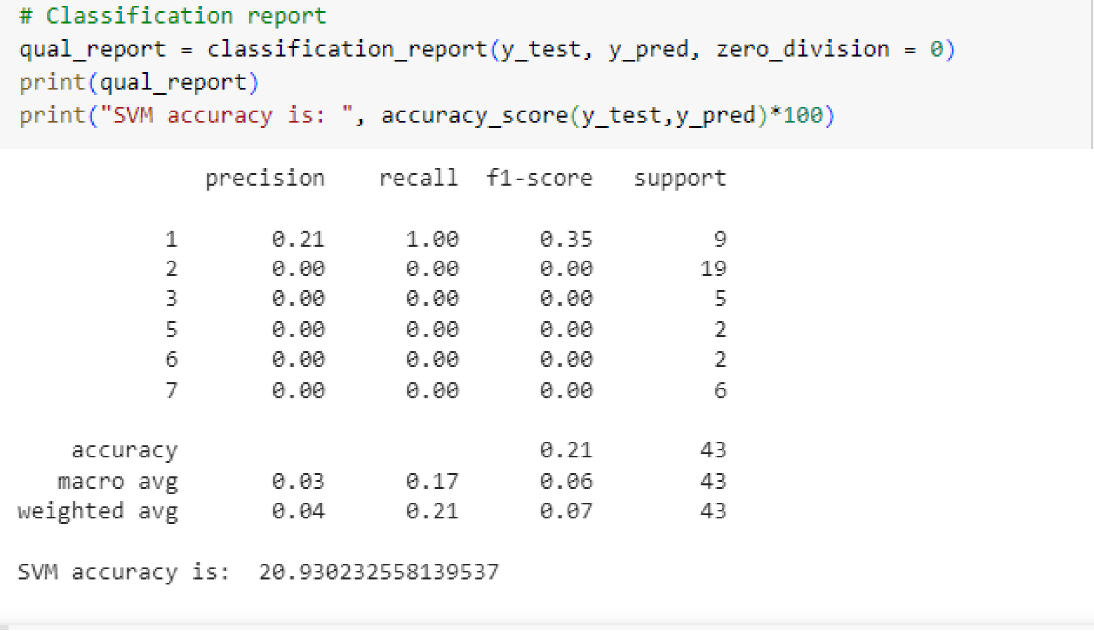
In this question, I have imported all the required methods from the sci-kit library and then imported the glass dataset and divided the data into train and test datasets using the type column and test_train_split.

I then trained the model using the classifier and then predicted the output and calculated the classification report on the test data. Lastly, I evaluated the accuracy score.

Question2



```
#2.Implement linear SVM method using scikit-learn
# Use the same dataset above
# Use train_test_split to create training and testing part
# Evaluate the model on test part using score and
# classification_report(y_true, y_pred)

import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import classification_report, accuracy_score


glass_data = pd.read_csv('/content/glass.csv')

x_train = glass_data.drop("Type", axis=1)
y_train = glass_data['Type']
# splitting train and test data using train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_train, y_train, test_size=0.2, random_state=0)

# Train the model using the training sets
svc = SVC()
svc.fit(x_train, y_train)
y_pred = svc.predict(x_test)
# Classification report
```



```
# Classification report
qual_report = classification_report(y_test, y_pred, zero_division = 0)
print(qual_report)
print("SVM accuracy is: ", accuracy_score(y_test,y_pred)*100)
```

```
              precision    recall  f1-score   support

           1       0.21      1.00      0.35         9
           2       0.00      0.00      0.00        19
           3       0.00      0.00      0.00         5
           5       0.00      0.00      0.00         2
           6       0.00      0.00      0.00         2
           7       0.00      0.00      0.00         6

    accuracy                           0.21        43
   macro avg       0.03      0.17      0.06        43
weighted avg       0.04      0.21      0.07        43

SVM accuracy is:  20.930232558139537
```

In this question, I have imported all the required methods from the sci-kit library and then imported the glass dataset and divided the data into train and test datasets using the type column and test_train_split.

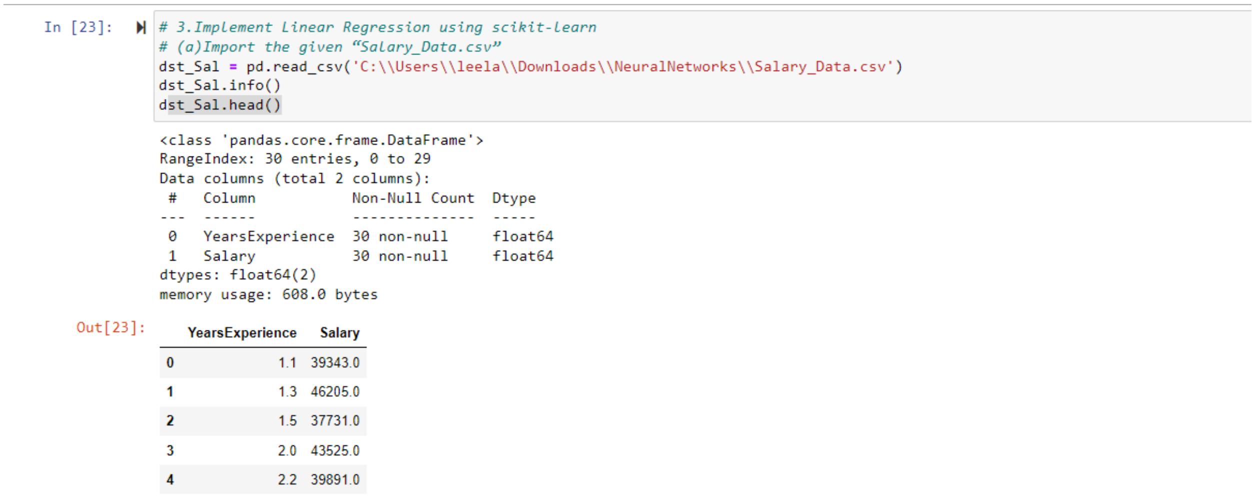
I then trained the model using the classifier and then predicted the output and calculated the classification report on the test data. Lastly, I evaluated the accuracy score.

Accuracy while using the Naive Bayes algorithm is 37.20%

Accuracy while using the linear SVM method is 20.93%

I got better accuracy while using the Naive Bayes algorithm. The assumption is that all the features are independent which makes this algorithm very fast compared to other complicated algorithms.

Question3

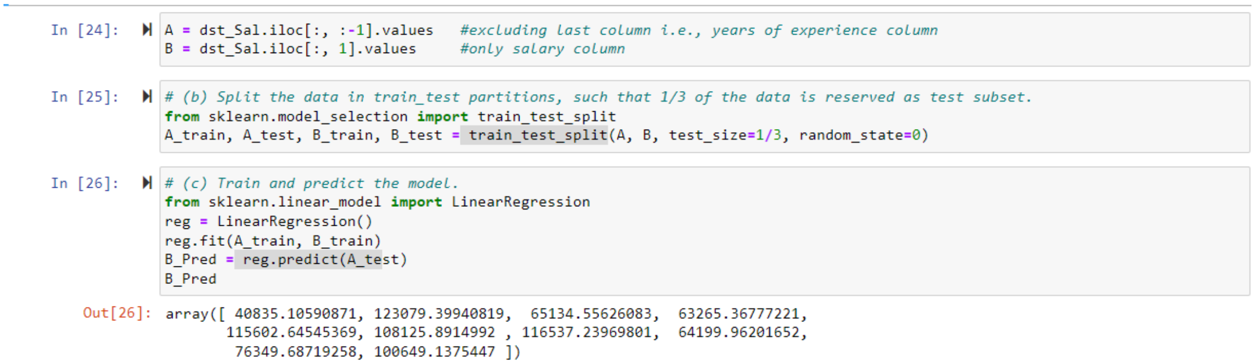


```
In [23]:  # 3.Implement Linear Regression using scikit-learn
          # (a)Import the given “Salary_Data.csv”
          dst_Sal = pd.read_csv('C:\\Users\\leela\\Downloads\\NeuralNetworks\\Salary_Data.csv')
          dst_Sal.info()
          dst_Sal.head()

          <class 'pandas.core.frame.DataFrame'>
          RangeIndex: 30 entries, 0 to 29
          Data columns (total 2 columns):
           #   Column           Non-Null Count  Dtype
          ---  ------           --------------  -----
           0   YearsExperience  30 non-null     float64
           1   Salary           30 non-null     float64
          dtypes: float64(2)
          memory usage: 608.0 bytes
```

Out[23]:

	YearsExperience	Salary
0	1.1	39343.0
1	1.3	46205.0
2	1.5	37731.0
3	2.0	43525.0
4	2.2	39891.0

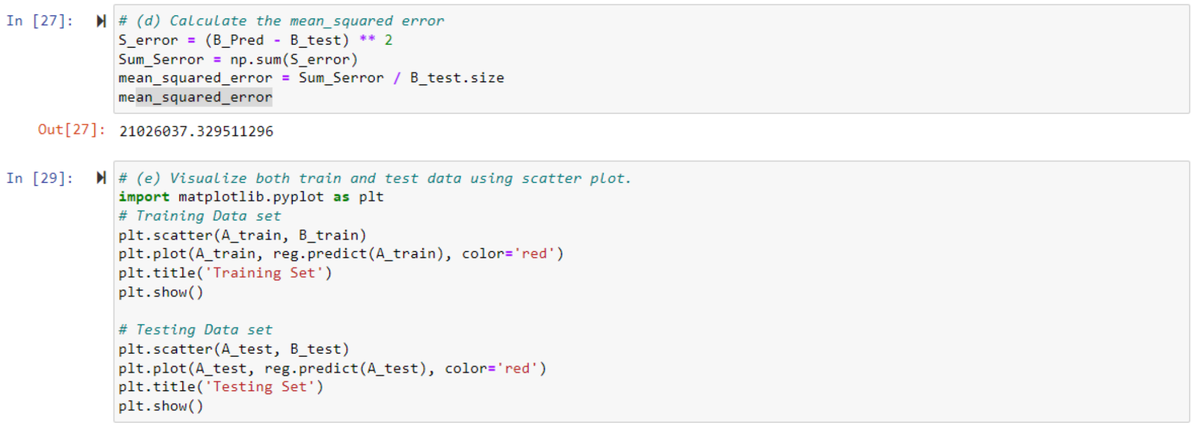
In this question, I have the csv file and printed the column headings along with the 1st 5 rows using head() method.



```
In [24]:  A = dst_Sal.iloc[:, :-1].values    #excluding last column i.e., years of experience column
          B = dst_Sal.iloc[:, 1].values      #only salary column

In [25]:  # (b) Split the data in train_test partitions, such that 1/3 of the data is reserved as test subset.
          from sklearn.model_selection import train_test_split
          A_train, A_test, B_train, B_test = train_test_split(A, B, test_size=1/3, random_state=0)

In [26]:  # (c) Train and predict the model.
          from sklearn.linear_model import LinearRegression
          reg = LinearRegression()
          reg.fit(A_train, B_train)
          B_Pred = reg.predict(A_test)
          B_Pred

Out[26]:  array([ 40835.10590871, 123079.39940819,  65134.55626083,  63265.36777221,
                 115602.64545369, 108125.8914992 , 116537.23969801,  64199.96201652,
                  76349.68719258, 100649.1375447 ])
```

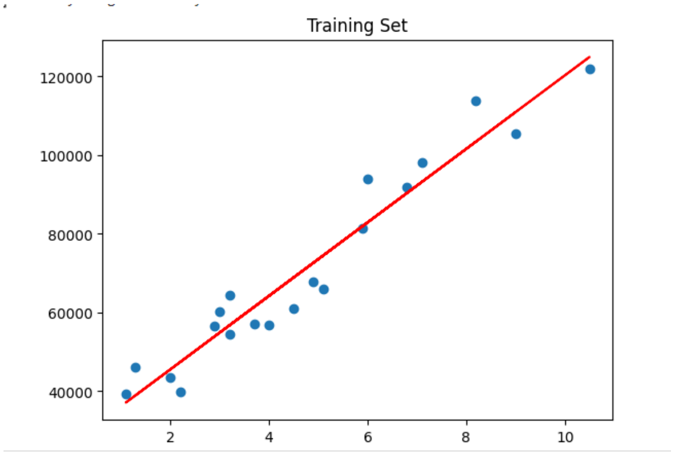
I have split the data into training and test , also 1/3rd of the data as test set.

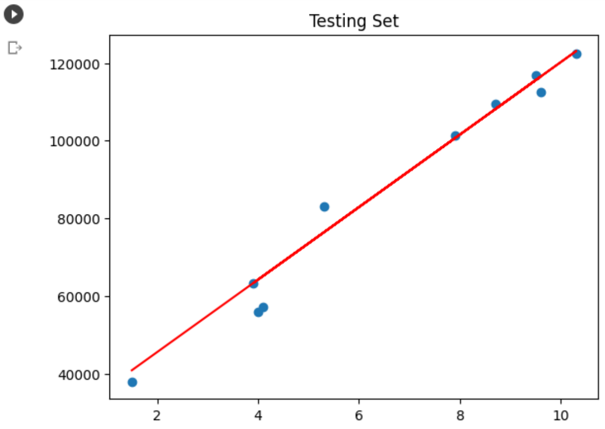
I have used linear Regression class, fit the data into train and test, also predicted the test data.



```
In [27]:  # (d) Calculate the mean_squared error
          S_error = (B_Pred - B_test) ** 2
          Sum_Serror = np.sum(S_error)
          mean_squared_error = Sum_Serror / B_test.size
          mean_squared_error

Out[27]:  21026037.329511296
```

```
In [29]:  # (e) Visualize both train and test data using scatter plot.
          import matplotlib.pyplot as plt
          # Training Data set
          plt.scatter(A_train, B_train)
          plt.plot(A_train, reg.predict(A_train), color='red')
          plt.title('Training Set')
          plt.show()

          # Testing Data set
          plt.scatter(A_test, B_test)
          plt.plot(A_test, reg.predict(A_test), color='red')
          plt.title('Testing Set')
          plt.show()
```





I have calculated the mean square error using the mean_squared_error() function.

I have plotted a scatter plot with the above title and x, y axis using training data sets.

My GitHub Link: https://github.com/SaiLeelaOtikundala/NEURAL1/tree/main