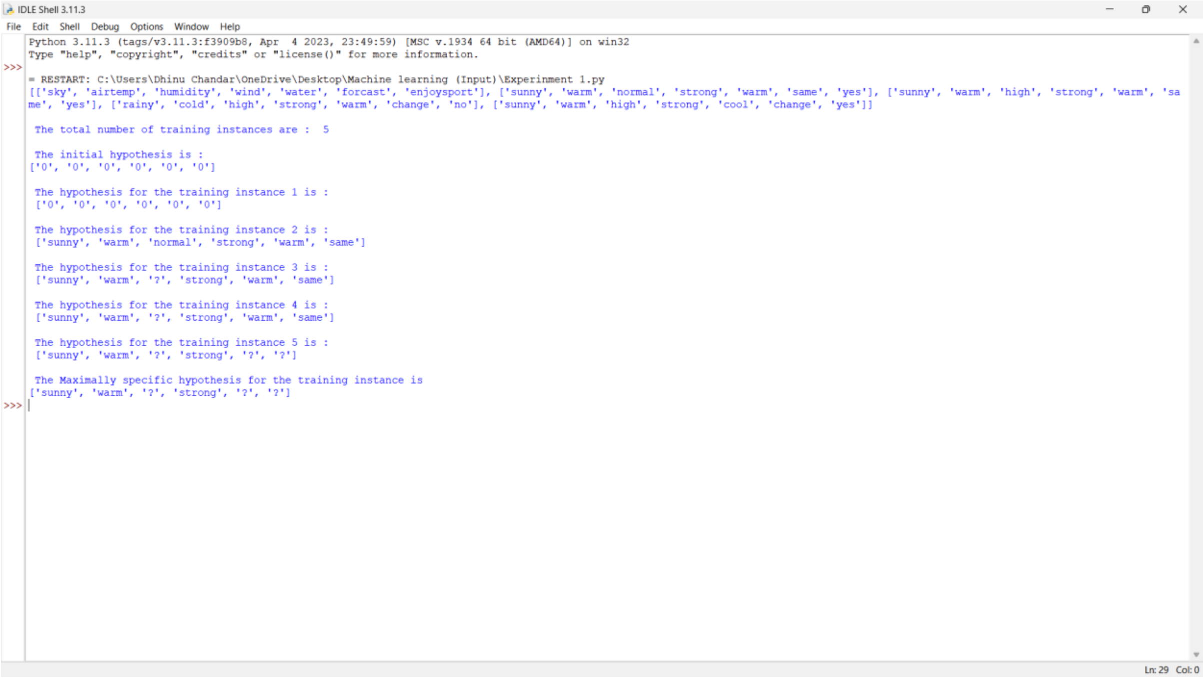
# ITA06-Machine Learning

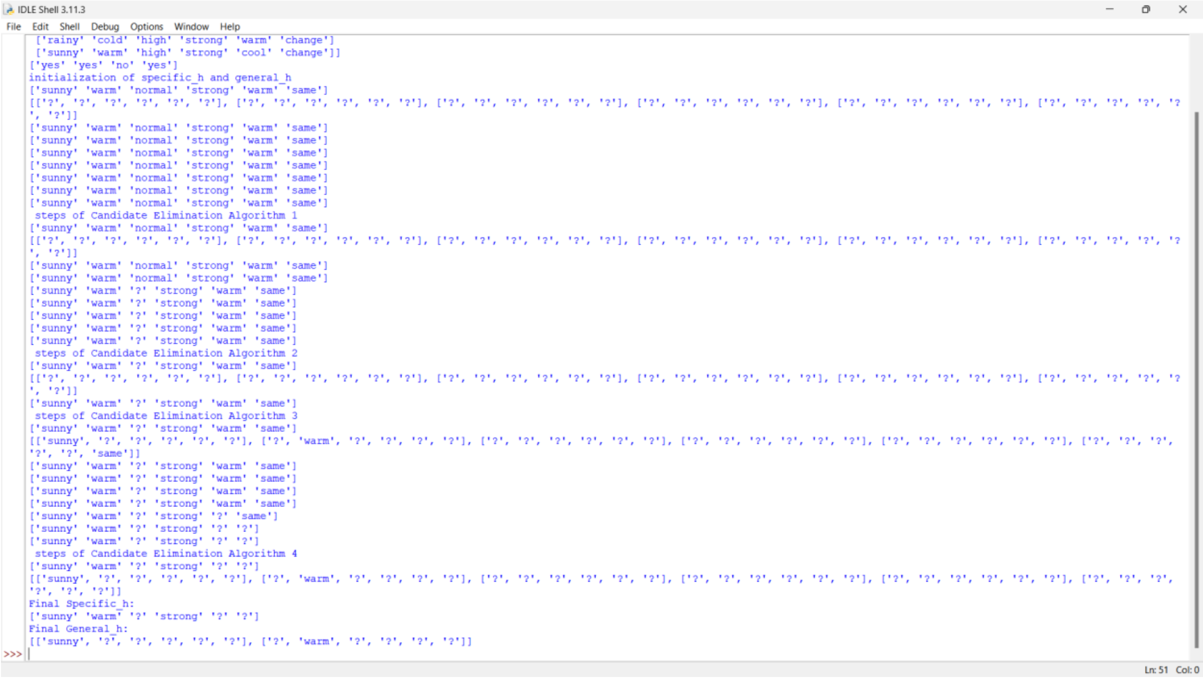
## EXPERINMENT (OUTPUT)

1.)



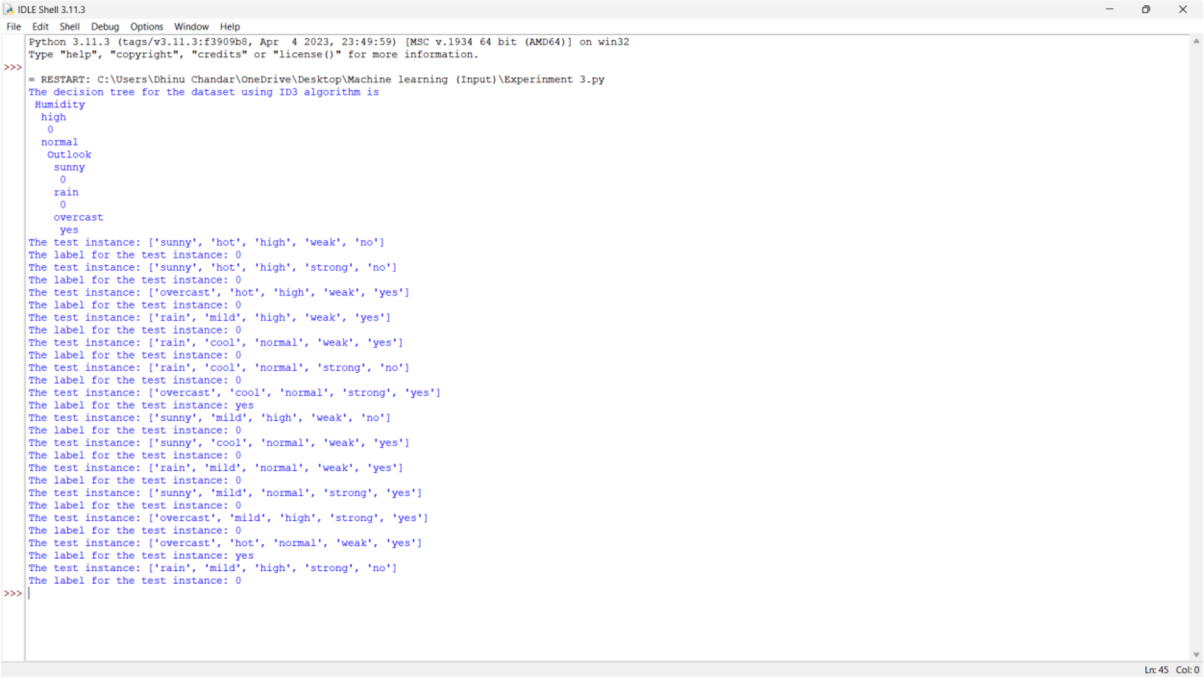
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 1.py
[['sky', 'airtemp', 'humidity', 'wind', 'water', 'forcast', 'enjoysport'], ['sunny', 'warm', 'normal', 'strong', 'warm', 'same', 'yes'], ['sunny', 'warm', 'high', 'strong', 'warm', 'sa
me', 'yes'], ['rainy', 'cold', 'high', 'strong', 'warm', 'change', 'no'], ['sunny', 'warm', 'high', 'strong', 'cool', 'change', 'yes']]

 The total number of training instances are :  5

 The initial hypothesis is :
['0', '0', '0', '0', '0', '0']

 The hypothesis for the training instance 1 is :
 ['0', '0', '0', '0', '0', '0']

 The hypothesis for the training instance 2 is :
 ['sunny', 'warm', 'normal', 'strong', 'warm', 'same']

 The hypothesis for the training instance 3 is :
 ['sunny', 'warm', '?', 'strong', 'warm', 'same']

 The hypothesis for the training instance 4 is :
 ['sunny', 'warm', '?', 'strong', 'warm', 'same']

 The hypothesis for the training instance 5 is :
 ['sunny', 'warm', '?', 'strong', '?', '?']

 The Maximally specific hypothesis for the training instance is
['sunny', 'warm', '?', 'strong', '?', '?']
>>> 
```

2. )



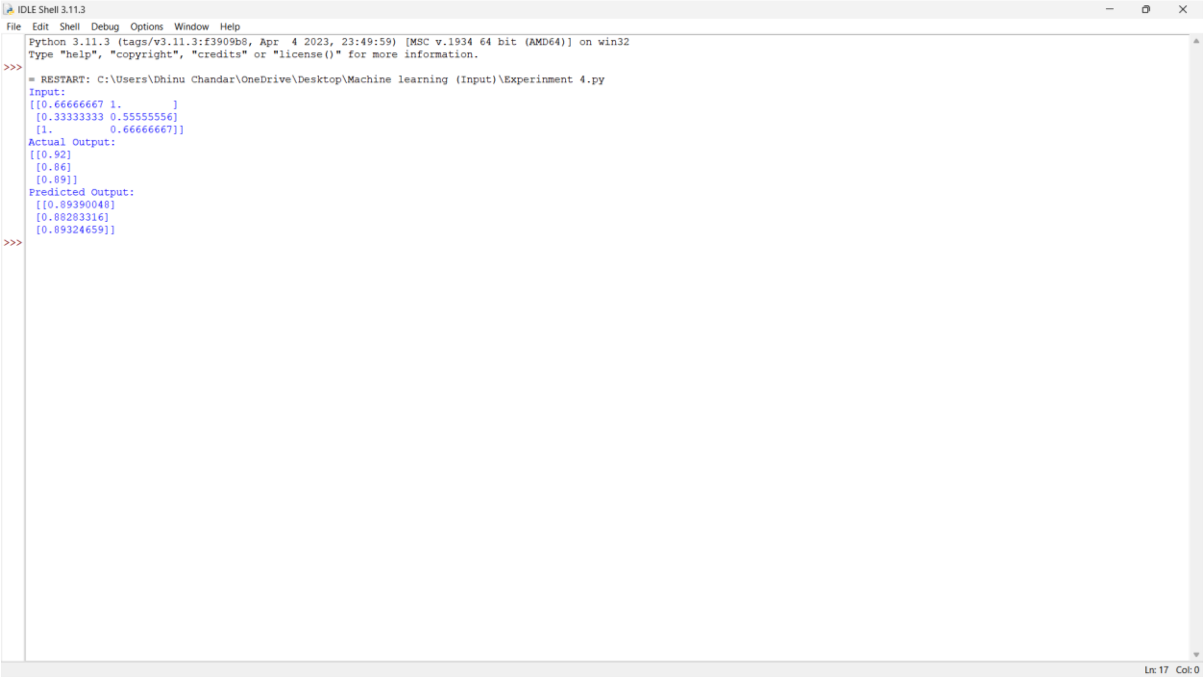
```
 ['rainy' 'cold' 'high' 'strong' 'warm' 'change']
 ['sunny' 'warm' 'high' 'strong' 'cool' 'change']]
['yes' 'yes' 'no' 'yes']
initialization of specific_h and general_h
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?
', '?']]
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
 steps of Candidate Elimination Algorithm 1
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?
', '?']]
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
 steps of Candidate Elimination Algorithm 2
['sunny' 'warm' '?' 'strong' 'warm' 'same']
[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?
', '?']]
['sunny' 'warm' '?' 'strong' 'warm' 'same']
 steps of Candidate Elimination Algorithm 3
['sunny' 'warm' '?' 'strong' 'warm' 'same']
[['sunny', '?', '?', '?', '?', '?'], ['?', 'warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?',
'?', '?', 'same']]
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' 'warm' 'same']
['sunny' 'warm' '?' 'strong' '?' 'same']
['sunny' 'warm' '?' 'strong' '?' '?']
['sunny' 'warm' '?' 'strong' '?' '?']
 steps of Candidate Elimination Algorithm 4
['sunny' 'warm' '?' 'strong' '?' '?']
[['sunny', '?', '?', '?', '?', '?'], ['?', 'warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?',
'?', '?', '?']]
Final Specific_h:
['sunny' 'warm' '?' 'strong' '?' '?']
Final General_h:
[['sunny', '?', '?', '?', '?', '?'], ['?', 'warm', '?', '?', '?', '?']]
>>> 
```

3. )



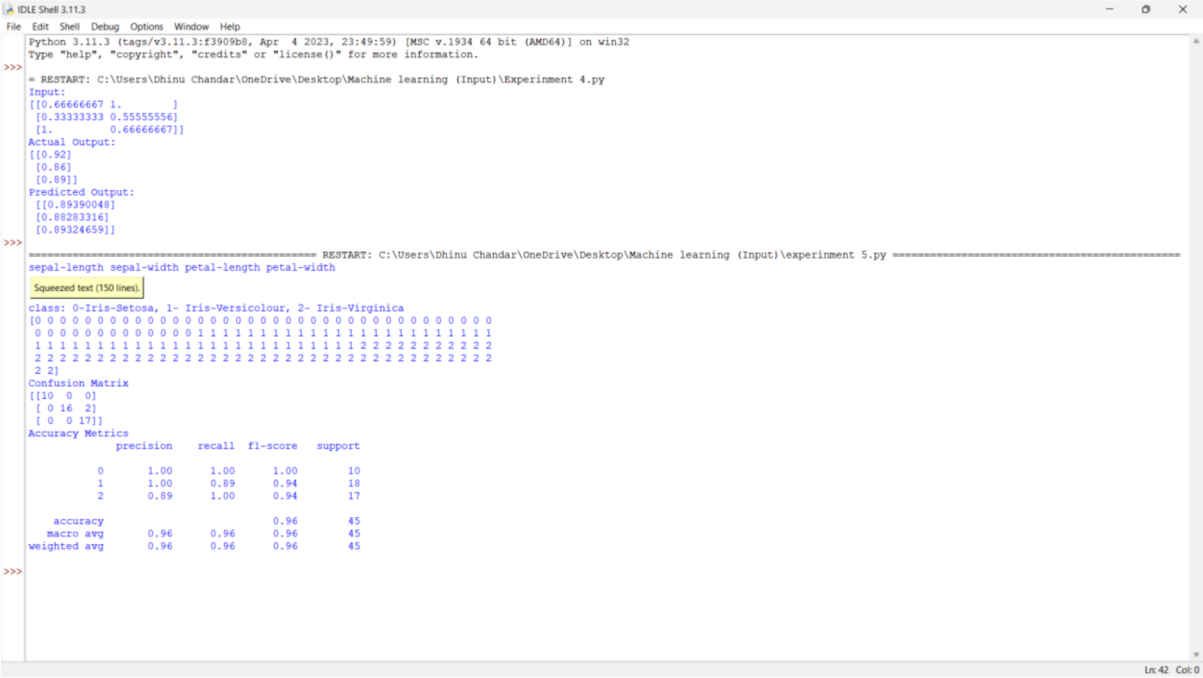
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 3.py
The decision tree for the dataset using ID3 algorithm is
 Humidity
  high
   0
  normal
   Outlook
    sunny
     0
    rain
     0
    overcast
     yes
The test instance: ['sunny', 'hot', 'high', 'weak', 'no']
The label for the test instance: 0
The test instance: ['sunny', 'hot', 'high', 'strong', 'no']
The label for the test instance: 0
The test instance: ['overcast', 'hot', 'high', 'weak', 'yes']
The label for the test instance: 0
The test instance: ['rain', 'mild', 'high', 'weak', 'yes']
The label for the test instance: 0
The test instance: ['rain', 'cool', 'normal', 'weak', 'yes']
The label for the test instance: 0
The test instance: ['rain', 'cool', 'normal', 'strong', 'no']
The label for the test instance: 0
The test instance: ['overcast', 'cool', 'normal', 'strong', 'yes']
The label for the test instance: yes
The test instance: ['sunny', 'mild', 'high', 'weak', 'no']
The label for the test instance: 0
The test instance: ['sunny', 'cool', 'normal', 'weak', 'yes']
The label for the test instance: 0
The test instance: ['rain', 'mild', 'normal', 'weak', 'yes']
The label for the test instance: 0
The test instance: ['sunny', 'mild', 'normal', 'strong', 'yes']
The label for the test instance: 0
The test instance: ['overcast', 'mild', 'high', 'strong', 'yes']
The label for the test instance: 0
The test instance: ['overcast', 'hot', 'normal', 'weak', 'yes']
The label for the test instance: yes
The test instance: ['rain', 'mild', 'high', 'strong', 'no']
The label for the test instance: 0
>>> 
```

4. )



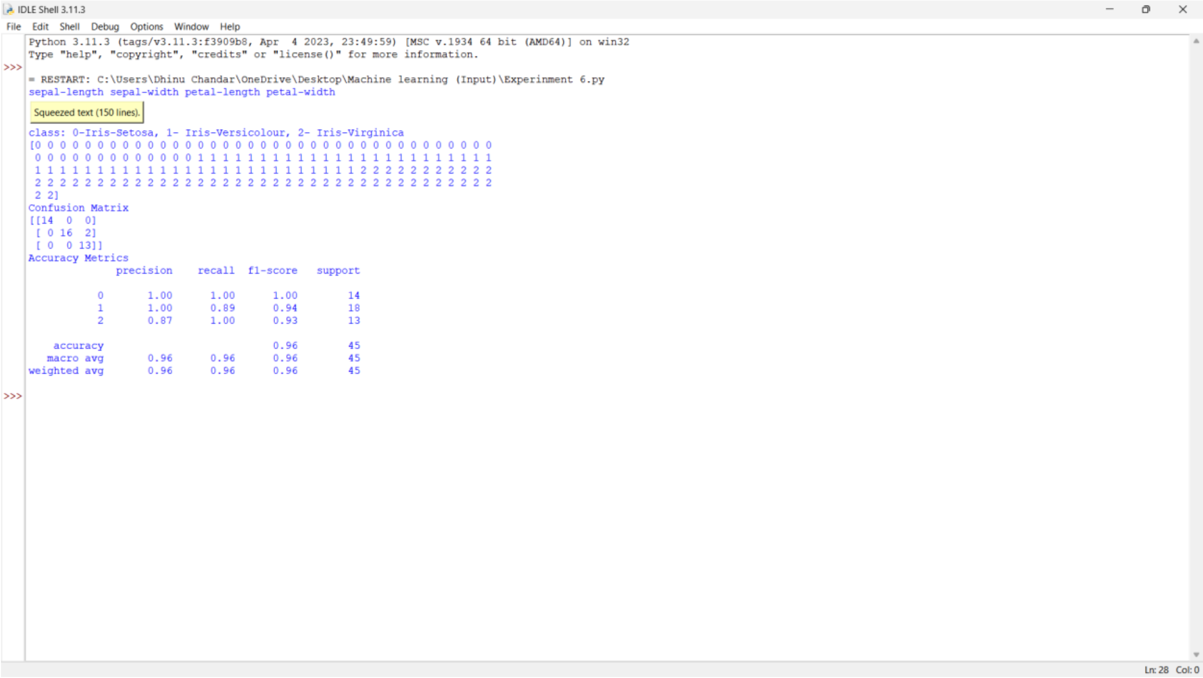
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 4.py
Input:
[[0.66666667 1.        ]
 [0.33333333 0.55555556]
 [1.         0.66666667]]
Actual Output:
[[0.92]
 [0.86]
 [0.89]]
Predicted Output:
 [[0.89390048]
 [0.88283316]
 [0.89324659]]
>>> 
```

5. )


IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help
Squeezed text (150 lines).
Ln: 42 Col: 0

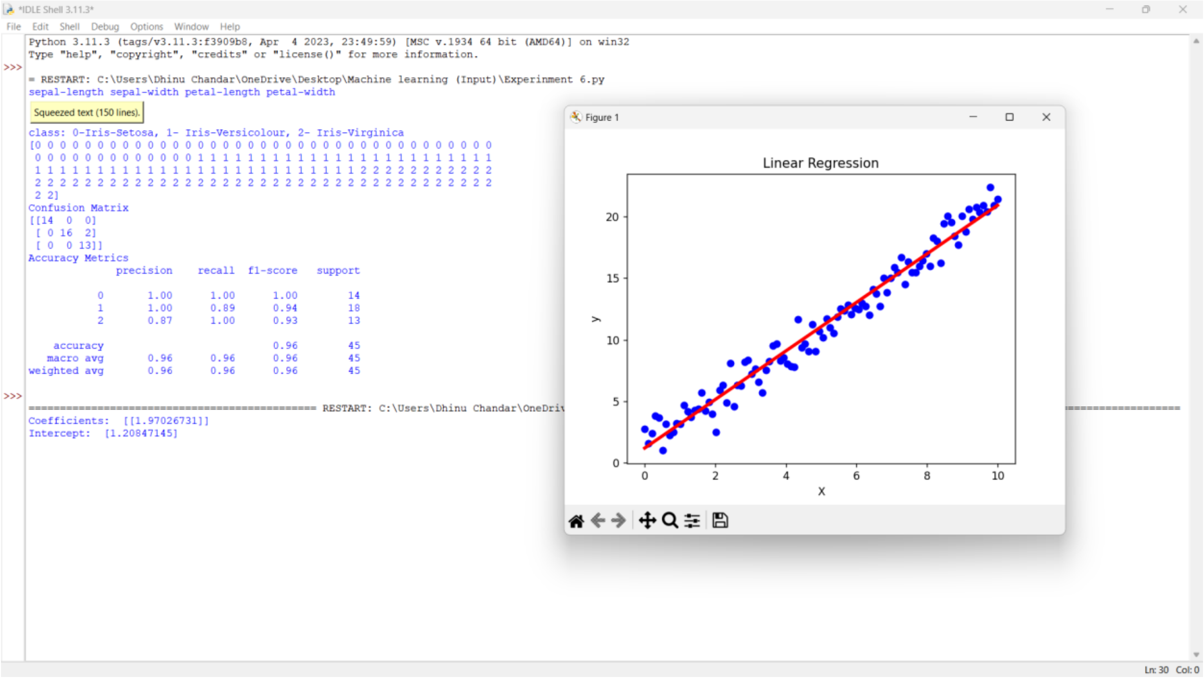
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 4.py
Input:
[[0.66666667 1.        ]
 [0.33333333 0.55555556]
 [1.         0.66666667]]
Actual Output:
[[0.92]
 [0.86]
 [0.89]]
Predicted Output:
 [[0.89390048]
 [0.88283316]
 [0.89324659]]
>>> 
============================================= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\experinment 5.py =============================================
sepal-length sepal-width petal-length petal-width
Squeezed text (150 lines).
class: 0-Iris-Setosa, 1- Iris-Versicolour, 2- Iris-Virginica
[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2
 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
 2 2]
Confusion Matrix
[[10  0  0]
 [ 0 16  2]
 [ 0  0 17]]
Accuracy Metrics
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        10
           1       1.00      0.89      0.94        18
           2       0.89      1.00      0.94        17

    accuracy                           0.96        45
   macro avg       0.96      0.96      0.96        45
weighted avg       0.96      0.96      0.96        45

>>> 
```

6. )


IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help
Squeezed text (150 lines).
Ln: 28 Col: 0

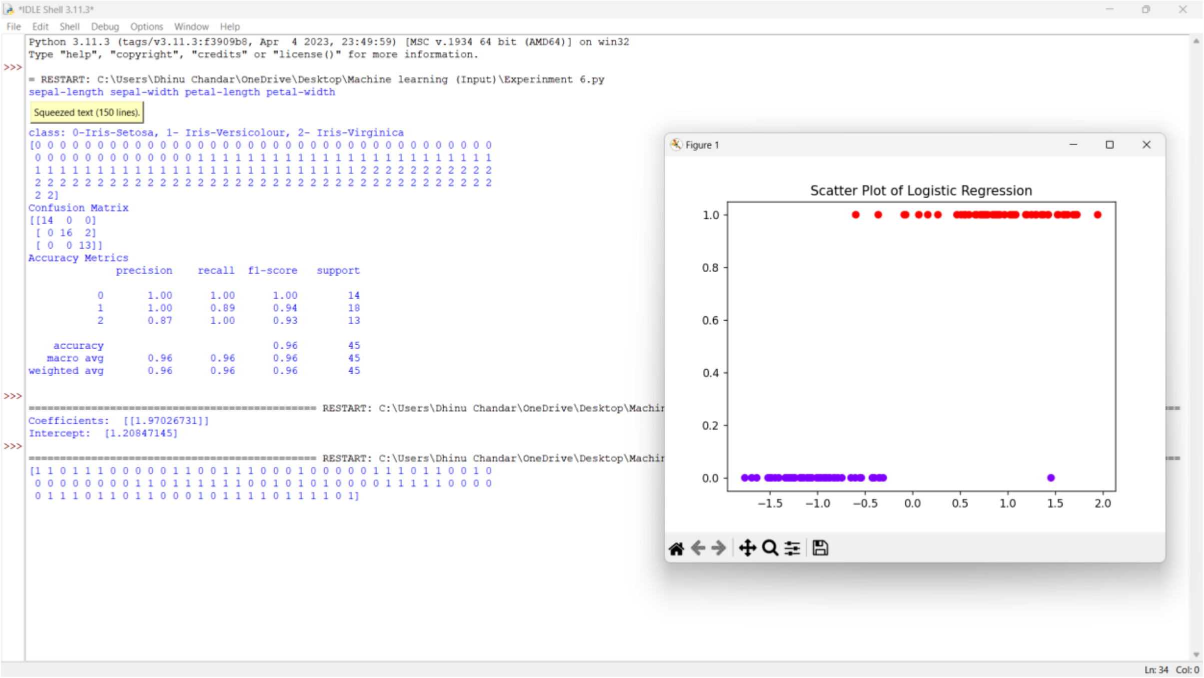
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 6.py
sepal-length sepal-width petal-length petal-width
Squeezed text (150 lines).
class: 0-Iris-Setosa, 1- Iris-Versicolour, 2- Iris-Virginica
[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2
 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
 2 2]
Confusion Matrix
[[14  0  0]
 [ 0 16  2]
 [ 0  0 13]]
Accuracy Metrics
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        14
           1       1.00      0.89      0.94        18
           2       0.87      1.00      0.93        13

    accuracy                           0.96        45
   macro avg       0.96      0.96      0.96        45
weighted avg       0.96      0.96      0.96        45

>>> 
```

7. )



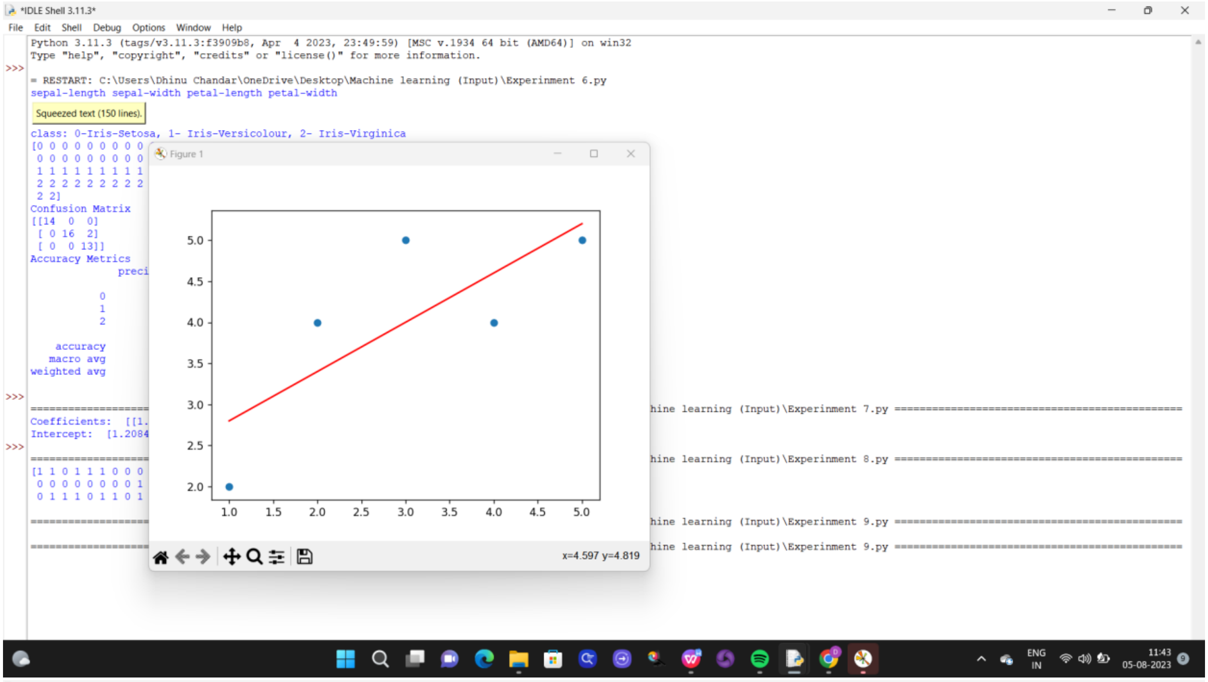
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 6.py
sepal-length sepal-width petal-length petal-width
Squeezed text (150 lines).
class: 0-Iris-Setosa, 1- Iris-Versicolour, 2- Iris-Virginica
[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2
 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
 2 2]
Confusion Matrix
[[14  0  0]
 [ 0 16  2]
 [ 0  0 13]]
Accuracy Metrics
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        14
           1       1.00      0.89      0.94        18
           2       0.87      1.00      0.93        13

    accuracy                           0.96        45
   macro avg       0.96      0.96      0.96        45
weighted avg       0.96      0.96      0.96        45

>>>
============================================== RESTART: C:\Users\Dhinu Chandar\OneDriv
Coefficients:  [[1.97026731]]
Intercept:  [1.20847145]
```

8. )

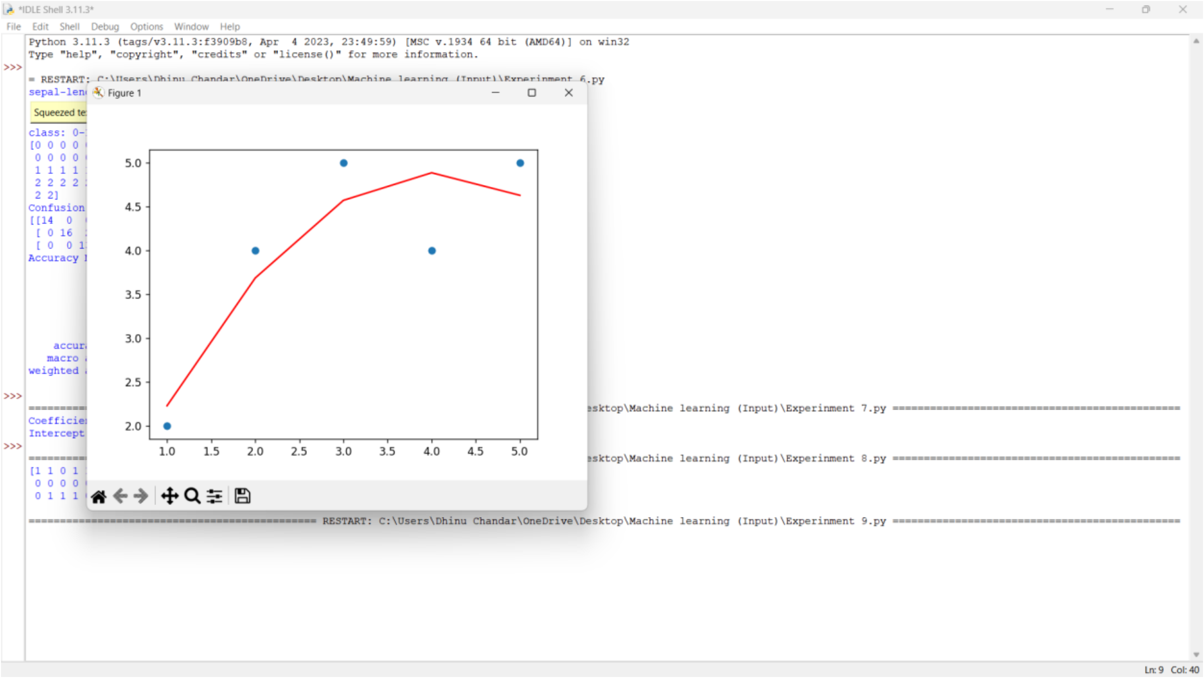

*IDLE Shell 3.11.3*
File Edit Shell Debug Options Window Help
Squeezed text (150 lines).
Figure 1
Scatter Plot of Logistic Regression
1.0
0.8
0.6
0.4
0.2
0.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
Ln: 34 Col: 0

```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 6.py
sepal-length sepal-width petal-length petal-width
Squeezed text (150 lines).
class: 0-Iris-Setosa, 1- Iris-Versicolour, 2- Iris-Virginica
[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2
 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
 2 2]
Confusion Matrix
[[14  0  0]
 [ 0 16  2]
 [ 0  0 13]]
Accuracy Metrics
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        14
           1       1.00      0.89      0.94        18
           2       0.87      1.00      0.93        13

    accuracy                           0.96        45
   macro avg       0.96      0.96      0.96        45
weighted avg       0.96      0.96      0.96        45

>>>
============================================== RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machir
Coefficients:  [[1.97026731]]
Intercept:  [1.20847145]
>>>
============================================== RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machir
[1 1 0 1 1 1 0 0 0 0 0 1 1 0 0 1 1 1 0 0 0 1 0 0 0 0 0 1 1 1 0 1 1 0 0 1 0
 0 0 0 0 0 0 0 0 1 1 0 1 1 1 1 1 1 0 0 1 0 1 0 1 0 0 0 0 1 1 1 1 1 0 0 0 0
 0 1 1 1 0 1 1 0 1 1 0 0 0 1 0 1 1 1 1 0 1 1 1 1 0 1]
```

9. )

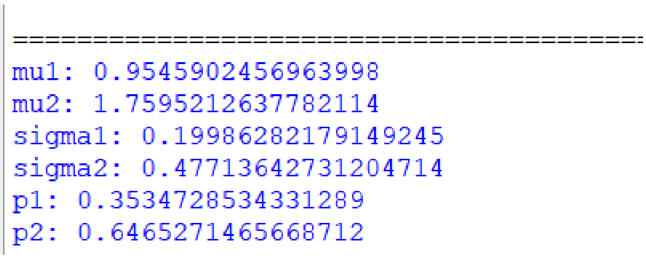


```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 6.py
sepal-length sepal-width petal-length petal-width
Squeezed text (150 lines).
class: 0-Iris-Setosa, 1- Iris-Versicolour, 2- Iris-Virginica
[0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0
 1 1 1 1 1 1 1 1 1
 2 2 2 2 2 2 2 2 2
 2 2]
Confusion Matrix
[[14  0  0]
 [ 0 16  2]
 [ 0  0 13]]
Accuracy Metrics
           preci

           0
           1
           2

    accuracy
   macro avg
weighted avg
>>>
===================                                    hine learning (Input)\Experinment 7.py ==============================================
Coefficients:  [[1.
Intercept:  [1.2084
>>>
===================                                    hine learning (Input)\Experinment 8.py ==============================================
[1 1 0 1 1 1 0 0 0
 0 0 0 0 0 0 0 0 1
 0 1 1 1 0 1 1 0 1

===================                                    hine learning (Input)\Experinment 9.py ==============================================

===================                                    hine learning (Input)\Experinment 9.py ==============================================
```



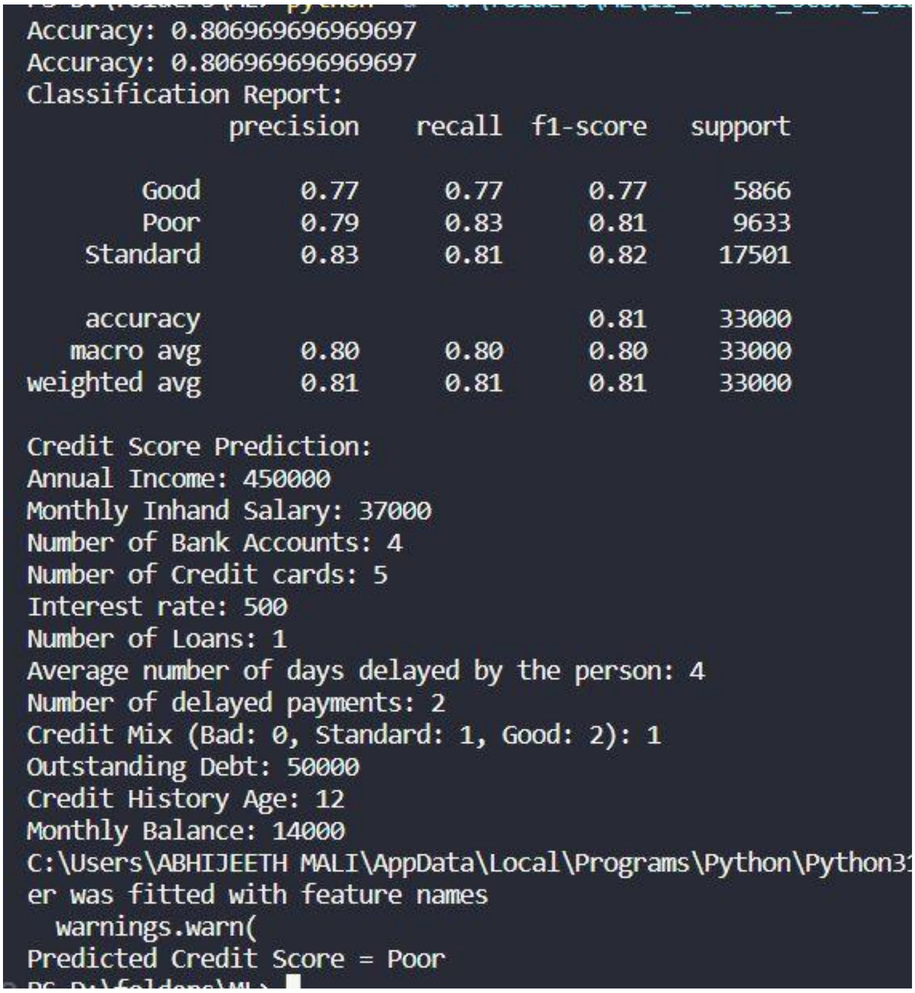
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 6.py
sepal-len
Squeezed te
class: 0-
[0 0 0 0
 0 0 0 0
 1 1 1 1
 2 2 2 2
 2 2]
Confusion
[[14  0
 [ 0 16
 [ 0  0 1
Accuracy 

    accur
   macro
weighted
>>>
=========                                    esktop\Machine learning (Input)\Experinment 7.py ==============================================
Coefficie
Intercept
>>>
=========                                    esktop\Machine learning (Input)\Experinment 8.py ==============================================
[1 1 0 1
 0 0 0 0
 0 1 1 1
============================================= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experinment 9.py ==============================================
```

10. )



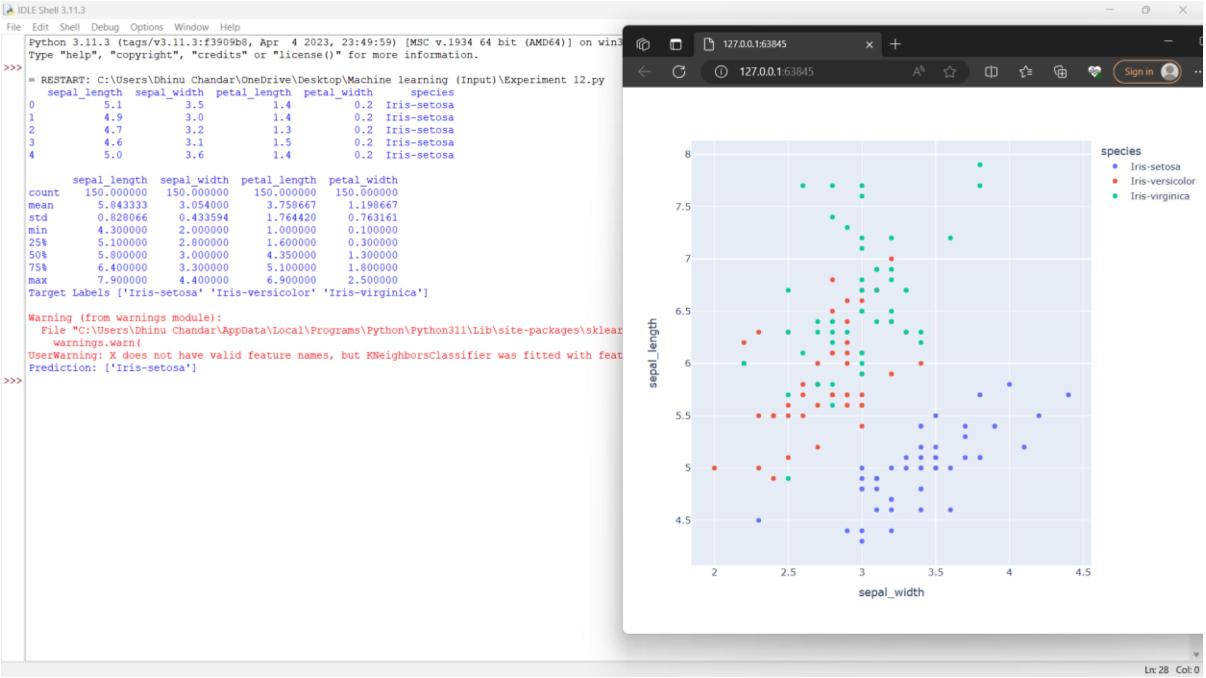
```
========================================
mu1: 0.9545902456963998
mu2: 1.7595212637782114
sigma1: 0.19986282179149245
sigma2: 0.47713642731204714
p1: 0.3534728534331289
p2: 0.6465271465668712
```

11. )



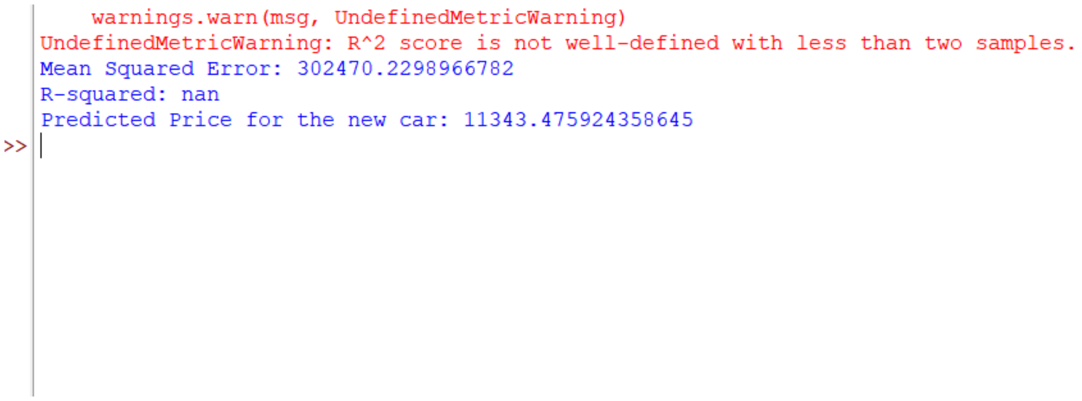
```
Accuracy: 0.806969696969697
Accuracy: 0.806969696969697
Classification Report:
              precision    recall  f1-score   support

        Good       0.77      0.77      0.77      5866
        Poor       0.79      0.83      0.81      9633
    Standard       0.83      0.81      0.82     17501

    accuracy                           0.81     33000
   macro avg       0.80      0.80      0.80     33000
weighted avg       0.81      0.81      0.81     33000

Credit Score Prediction:
Annual Income: 450000
Monthly Inhand Salary: 37000
Number of Bank Accounts: 4
Number of Credit cards: 5
Interest rate: 500
Number of Loans: 1
Average number of days delayed by the person: 4
Number of delayed payments: 2
Credit Mix (Bad: 0, Standard: 1, Good: 2): 1
Outstanding Debt: 50000
Credit History Age: 12
Monthly Balance: 14000
C:\Users\ABHIJEETH MALI\AppData\Local\Programs\Python\Python31
er was fitted with feature names
  warnings.warn(
Predicted Credit Score = Poor
PS D:\folders\ML> 
```

12. )



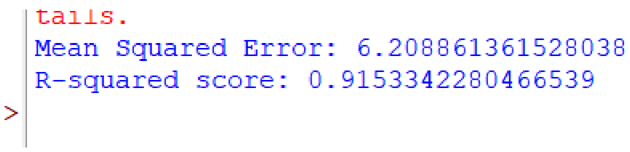
```
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win3
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experiment 12.py
   sepal_length  sepal_width  petal_length  petal_width      species
0           5.1          3.5           1.4          0.2  Iris-setosa
1           4.9          3.0           1.4          0.2  Iris-setosa
2           4.7          3.2           1.3          0.2  Iris-setosa
3           4.6          3.1           1.5          0.2  Iris-setosa
4           5.0          3.6           1.4          0.2  Iris-setosa

       sepal_length  sepal_width  petal_length  petal_width
count    150.000000   150.000000    150.000000   150.000000
mean       5.843333     3.054000      3.758667     1.198667
std        0.828066     0.433594      1.764420     0.763161
min        4.300000     2.000000      1.000000     0.100000
25%        5.100000     2.800000      1.600000     0.300000
50%        5.800000     3.000000      4.350000     1.300000
75%        6.400000     3.300000      5.100000     1.800000
max        7.900000     4.400000      6.900000     2.500000
Target Labels ['Iris-setosa' 'Iris-versicolor' 'Iris-virginica']

Warning (from warnings module):
  File "C:\Users\Dhinu Chandar\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklear
    warnings.warn(
UserWarning: X does not have valid feature names, but KNeighborsClassifier was fitted with feat
Prediction: ['Iris-setosa']
>>>
```

13. )



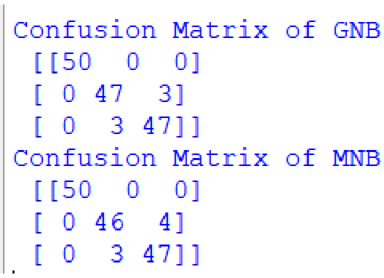
```
    warnings.warn(msg, UndefinedMetricWarning)
UndefinedMetricWarning: R^2 score is not well-defined with less than two samples.
Mean Squared Error: 302470.2298966782
R-squared: nan
Predicted Price for the new car: 11343.475924358645
>>
```

14. )



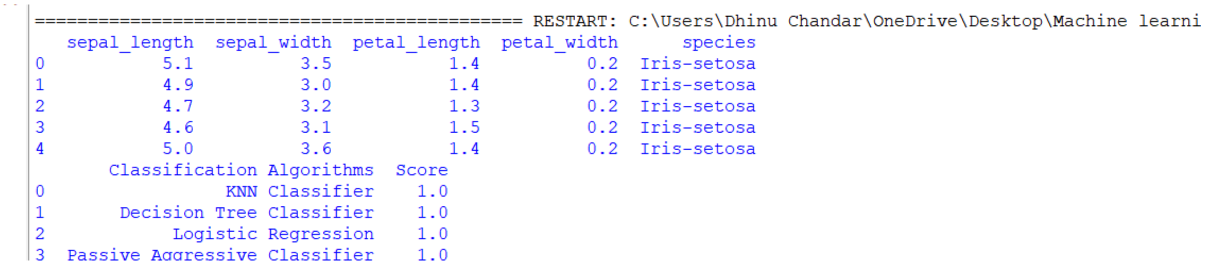
```
tails.
Mean Squared Error: 6.208861361528038
R-squared score: 0.9153342280466539
>
```

15. )



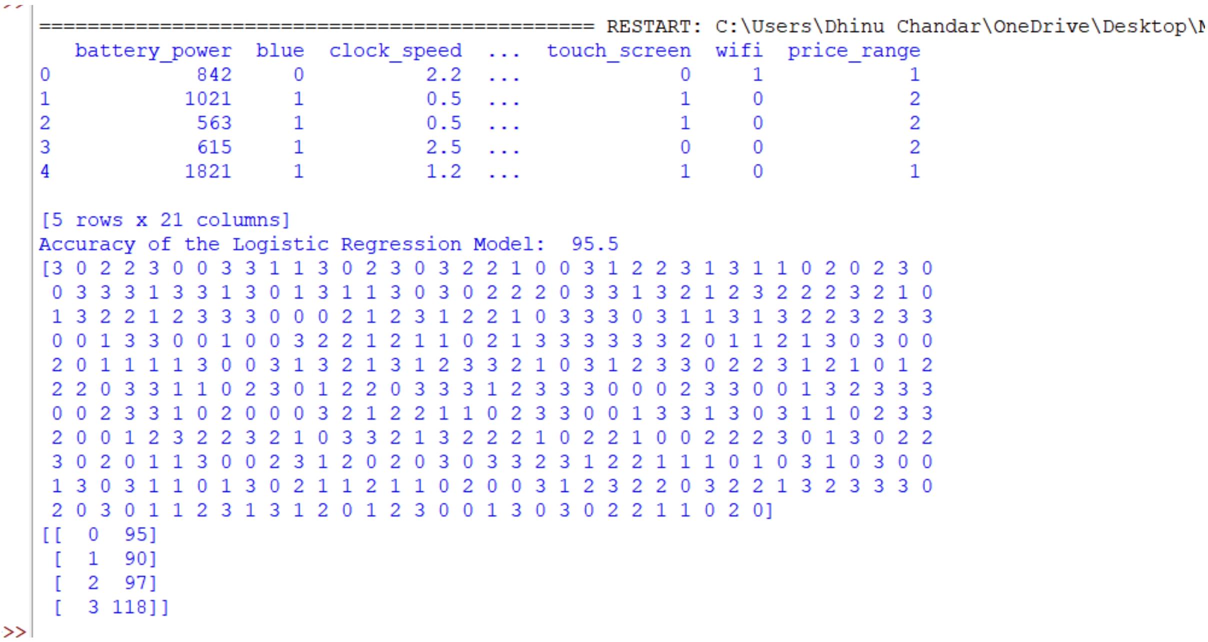
```
Confusion Matrix of GNB
 [[50  0  0]
 [ 0 47  3]
 [ 0  3 47]]
Confusion Matrix of MNB
 [[50  0  0]
 [ 0 46  4]
 [ 0  3 47]]
```

16. )



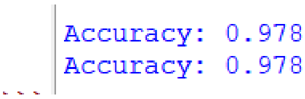
```
============================================== RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learni
   sepal_length  sepal_width  petal_length  petal_width      species
0           5.1          3.5           1.4          0.2  Iris-setosa
1           4.9          3.0           1.4          0.2  Iris-setosa
2           4.7          3.2           1.3          0.2  Iris-setosa
3           4.6          3.1           1.5          0.2  Iris-setosa
4           5.0          3.6           1.4          0.2  Iris-setosa
       Classification Algorithms  Score
0                 KNN Classifier    1.0
1       Decision Tree Classifier    1.0
2            Logistic Regression    1.0
3  Passive Aggressive Classifier    1.0
```

17. )



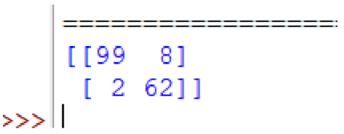
```
============================================== RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop\M
   battery_power  blue  clock_speed  ...  touch_screen  wifi  price_range
0            842     0          2.2  ...             0     1            1
1           1021     1          0.5  ...             1     0            2
2            563     1          0.5  ...             1     0            2
3            615     1          2.5  ...             0     0            2
4           1821     1          1.2  ...             1     0            1

[5 rows x 21 columns]
Accuracy of the Logistic Regression Model:  95.5
[3 0 2 2 3 0 0 3 3 1 1 3 0 2 3 0 3 2 2 1 0 0 3 1 2 2 3 1 3 1 1 0 2 0 2 3 0
 0 3 3 3 1 3 3 1 3 0 1 3 1 1 3 0 3 0 2 2 2 0 3 3 1 3 2 1 2 3 2 2 2 3 2 1 0
 1 3 2 2 1 2 3 3 3 0 0 0 2 1 2 3 1 2 2 1 0 3 3 3 0 3 1 1 3 1 3 2 2 3 2 3 3
 0 0 1 3 3 0 0 1 0 0 3 2 2 1 2 1 1 0 2 1 3 3 3 3 3 3 2 0 1 1 2 1 3 0 3 0 0
 2 0 1 1 1 1 3 0 0 3 1 3 2 1 3 1 2 3 3 2 1 0 3 1 2 3 3 0 2 2 3 1 2 1 0 1 2
 2 2 0 3 3 1 1 0 2 3 0 1 2 2 0 3 3 3 1 2 3 3 3 0 0 0 2 3 3 0 0 1 3 2 3 3 3
 0 0 2 3 3 1 0 2 0 0 0 3 2 1 2 2 1 1 0 2 3 3 0 0 1 3 3 1 3 0 3 1 1 0 2 3 3
 2 0 0 1 2 3 2 2 3 2 1 0 3 3 2 1 3 2 2 2 1 0 2 2 1 0 0 2 2 2 3 0 1 3 0 2 2
 3 0 2 0 1 1 3 0 0 2 3 1 2 0 2 0 3 0 3 3 2 3 1 2 2 1 1 1 0 1 0 3 1 0 3 0 0
 1 3 0 3 1 1 0 1 3 0 2 1 1 2 1 1 0 2 0 0 3 1 2 3 2 2 0 3 2 2 1 3 2 3 3 3 0
 2 0 3 0 1 1 2 3 1 3 1 2 0 1 2 3 0 0 1 3 0 3 0 2 2 1 1 0 2 0]
[[  0  95]
 [  1  90]
 [  2  97]
 [  3 118]]
>>
```

18. )



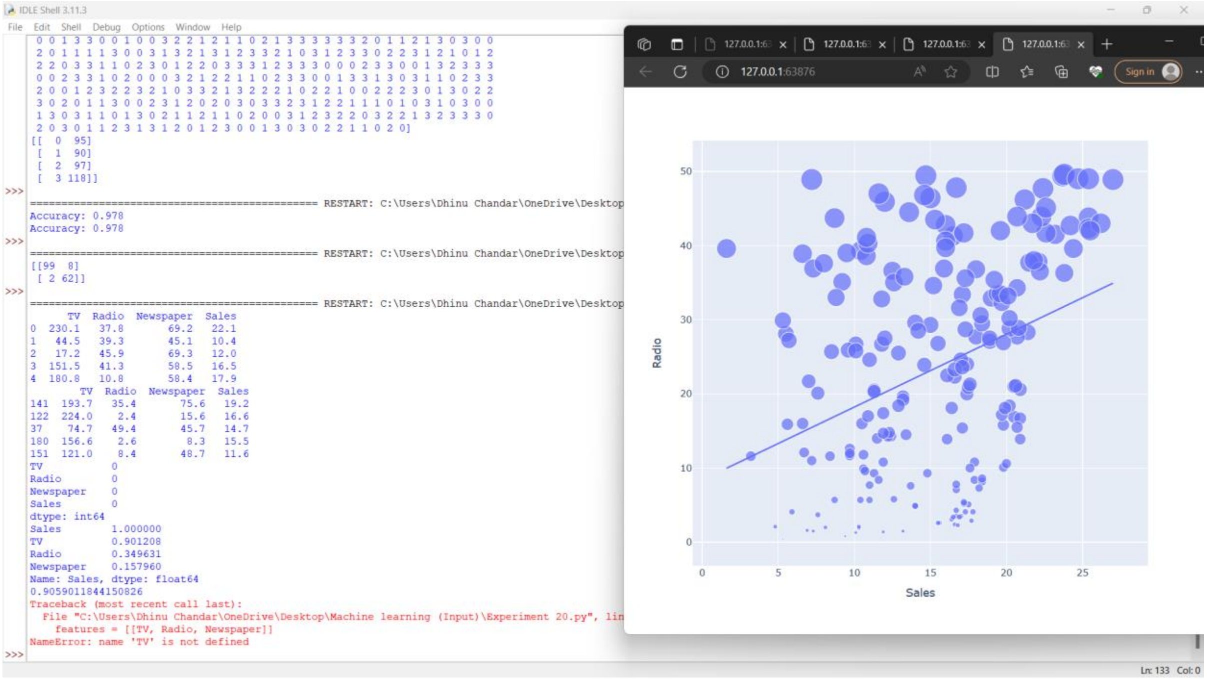
```
Accuracy: 0.978
Accuracy: 0.978
```

19. )



```
=================
[[99  8]
 [ 2 62]]
>>> |
```

20. )



```
 0 0 1 3 3 0 0 1 0 0 3 2 2 1 2 1 1 0 2 1 3 3 3 3 3 3 2 0 1 1 2 1 3 0 3 0 0
 2 0 1 1 1 1 3 0 0 3 1 3 2 1 3 1 2 3 3 2 1 0 3 1 2 3 3 0 2 2 3 1 2 1 0 1 2
 2 2 0 3 3 1 1 0 2 3 0 1 2 2 0 3 3 3 1 2 3 3 3 0 0 0 2 3 3 0 0 1 3 2 3 3 3
 0 0 2 3 3 1 0 2 0 0 0 3 2 1 2 2 1 1 0 2 3 3 0 0 1 3 3 1 3 0 3 1 1 0 2 3 3
 2 0 0 1 2 3 2 2 3 2 1 0 3 3 2 1 3 2 2 2 1 0 2 2 1 0 0 2 2 2 3 0 1 3 0 2 2
 3 0 2 0 1 1 3 0 0 2 3 1 2 0 2 0 3 0 3 3 2 3 1 2 2 1 1 1 0 1 0 3 1 0 3 0 0
 1 3 0 3 1 1 0 1 3 0 2 1 1 2 1 1 0 2 0 0 3 1 2 3 2 2 0 3 2 2 1 3 2 3 3 3 0
 2 0 3 0 1 1 2 3 1 3 1 2 0 1 2 3 0 0 1 3 0 3 0 2 2 1 1 0 2 0]
[[  0  95]
 [  1  90]
 [  2  97]
 [  3 118]]
>>>
================================================ RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop
Accuracy: 0.978
Accuracy: 0.978
>>>
================================================ RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop
[[99  8]
 [ 2 62]]
>>>
================================================ RESTART: C:\Users\Dhinu Chandar\OneDrive\Desktop
      TV  Radio  Newspaper  Sales
0  230.1   37.8       69.2   22.1
1   44.5   39.3       45.1   10.4
2   17.2   45.9       69.3   12.0
3  151.5   41.3       58.5   16.5
4  180.8   10.8       58.4   17.9
        TV  Radio  Newspaper  Sales
141  193.7   35.4       75.6   19.2
122  224.0    2.4       15.6   16.6
37    74.7   49.4       45.7   14.7
180  156.6    2.6        8.3   15.5
151  121.0    8.4       48.7   11.6
TV           0
Radio        0
Newspaper    0
Sales        0
dtype: int64
Sales        1.000000
TV           0.901208
Radio        0.349631
Newspaper    0.157960
Name: Sales, dtype: float64
0.9059011844150826
Traceback (most recent call last):
  File "C:\Users\Dhinu Chandar\OneDrive\Desktop\Machine learning (Input)\Experiment 20.py", lin
    features = [[TV, Radio, Newspaper]]
NameError: name 'TV' is not defined
>>>
```