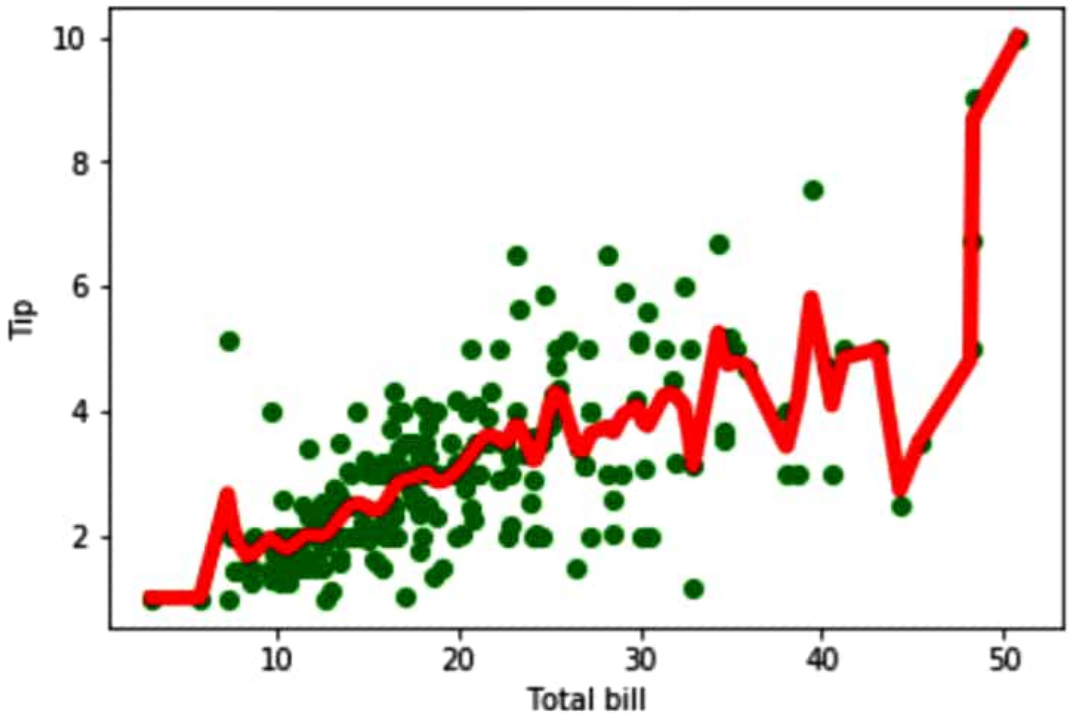
Dataset

Add Tips.csv (256 rows)

OUTPUT

(244, 2)



Dataset

iris_data.csv (149 Rows)

OUTPUT

Number of Training data: 101
Number of Test Data: 48

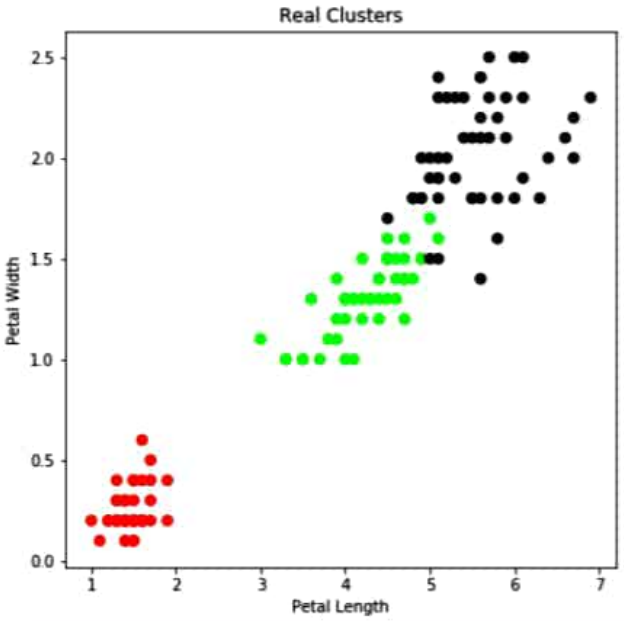
The predictions are:
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-setosa', actual='Iris-setosa'

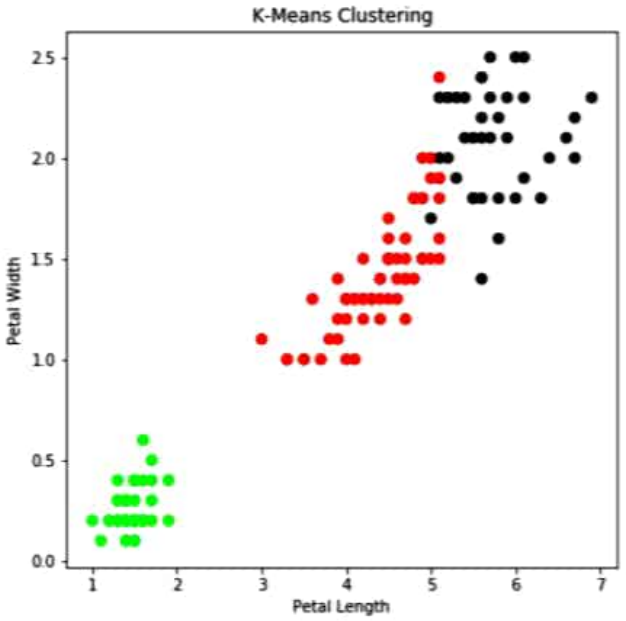
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-setosa', actual='Iris-setosa'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-virginica', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-versicolor', actual='Iris-versicolor'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'
predicted='Iris-virginica', actual='Iris-virginica'

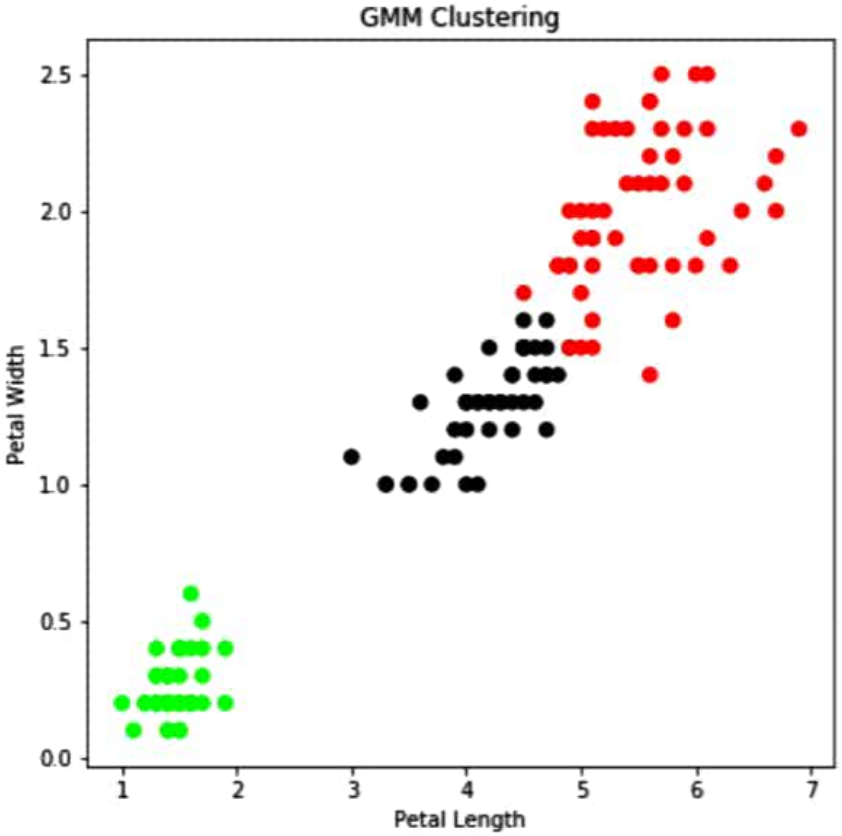
The Accuracy is: 97.91666666666666%

OUTPUT

```
Observation: The GMM using EM algorithm based clustering matched the true labels more closely than the Kmeans.
```







ConceptLearning.csv

1	1	1	1	5
1	1	1	2	5
2	1	1	2	10
3	2	1	1	10
3	3	2	1	10
3	3	2	2	5
2	3	2	2	10
1	2	1	1	5
1	3	2	1	10
3	2	2	2	10
1	2	2	2	10
2	2	1	2	10
2	1	2	1	10
3	2	1	2	5
1	2	1	2	5
1	2	1	2	5

OUTPUT

Naive Bayes Classifier for concept learning problem
Split 16 rows into
Number of Training data: 14
Number of Test Data: 2

The values assumed for the concept learning attributes are

OUTLOOK=> Sunny=1 Overcast=2 Rain=3
TEMPERATURE=> Hot=1 Mild=2 Cool=3
HUMIDITY=> High=1 Normal=2
WIND=> Weak=1 Strong=2
TARGET CONCEPT:PLAY TENNIS=> Yes=10 No=5

The Training set are:
[1.0, 1.0, 1.0, 1.0, 5.0]
[1.0, 1.0, 1.0, 2.0, 5.0]
[2.0, 1.0, 1.0, 2.0, 10.0]
[3.0, 2.0, 1.0, 1.0, 10.0]
[3.0, 3.0, 2.0, 1.0, 10.0]
[3.0, 3.0, 2.0, 2.0, 5.0]

[2.0, 3.0, 2.0, 2.0, 10.0]
[1.0, 2.0, 1.0, 1.0, 5.0]
[1.0, 3.0, 2.0, 1.0, 10.0]
[3.0, 2.0, 2.0, 2.0, 10.0]
[1.0, 2.0, 2.0, 2.0, 10.0]
[2.0, 2.0, 1.0, 2.0, 10.0]
[2.0, 1.0, 2.0, 1.0, 10.0]
[3.0, 2.0, 1.0, 2.0, 5.0]

The Test data set are:
[1.0, 2.0, 1.0, 2.0, 5.0]
[1.0, 2.0, 1.0, 2.0, 5.0]

Actual values: [5.0, 5.0]%

OUTPUT

2257
1502
1
Accuracy: 0.8348868175765646

	precision	recall	f1-score	support
alt.atheism	0.97	0.60	0.74	319
comp.graphics	0.96	0.89	0.92	389
sci.med	0.97	0.81	0.88	396
soc.religion.christian	0.65	0.99	0.78	398
avg / total	0.88	0.83	0.84	1502

confusion matrix is

[[192 2 6 119]
[2 347 4 36]
[2 11 322 61]
[2 2 1 393]]

Dataset

heart_disease_data.csv

SuperSeniorCitizen	Male	Yes	Medium	Sedetary	High	Yes
SuperSeniorCitizen	Female	Yes	Medium	Sedetary	High	Yes
SeniorCitizen	Male	No	High	Moderate	BorderLine	Yes
Teen	Male	Yes	Medium	Sedetary	Normal	No
Youth	Female	Yes	High	Athlete	Normal	No
MiddleAged	Male	Yes	Medium	Active	High	Yes
Teen	Male	Yes	High	Moderate	High	Yes
SuperSeniorCitizen	Male	Yes	Medium	Sedetary	High	Yes
Youth	Female	Yes	High	Athlete	Normal	No
SeniorCitizen	Female	No	High	Athlete	Normal	Yes
Teen	Female	No	Medium	Moderate	High	Yes
Teen	Male	Yes	Medium	Sedetary	Normal	No
MiddleAged	Female	No	High	Athlete	High	No
MiddleAged	Male	Yes	Medium	Active	High	Yes
Youth	Female	Yes	High	Athlete	BorderLine	No
SuperSeniorCitizen	Male	Yes	High	Athlete	Normal	Yes
SeniorCitizen	Female	No	Medium	Moderate	BorderLine	Yes
Youth	Female	Yes	Medium	Athlete	BorderLine	No
Teen	Male	Yes	Medium	Sedetary	Normal	No

OUTPUT

Enter Age: {'SuperSeniorCitizen': 0, 'SeniorCitizen': 1, 'MiddleAged': 2, 'Youth': 3, 'Teen': 4}4

Enter Gender: {'Male': 0, 'Female': 1}1

Enter FamilyHistory: {'Yes': 0, 'No': 1}0

Enter dietEnum: {'High': 0, 'Medium': 1, 'Low': 2}2

Enter LifeStyle: {'Athlete': 0, 'Active': 1, 'Moderate': 2, 'Sedetary': 3}3

Enter Cholesterol: {'High': 0, 'BorderLine': 1, 'Normal': 2}0
Probability(HeartDisease) = 0.5
Enter for Continue:0, Exit :1 1

OUTPUT

```
>epoch=0, lrate=0.500, error=6.350
>epoch=1, lrate=0.500, error=5.531
>epoch=2, lrate=0.500, error=5.221
>epoch=3, lrate=0.500, error=4.951
>epoch=4, lrate=0.500, error=4.519
>epoch=5, lrate=0.500, error=4.173
>epoch=6, lrate=0.500, error=3.835
>epoch=7, lrate=0.500, error=3.506
>epoch=8, lrate=0.500, error=3.192
>epoch=9, lrate=0.500, error=2.898
>epoch=10, lrate=0.500, error=2.626
>epoch=11, lrate=0.500, error=2.377
>epoch=12, lrate=0.500, error=2.153
>epoch=13, lrate=0.500, error=1.953
>epoch=14, lrate=0.500, error=1.774
>epoch=15, lrate=0.500, error=1.614
>epoch=16, lrate=0.500, error=1.472
>epoch=17, lrate=0.500, error=1.346
>epoch=18, lrate=0.500, error=1.233
>epoch=19, lrate=0.500, error=1.132
[{'weights': [-1.4688375095432327, 1.850887325439514, 1.0858178629550297], 'output':
0.029980305604426185, 'delta': -0.0059546604162323625}, {'weights': [0.37711098142462157,
-0.0625909894552989, 0.2765123702642716], 'output': 0.9456229000211323, 'delta':
0.0026279652850863837}]
[{'weights': [2.515394649397849, -0.3391927502445985, -0.9671565426390275], 'output':
0.23648794202357587, 'delta': -0.04270059278364587}, {'weights': [-2.5584149848484263,
1.0036422106209202, 0.42383086467582715], 'output': 0.7790535202438367, 'delta':
0.03803132596437354}]
```

Dataset

tennis.csv

Outlook	Temperature	Humidity	Windy	PlayTennis
Sunny	Hot	High	Weak	No
Sunny	Hot	High	Strong	No
Overcast	Hot	High	Weak	Yes
Rainy	Mild	High	Weak	Yes
Rainy	Cool	Normal	Weak	Yes
Rainy	Cool	Normal	Strong	No
Overcast	Cool	Normal	Strong	Yes
Sunny	Mild	High	Weak	No
Sunny	Cool	Normal	Weak	Yes
Rainy	Mild	Normal	Weak	Yes
Sunny	Mild	Normal	Strong	Yes
Overcast	Mild	High	Strong	Yes
Overcast	Hot	Normal	Weak	Yes
Rainy	Mild	High	Strong	No

OUTPUT

```
Entropy = 0.9402859586706311
Entropy = 0.0
Entropy = 0.9709505944546686
Entropy = 0.9709505944546686
Entropy = 0.9402859586706311
Entropy = 0.8112781244591328
Entropy = 1.0
Entropy = 0.9182958340544896
Entropy = 0.9402859586706311
Entropy = 0.9852281360342515
Entropy = 0.5916727785823275
Entropy = 0.9402859586706311
Entropy = 1.0
Entropy = 0.8112781244591328
Entropy = 0.9709505944546686
Entropy = 1.0
Entropy = 0.9182958340544896
Entropy = 0.9709505944546686
Entropy = 1.0
Entropy = 0.9182958340544896
Entropy = 0.9709505944546686
Entropy = 0.0
Entropy = 0.0
Entropy = 0.9709505944546686
Entropy = 0.0
Entropy = 0.0
Entropy = 1.0
Entropy = 0.9709505944546686
Entropy = 0.0
Entropy = 0.0
Entropy = 0.9709505944546686
Entropy = 1.0
Entropy = 0.9182958340544896
 Display Tree {'Outlook': {'Overcast': 'Yes', 'Rainy': {'Wind': {'Strong': 'No', 'Weak':
'Yes'}}, 'Sunny': {'Humidity': {'High': 'No', 'Normal': 'Yes'}}}}
len= 14
The prediction accuracy is:  100.0 %
```

Dataset

Training.csv

Sky	Airtemp	Humidity	Wind	Water	Forecast	WaterSport
Sunny	Warm	Normal	Strong	Warm	Same	Yes
Sunny	Warm	High	Strong	Warm	Same	Yes
Cloudy	Cold	High	Strong	Warm	Change	No
Sunny	Warm	High	Strong	Cool	Change	Yes

OUTPUT

initialization of specific_h and general_h

['Sunny' 'Warm' 'Normal' 'Strong' 'Warm' 'Same']
[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]

steps of Candidate Elimination Algorithm 1
Specific_h 1

['Sunny' 'Warm' 'Normal' 'Strong' 'Warm' 'Same']
general_h 1

[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]
steps of Candidate Elimination Algorithm 2
Specific_h 2

['Sunny' 'Warm' '?' 'Strong' 'Warm' 'Same']
general_h 2

[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]
steps of Candidate Elimination Algorithm 3
Specific_h 3

['Sunny' 'Warm' '?' 'Strong' 'Warm' 'Same']
general_h 3

[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', 'Same']]
steps of Candidate Elimination Algorithm 4
Specific_h 4

['Sunny' 'Warm' '?' 'Strong' '?' '?']
general_h 4

[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]

Final Specific_h:
['Sunny' 'Warm' '?' 'Strong' '?' '?']

Final General_h:
[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?']]

Dataset

Weather.csv

Sunny	Warm	Normal	Strong	Warm	Same	Yes
Sunny	Warm	High	Strong	Warm	Same	Yes
Rainy	Cold	High	Strong	Warm	Change	No
Sunny	Warm	High	Strong	Cool	Change	Yes

OUTPUT

Attributes = ['Sky', 'Temp', 'Humidity', 'Wind', 'Water', 'Forecast']

[['Sunny ', 'Warm', 'Normal', 'Strong ', 'Warm', 'Same', 'Yes'],
['Sunny ', 'Warm', 'High', 'Strong ', 'Warm', 'Same', 'Yes'],
['Rainy', 'Cold', 'High', 'Strong ', 'Warm', 'Change', 'No'],
['Sunny ', 'Warm', 'High', 'Strong ', 'Cool', 'Change', 'Yes']]

Intial Hypothesis
['0', '0', '0', '0', '0', '0']

The Hypothesis are
1 = ['Sunny ', 'Warm', 'Normal', 'Strong ', 'Warm', 'Same']
2 = ['Sunny ', 'Warm', '?', 'Strong ', 'Warm', 'Same']
3 = ['Sunny ', 'Warm', '?', 'Strong ', 'Warm', 'Same']
4 = ['Sunny ', 'Warm', '?', 'Strong ', '?', '?']

Final Hypothesis
['Sunny ', 'Warm', '?', 'Strong ', '?', '?']