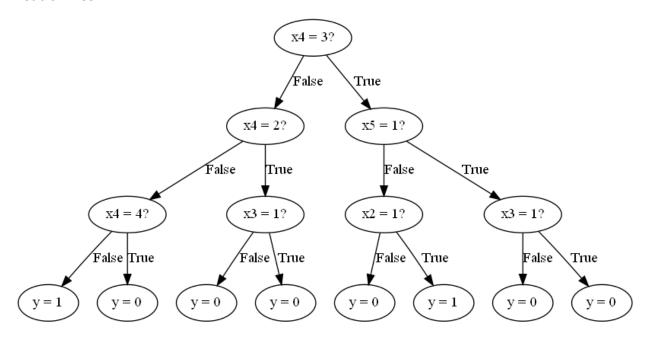
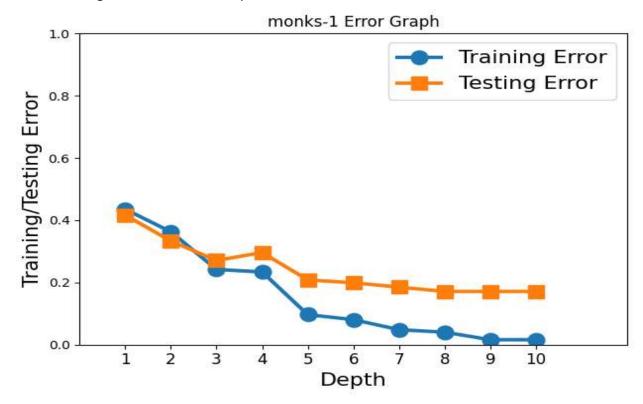
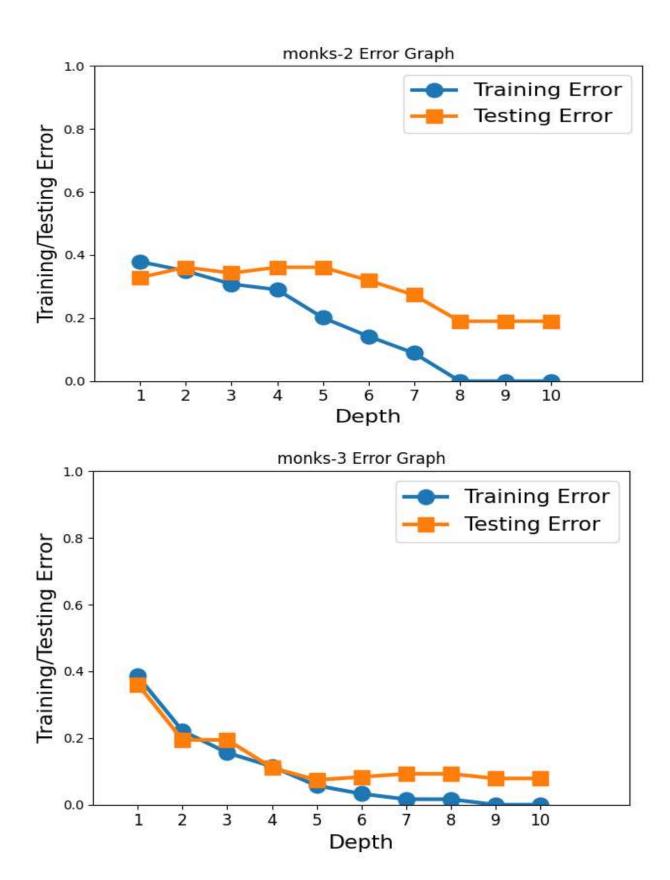
Assignment 2 Plotting Report

Decision Tree

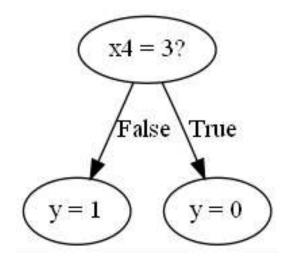


Part b – Plotting learned errors with depths of different monk data.





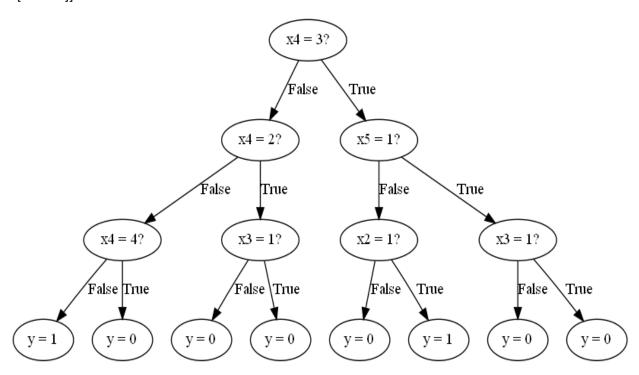
Part c Monk_1 Tree of depth 1,3,5



Monk1_depth:1 confusion matrix

[[72 144]

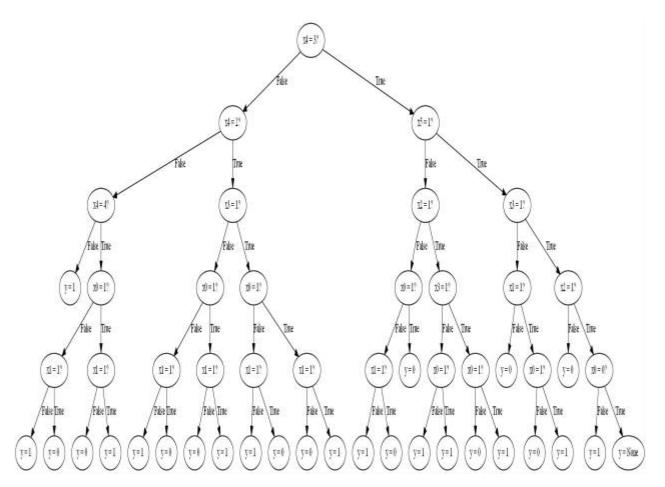
[36 180]]



Monk1_depth:3 confusion matrix

[[198 18]

[99 117]]

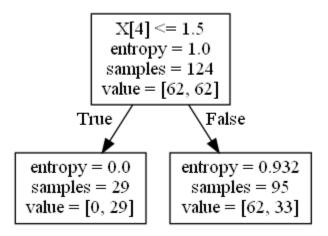


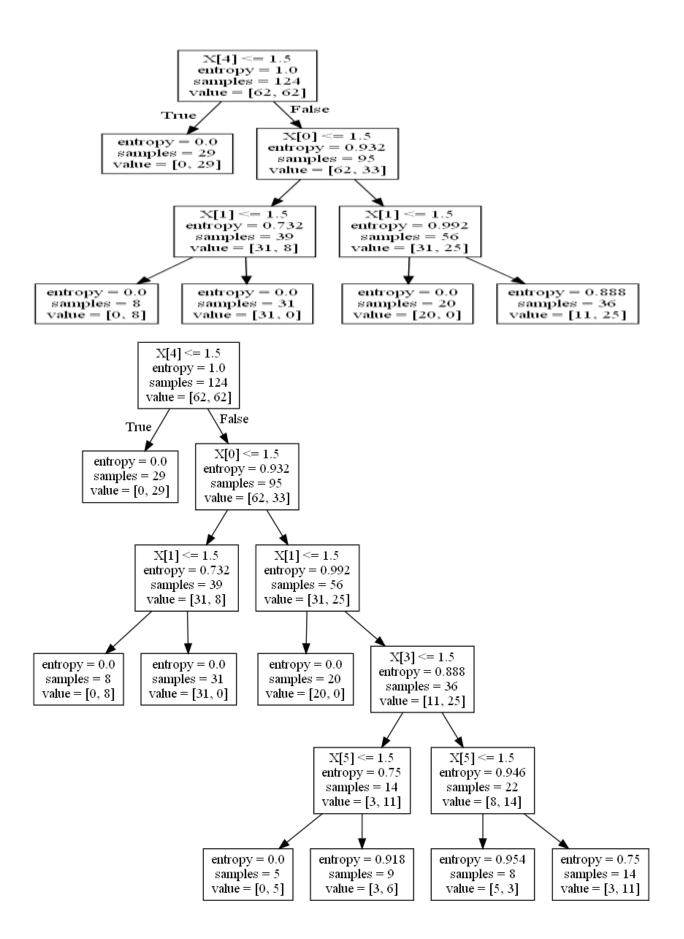
Monk1_depth:5 confusion_matrix

[[142 74]

[16 200]]

Part d Monk_1 Decision_Tree_Classifier to learn a Tree of depth 1,3,5





Along with the different confusion matrix:

Monk1_depth:1 confusion_matrix

[[216 0]

[108 108]]

Monk1_depth:3 confusion_matrix

[[144 72]

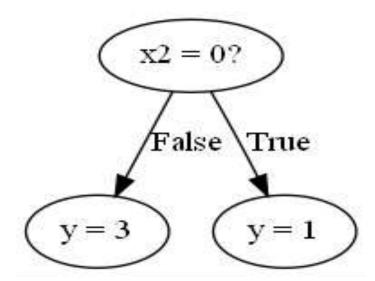
[0 216]]

Monk1_depth:5 confusion_matrix

[[168 48]

[24 192]]

Part e(c) Self Data Iris with depth 1,3,5

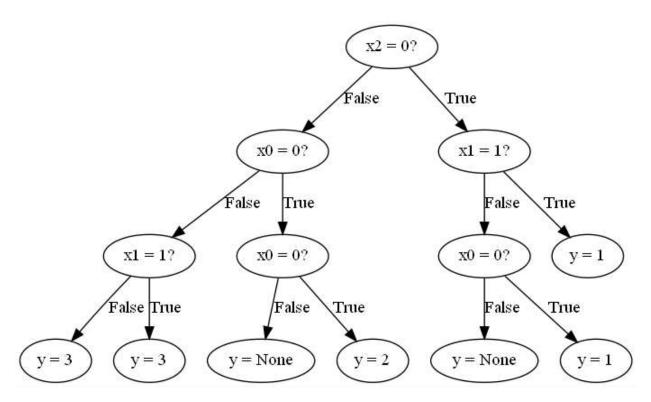


iris_depth:1 confusion_matrix

 $[[0 \quad 0 \quad 0]$

[2 0 8]

[0 010]]

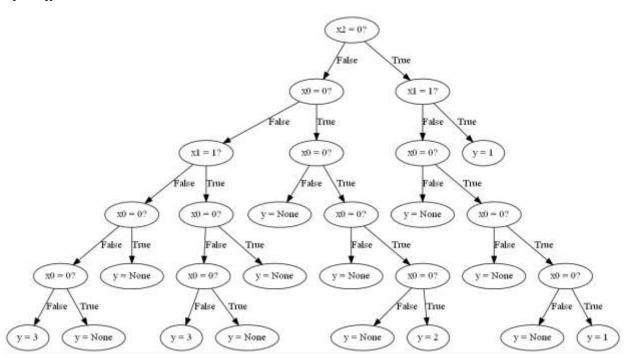


iris_depth:3 confusion_matrix

[[0 0 0]]

[2 6 2]

[0 1 9]]



iris_depth:5 confusion_matrix $[[0\ 0\ 0]]$ [262][0 1 9]] Part e(d) (Self Data) Decision_Tree_Classifier to learn a Iris with depth 1,3,5 $X[2] \le 0.5$ entropy = 1.577samples = 130value = [50, 40, 40]False True entropy = 0.439entropy = 0.997samples = 55samples = 75value = [50, 5, 0]value = [0, 35, 40] $X[2] \le 0.5$ entropy = 1.577samples = 130value = [50, 40, 40]False True $X[1] \le 0.5$ $X[0] \le 0.5$ entropy = 0.439entropy = 0.997samples = 55samples = 75value = [50, 5, 0]value = [0, 35, 40] $X[1] \le 0.5$ entropy = 0.961entropy = 0.0entropy = 0.896entropy = 0.975samples = 13samples = 16samples = 42samples = 59value = [8, 5, 0]value = [42, 0, 0]value = [0, 11, 5]

value = [0, 24, 35]

entropy = 0.971

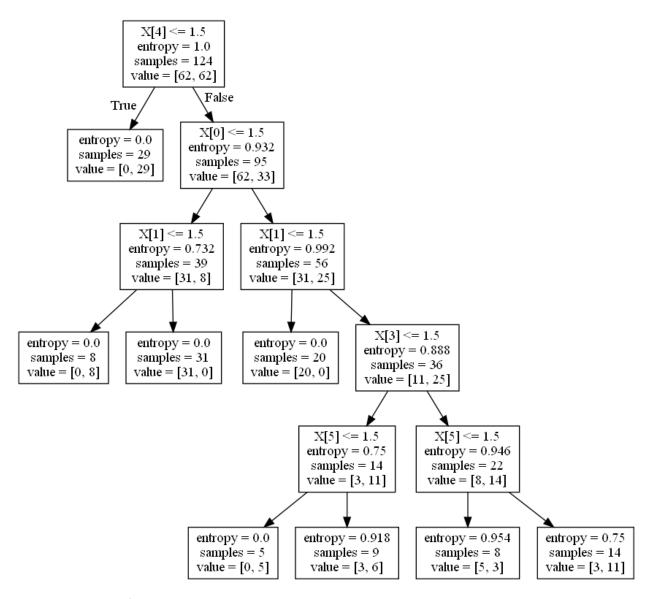
samples = 20

value = [0, 8, 12]

entropy = 0.977

samples = 39

value = [0, 16, 23]



Along with the confusion matix:

iris_depth:1 confusion_matrix

 $[[0 \quad 0 \quad 0]]$

[2 0 8]

[0 010]]

iris_depth:3 confusion_matrix

```
[[0 0 0]
  [2 6 2]
  [0 1 9]]
iris_depth:5 confusion_matrix
[[0 0 0]
  [2 6 2]
  [0 1 9]]
```

From the above confusion matrix we could observe that ID3 algorithm that I had implement in this assignment is less efficient than the scikit-learn algorithm. For example, it can be tell that if the dataset is large and complicated (monk problem), then scikit-learn is way better than mine ID3 algorithm. But if the dataset is small like what I did for iris (150 datasets), the efficient is quit similar.