

# **RIPHAH INTERNATIONAL** **UNIVERSITY, ISLAMABAD**



## **Lab#13**

**Bachelors of Computer Science – 6<sup>th</sup> Semester**

**Course: Artificial Intelligence**

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## Lab Tasks

### Question 01:

#### Decision Tree Algorithm:

Train a decision tree to predict whether a student will **Pass (1)** or **Fail (0)** based on their study habits.

The dataset is given below

Hours_Studied	Sleep_Hours	Tuition_Attended	Pass
2	5	0	0
4	6	1	1
1	4	0	0
5	7	1	1
3	6	0	0
6	8	1	1
4	5	1	1
2	6	0	0

- Use this dataset in your code as features X and labels Y.
- Train a Decision Tree Classifier.
- Predict the result for a new student who:
  - Studied 3 hours
  - Slept 7 hours
  - Did attend tuition (Tuition\_Attended = 1)
- Show the application and decision tree diagram.
- Visualize the decision tree.

```

1  from sklearn import tree
2  import matplotlib.pyplot as plt
3
4  X = [
5      [2, 5, 0],
6      [4, 6, 1],
7      [1, 4, 0],
8      [5, 7, 1],
9      [3, 6, 0],
10     [6, 8, 1],
11     [4, 5, 1],
12     [2, 6, 0]
13 ]
14 Y = [0, 1, 0, 1, 0, 1, 1, 0]
15
16 clf = tree.DecisionTreeClassifier()
17
18 clf = clf.fit(X, Y)
19
20 new_student = [[3, 7, 1]]
21 prediction = clf.predict(new_student)
22
23 print("Will the student pass? (1 = Yes, 0 = No):", prediction[0])
24
25 plt.figure(figsize=(10, 6))
26 tree.plot_tree(clf,
27                 feature_names=["Hours_Studied", "Sleep_Hours", "Tuition_Attended"],
28                 class_names=["Fail", "Pass"],
29                 filled=True)
30 plt.title("Decision Tree for Student Pass Prediction")
31 plt.show()

```

```

D:\BSCS_6th_Semester\Artificial_Intelligence\Lab\Python_Programs\venv\Scripts\python.exe D:\BSCS_
Column names: Index(['ID', 'Feature 1 (X1)', 'Feature 2 (X2)', 'Label (Y)'], dtype='object')
Test Accuracy: 100.00%

```