QUIZ No 1 **CS 4104 - Applied Machine Learning** Marks 60

Q1. Multiple choice questions: Circle the correct choice. (12 marks)

**1. What does CART stand for?**

- A. Classification and Regression Trees

- B. Classification and Regression Technique

- C. Clustering and Regression Trees

- D. Classification and Analysis Trees

**2. What type of tasks can CART be used for?**

- A. Only classification tasks

- B. Only regression tasks

- C. Both classification and regression tasks

- D. Neither classification nor regression tasks

**3. Which of the following best describes the structure of a CART model?**

- A. Linear equation

- B. Decision tree

- C. Neural network

- D. Cluster

**4. In a CART model, what determines how the tree is split at each node?**

- A. Random selection

- B. Pre-determined rules

- C. A set of criteria or algorithm

- D. User input

**5. What is the Gini index used for in a CART algorithm?**

- A. To measure the quality of a split

- B. To calculate prediction error

- C. To determine tree depth

- D. To tune hyper-parameters

**6. Which of the following is not a step in building a CART model?**

- A. Splitting the dataset into training and testing sets

- B. Selecting the root node

- C. Pruning the tree

- D. Combining multiple trees to form a forest

**Q2.** Consider the following dataset with four attributes and a class label “Flu?” **(20 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Chills | Runny Nose | Headache | Fever | Flu? |
| Y | N | Mild | Y | N |
| Y | Y | No | N | Y |
| Y | N | Strong | Y | Y |
| N | Y | Mild | Y | Y |
| N | N | No | N | N |
| N | Y | Strong | Y | Y |
| N | Y | Strong | N | N |
| Y | Y | Mild | Y | Y |

Using the Decision Tree Learning model of your choice, determine if a patient with the following symptoms has the flu.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Chills | Runny Nose | Headache | Fever | Flu? |
| Y | N | No | Y | ? |

**Q3.** Run CART Algorithm on the dataset below. Draw the complete tree and generate decision rules.

**(28 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Weather** | **Parents** | **Money** | **Decision** |
| Sunny | Yes | Rich | Cinema |
| Sunny | No | Rich | Tennis |
| Windy | Yes | Rich | Cinema |
| Rainy | Yes | Poor | Cinema |
| Rainy | No | Rich | Stay In |
| Rainy | Yes | Poor | Cinema |
| Windy | No | Poor | Cinema |
| Windy | No | Rich | Shopping |
| Windy | Yes | Rich | Cinema |
| Sunny | No | Rich | Tennis |

**Good Luck!**