Decision Tree Example

- A Decision Tree is a supervised learning algorithm used for both classification and regression tasks.
- It splits the data into subsets based on the value of input features, creating a tree-like model of decisions.
- Components of a Decision Tree,

❖ **Root Node:** The topmost node representing the entire dataset, which gets split into two or more homogeneous sets.
❖ **Decision Nodes:** Nodes where the data is split based on certain conditions.
❖ **Leaf Nodes (Terminal Nodes):** Nodes that represent the final outcome or class.
❖ **Branches:** Arrows connecting nodes, representing the decision rules or conditions

- How Decision Trees Work,

❖ **Splitting:** At each node, the algorithm chooses a feature and a threshold that maximizes the separation of the classes or minimizes the prediction error for regression. This process involves evaluating different splits using criteria like Gini impurity, entropy (for classification), or mean squared error (for regression).
❖ **Stopping Criteria:** The splitting process continues until a stopping condition is met. Common stopping conditions include:

Maximum depth of the tree is reached.
Minimum number of samples per node.
All data points in a node belong to the same class (for classification).

Predictors | Target

Outlook	Temp	Humidity	Windy	Play Golf
Rainy	Hot	High	False	No
Rainy	Hot	High	True	No
Overcast	Hot	High	False	Yes
Sunny	Mild	High	False	Yes
Sunny	Cool	Normal	False	Yes
Sunny	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Rainy	Mild	High	False	No
Rainy	Cool	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Rainy	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Sunny	Mild	High	True	No