**a decision tree** is a structure that contains nodes and edges and is built from a dataset (table of columns representing features/attributes and rows corresponds to records). Each node is either used to make a decision (known as decision node) or represent an outcome(known as leaf node).

**ID3**

ID3 stands for Iterative Dichotomiser 3 and is named after that because the algorithm iteratively (repeatedly) dichotomizes(divides) features into two or more groups at each step.

ID3 uses a **top-down greedy** approach to build a decision tree. In simple words, the **top-down** approach means that we start building the tree from the top and the **greedy**approach means that at each iteration we select the best feature now to create a node.

**ID3 Steps**

1. Calculate the Information Gain of each feature.
2. Considering that all rows don’t belong to the same class, split the dataset Sinto subsets using the feature for which the Information Gain is maximum.
3. Make a decision tree node using the feature with the maximum Information gain.
4. If all rows belong to the same class, make the current node as a leaf node with the class as its label.
5. Repeat for the remaining features until we run out of all features, or the decision tree has all leaf nodes.

**RF** in machine learning stands for Random Forest, which is a popular supervised learning algorithm used for both regression and classification tasks. It is a type of ensemble learning method, which means it combines multiple decision trees to create a more accurate and robust model.

In a Random Forest, a set of decision trees are built using random subsets of the original data and a subset of the features. Each tree in the forest is built independently, and the final output is determined by the average or the majority vote of all the trees.

The random selection of data and features helps to reduce overfitting, and the use of multiple trees helps to improve the accuracy and stability of the model. Random Forests are also resistant to noise and missing data, making them a popular choice for real-world problems.

The process of building a Random Forest involves the following steps:

1. Select a random subset of the original data

2. Select a random subset of features

3. Build a decision tree based on the selected data and features

4. Repeat steps 1-3 to build multiple decision trees

5. Determine the final output by taking the average or majority vote of all the trees