You need to Implement one of the most important part of Decision-Tree Classifier, known as Entropy.

(What is Entropy? In the most layman terms, Entropy is nothing but the **measure of disorder.** You can think of it as a measure of purity as well. You'll see. I like disorder because it sounds cooler).

The Mathematical formula for Entropy is as follows -

$$E(S) = \sum_{i=1}^{c} - p_i \log_2 p_i$$

About Data-Set

The **Iris Dataset** is multivariate flowers datset contains four features (length and width of sepals and petals) of 50 samples of three species of **Iris** (**Iris** setosa, **Iris** virginica and **Iris** versicolor) with the total of 150 samples.

```
subset(iris, Species == "setosa")[1:5,]

##    Sepal.Length Sepal.Width Petal.Length Petal.Width Species
## 1           5.1         3.5          1.4         0.2  setosa
## 2           4.9         3.0          1.4         0.2  setosa
## 3           4.7         3.2          1.3         0.2  setosa
## 4           4.6         3.1          1.5         0.2  setosa
## 5           5.0         3.6          1.4         0.2  setosa
```

```
subset(iris, Species == "versicolor")[1:5,]

##    Sepal.Length Sepal.Width Petal.Length Petal.Width    Species
## 51          7.0         3.2          4.7         1.4 versicolor
## 52          6.4         3.2          4.5         1.5 versicolor
## 53          6.9         3.1          4.9         1.5 versicolor
## 54          5.5         2.3          4.0         1.3 versicolor
## 55          6.5         2.8          4.6         1.5 versicolor
```

```
subset(iris, Species == "virginica")[1:5,]

##     Sepal.Length Sepal.Width Petal.Length Petal.Width   Species
## 101          6.3         3.3          6.0         2.5 virginica
## 102          5.8         2.7          5.1         1.9 virginica
## 103          7.1         3.0          5.9         2.1 virginica
## 104          6.3         2.9          5.6         1.8 virginica
## 105          6.5         3.0          5.8         2.2 virginica
```

Tasks to perform

☑ Load the given Iris Dataset in a Dataframe

☑ Pr e-Processing of data
- ◦ Replace None values in a features with the mean value of that feature values belongs to the class of record.
- ◦ Normalizing or standardizing the features

☑ Calculate Entropy of All features and Display the feature deserve to be at root node through purity Measure .