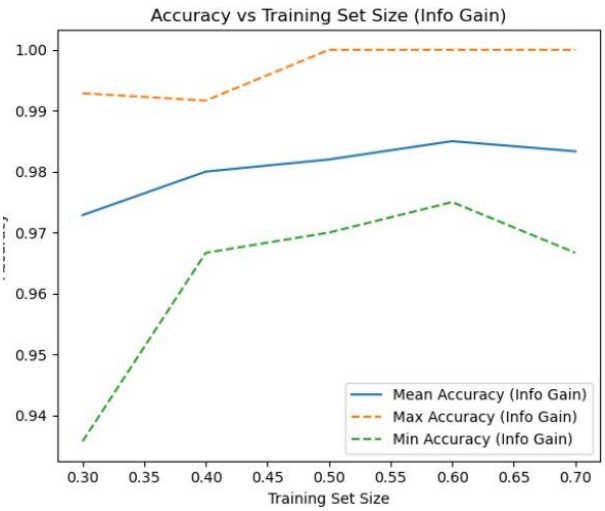
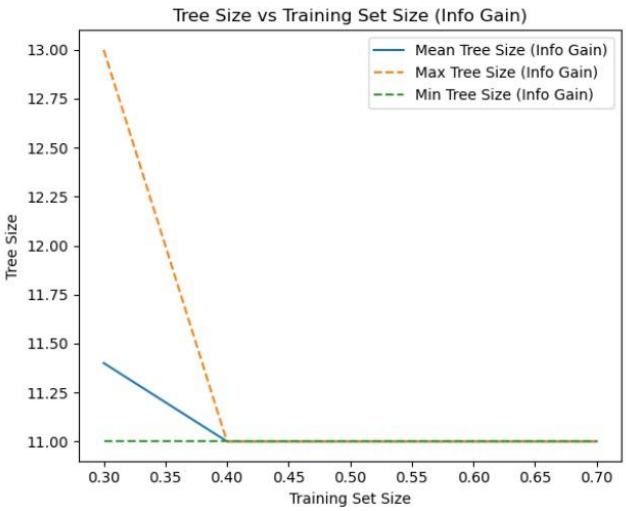
	ID	NAMES
	Farah ashraf wafaa	20201136
	Hadeer adel mahmoud	20201210
	Walaa soudy ibrahim	20201218
	Hana hany ayman	20201213

Decision tree output:

11 11






```
df = pd.read_csv("drug.csv")

# Display the first few rows of the dataset
print(df.head())
```

```
   Age Sex      BP Cholesterol  Na_to_K   Drug
0   23   F    HIGH        HIGH   25.355  drugY
1   47   M     LOW        HIGH   13.093  drugC
2   47   M     LOW        HIGH   10.114  drugC
3   28   F  NORMAL        HIGH      NaN  drugX
4   61   F     LOW        HIGH   18.043  drugY
```

```
After handling missing values:
Age            0
Sex            0
BP             0
Cholesterol    0
Na_to_K        0
Drug           0
dtype: int64
Modified dataset:
   Age  Sex  BP  Cholesterol  Na_to_K   Drug
0   23    0   0            0   25.355  drugY
1   47    1   1            0   13.093  drugC
2   47    1   1            0   10.114  drugC
3   28    0   2            0   12.006  drugX
4   61    0   1            0   18.043  drugY
```

```
Experiment 1 - Decision Tree Size: 11, Accuracy: 1.0, Information Gain: 2.0037125139959544
Experiment 2 - Decision Tree Size: 11, Accuracy: 1.0, Information Gain: 1.951843437803709
Experiment 3 - Decision Tree Size: 11, Accuracy: 1.0, Information Gain: 1.9369862845516475
Experiment 4 - Decision Tree Size: 11, Accuracy: 0.9833333333333333, Information Gain: 1.9368180563953048
Experiment 5 - Decision Tree Size: 11, Accuracy: 0.9833333333333333, Information Gain: 1.9983425673443027

Best Performing Model - Decision Tree Size: 11, Accuracy: 1.0, Information Gain: 2.0037125139959544
```

```
Experiment Report with Information Gain:
   Split Ratio  Mean Accuracy (Info Gain)  Max Accuracy (Info Gain)  \
0          0.3                   0.972857                  0.992857
1          0.4                   0.980000                  0.991667
2          0.5                   0.982000                  1.000000
3          0.6                   0.985000                  1.000000
4          0.7                   0.983333                  1.000000

   Min Accuracy (Info Gain)  Mean Tree Size (Info Gain)  \
0                  0.935714                        11.4
1                  0.966667                        11.0
2                  0.970000                        11.0
3                  0.975000                        11.0
4                  0.966667                        11.0

   Max Tree Size (Info Gain)  Min Tree Size (Info Gain)
0                         13                         11
1                         11                         11
2                         11                         11
3                         11                         11
4                         11                         11
```

KNN OUTPUT:

```
K =  3
Number of correctly classified instances : 172
Total number of instances :  231
Accuracy:  74.45887445887446 %
K =  4
Number of correctly classified instances : 172
Total number of instances :  231
Accuracy:  74.45887445887446 %
K =  5
Number of correctly classified instances : 172
Total number of instances :  231
Accuracy:  74.45887445887446 %
K =  6
Number of correctly classified instances : 172
Total number of instances :  231
Accuracy:  74.45887445887446 %
```