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```
import pandas as pd
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
from sklearn import metrics
from sklearn import tree

from sklearn.metrics import confusion_matrix
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report
import graphviz
```

```
data=pd.read_csv('/content/Result.csv')
data.head()
```

	Unnamed: 0	CAT1	CAT2	DA1	DA2	DA3	FAT	Outcome
0	0	12.25	6.90	8	5	9	25.4	Pass
1	1	11.00	7.65	10	9	6	9.0	Fail
2	2	15.00	10.50	10	6	6	24.4	Pass
3	3	9.50	11.10	8	10	7	29.6	Pass
4	4	7.50	5.40	9	9	8	24.4	Pass

```
data=data.replace(['Pass','Fail'],[1,0])
X=data.drop(columns=['Outcome'])
Y=data['Outcome']
X_train, X_test, y_train, y_test = train_test_split(X, Y, test_size = 0.9, random_state =0)
```

```
print("Gini")
model=DecisionTreeClassifier(criterion = "gini")
model=model.fit(X_train, y_train)
y_pred = model.predict(X_test)
print("Predicted values:")
print(y_pred)
```

```
Gini
Predicted values:
[1 1 1 1 1 1 1 1 1 1]
```

```
print("Confusion Matrix: ",confusion_matrix(y_test, y_pred))
print("Accuracy : ",accuracy_score(y_test,y_pred)*100)
print("Report : ",classification_report(y_test, y_pred))
```

```
Confusion Matrix:  [[0 2]
 [0 8]]
Accuracy :  80.0
```

```
Report :                precision    recall  f1-score   support

           0       0.00      0.00      0.00         2
           1       0.80      1.00      0.89         8

    accuracy                           0.80        10
   macro avg       0.40      0.50      0.44        10
weighted avg       0.64      0.80      0.71        10

/usr/local/lib/python3.7/dist-packages/sklearn/metrics/_classification.py:1318: Undef
  _warn_prf(average, modifier, msg_start, len(result))
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  _warn_prf(average, modifier, msg_start, len(result))
```

```python
print("Entropy")
ent = DecisionTreeClassifier(criterion = "entropy")
ent.fit(X_train, y_train)
y_pred = model.predict(X_test)
print("Predicted values:")
print(y_pred)
print("Confusion Matrix: ",confusion_matrix(y_test, y_pred))
print("Accuracy : ",accuracy_score(y_test,y_pred)*100)
print("Report : ",classification_report(y_test, y_pred))
```

```
Entropy
Predicted values:
[1 1 1 1 1 1 1 1 1 1]
Confusion Matrix:  [[0 2]
 [0 8]]
Accuracy :  80.0
Report :                precision    recall  f1-score   support

           0       0.00      0.00      0.00         2
           1       0.80      1.00      0.89         8

    accuracy                           0.80        10
   macro avg       0.40      0.50      0.44        10
weighted avg       0.64      0.80      0.71        10

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```
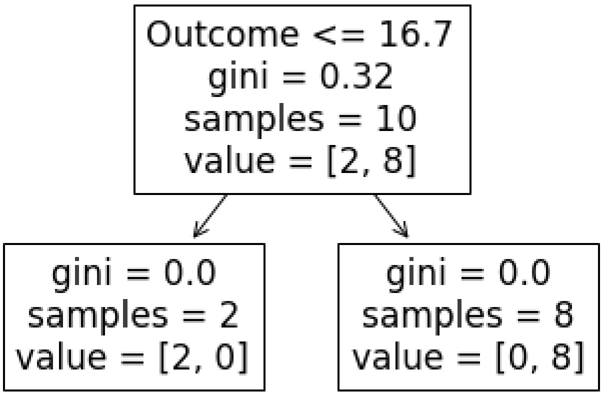
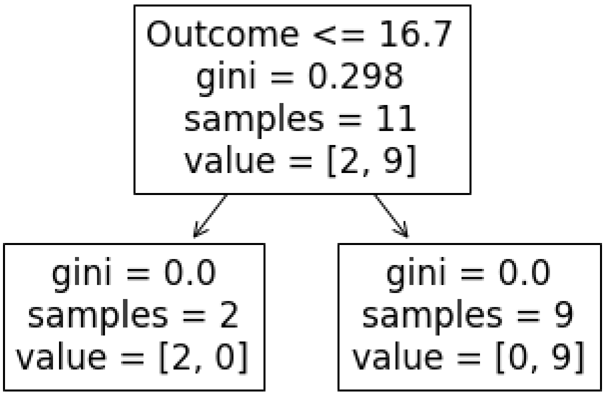

```python
dtree = DecisionTreeClassifier()
dtree = dtree.fit(X_test, y_test)
features = ['CAT1', 'CAT2', 'DA1', 'DA2','DA3','FAT','Outcome']
tree.plot_tree(dtree, feature_names=features)
```

```
[Text(0.5, 0.75, 'Outcome <= 16.7\ngini = 0.32\nsamples = 10\nvalue = [2, 8]'),
 Text(0.25, 0.25, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.75, 0.25, 'gini = 0.0\nsamples = 8\nvalue = [0, 8]')]
```



```
dtree = dtree.fit(X,Y)
features = ['CAT1', 'CAT2', 'DA1', 'DA2','DA3','FAT','Outcome']
tree.plot_tree(dtree, feature_names=features)
```

```
[Text(0.5, 0.75, 'Outcome <= 16.7\ngini = 0.298\nsamples = 11\nvalue = [2, 9]'),
 Text(0.25, 0.25, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.75, 0.25, 'gini = 0.0\nsamples = 9\nvalue = [0, 9]')]
```


Outcome <= 16.7
gini = 0.298
samples = 11
value = [2, 9]
gini = 0.0
samples = 2
value = [2, 0]
gini = 0.0
samples = 9
value = [0, 9]