IMPORTING THE NECESSARY LIBRARIES

```
!pip install pydotplus
```

```
Collecting pydotplus
  Downloading pydotplus-2.0.2.tar.gz (278 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 278.7/278.7 kB 4.6 MB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
Requirement already satisfied: pyparsing>=2.0.1 in /usr/local/lib/python3.10/dist-packages (from pydotplus) (3.2.0)
Building wheels for collected packages: pydotplus
  Building wheel for pydotplus (setup.py) ... done
  Created wheel for pydotplus: filename=pydotplus-2.0.2-py3-none-any.whl size=24551 sha256=27505f662e01793bc44a1231d4c18532702b0c41e
  Stored in directory: /root/.cache/pip/wheels/69/b2/67/08f0eef649af92df772c09f451558298e07fab1bc7cdf33db0
Successfully built pydotplus
Installing collected packages: pydotplus
Successfully installed pydotplus-2.0.2
```

```
import pandas as pd
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split, GridSearchCV
from sklearn.metrics import accuracy_score, classification_report
import matplotlib.pyplot as plt
from sklearn import tree
from io import StringIO
from IPython.display import Image
import pydotplus
from sklearn.tree import export_graphviz
```

DEFINE THE DATASET

```
data = {
    'CGPA': ['>=9', '>=8', '>=9', '<8', '>=8', '>=9', '<8', '>=9', '>=8', '<8'],
    'Interactive': ['Yes', 'No', 'No', 'No', 'Yes', 'Yes', 'Yes', 'No', 'Yes', 'Yes'],
    'Practical Knowledge': ['Very good', 'Good', 'Average', 'Average', 'Good', 'Good', 'Good', 'Very good', 'Average', 'Good'],
    'Comm Skills': ['Good', 'Moderate', 'Poor', 'Good', 'Moderate', 'Moderate', 'Poor', 'Good', 'Good', 'Poor'],
    'Job Offer': ['Yes', 'Yes', 'No', 'No', 'Yes', 'Yes', 'No', 'Yes', 'Yes', 'No']
}
```

CONVERT THE DATA INTO DATAFRAME

```
df = pd.DataFrame(data)
```

CONVERT THE NUMERICAL FEATURES INTO MUMERICAL FEATURES

```
for col in df.columns:
    df[col] = pd.Categorical(df[col]).codes
```

SPLIT THE FEATURES AND TARGET

```
X = df.drop('Job Offer', axis=1)  # Features
y = df['Job Offer']               # Target
```

SPLIT TRAINING AND TEST DATASET

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)
```

PARAMETER FOR GRIDSEARCH

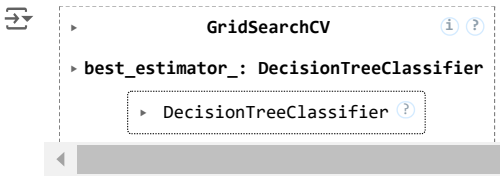
```
param_grid = {
    'max_depth': [3, 4, 5, None],
    'min_samples_split': [2, 5, 10],
    'min_samples_leaf': [1, 2, 4],
    'max_features': [None, 'sqrt', 'log2']
}
```

INITIALIZE DECISION_TREE AND GRIDSEARCH

```
clf = DecisionTreeClassifier(random_state=42)
grid_search = GridSearchCV(estimator=clf, param_grid=param_grid, cv=3, scoring='accuracy', n_jobs=-1)
```

FIT THE MODEL

```
grid_search.fit(X_train, y_train)
```



GET THE BEST MODEL

```
best_clf = grid_search.best_estimator_
print("Best parameters found by GridSearchCV:", grid_search.best_params_)
```

```
Best parameters found by GridSearchCV: {'max_depth': 3, 'max_features': 'sqrt', 'min_samples_leaf': 1, 'min_samples_split': 2}
```

MAKE PREDICTIONS USING BEST MODEL

```
y_pred = best_clf.predict(X_test)
```

ACCURACY

```
accuracy = accuracy_score(y_test, y_pred)
print(f"Improved Accuracy: {accuracy:.2f}")
```

```
Improved Accuracy: 1.00
```

CLASSIFICATION REPORT

```
unique_classes = y_test.unique()
if len(unique_classes) == 1:
    target_names = ['No'] if unique_classes[0] == 0 else ['Yes']
else:
    target_names = ['No', 'Yes']


print("Classification Report:")
print(classification_report(y_test, y_pred, target_names=target_names))
```

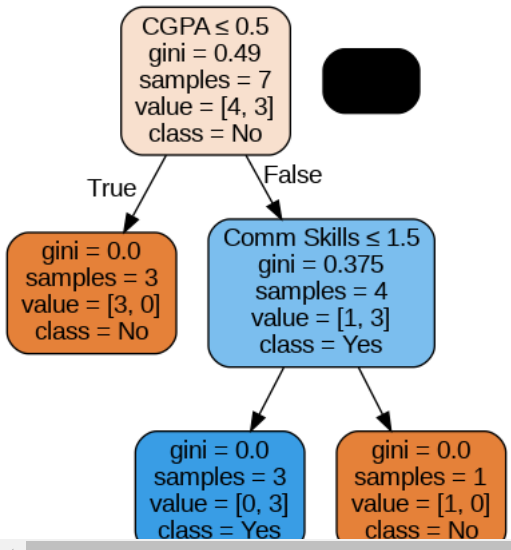
```
Classification Report:
                precision    recall  f1-score   support

           Yes       1.00      1.00      1.00         3

      accuracy                           1.00         3
     macro avg       1.00      1.00      1.00         3
  weighted avg       1.00      1.00      1.00         3
```

VISUALISE THE TREE

```
dot_data = StringIO()
export_graphviz(best_clf, out_file=dot_data, feature_names=['CGPA', 'Interactive', 'Practical Knowledge', 'Comm Skills'],
                class_names=['No', 'Yes'], filled=True, rounded=True, special_characters=True)
graph = pydotplus.graph_from_dot_data(dot_data.getvalue())
Image(graph.create_png())
```


CGPA ≤ 0.5
gini = 0.49
samples = 7
value = [4, 3]
class = No
True
False
gini = 0.0
samples = 3
value = [3, 0]
class = No
Comm Skills ≤ 1.5
gini = 0.375
samples = 4
value = [1, 3]
class = Yes
gini = 0.0
samples = 3
value = [0, 3]
class = Yes
gini = 0.0
samples = 1
value = [1, 0]
class = No