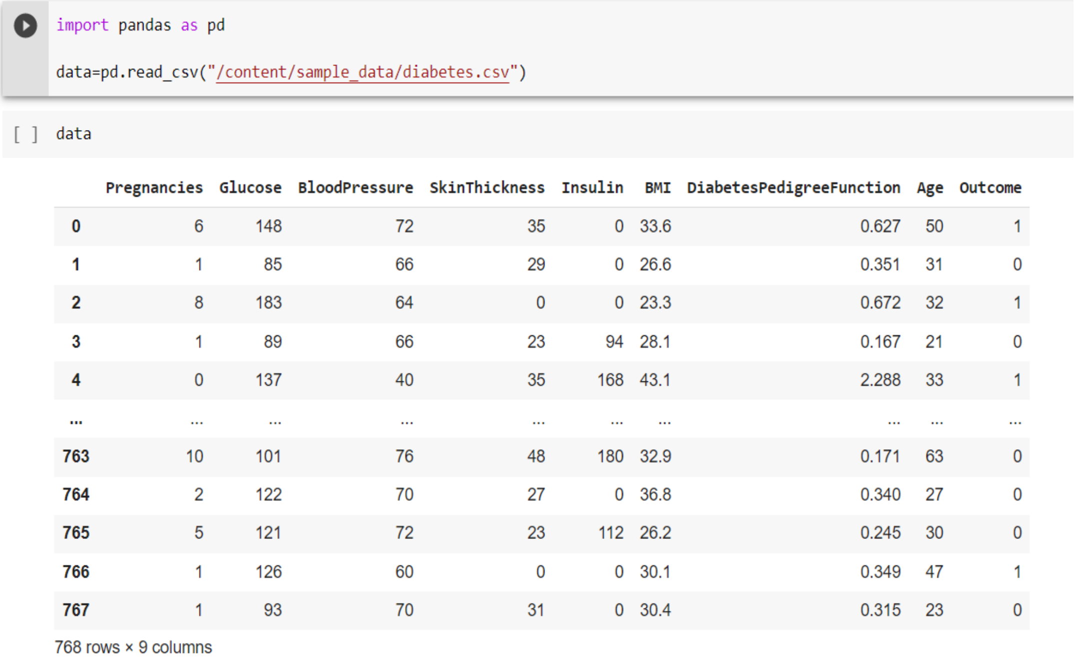
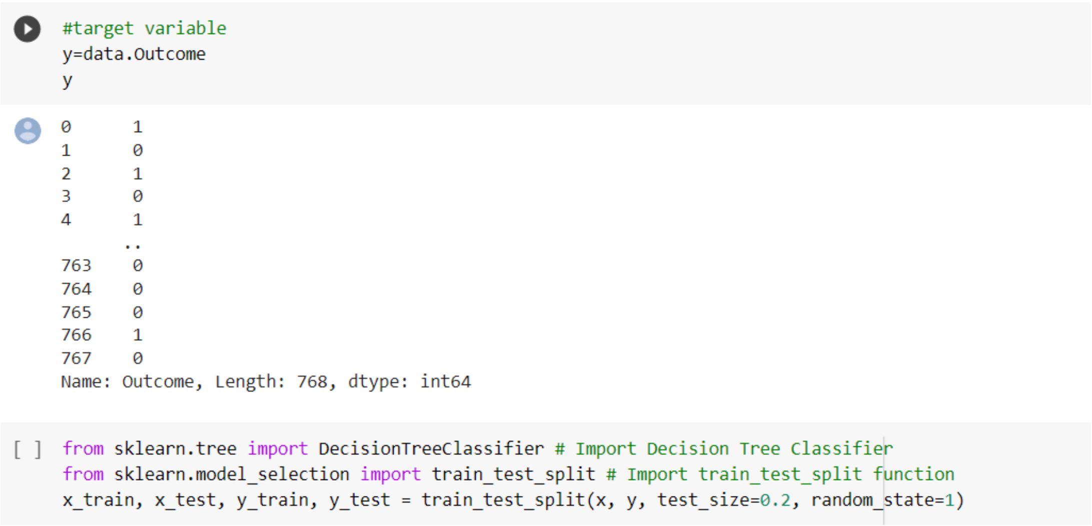


```python
import pandas as pd

data=pd.read_csv("/content/sample_data/diabetes.csv")
```

```
[ ] data
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	6	148	72	35	0	33.6	0.627	50	1
1	1	85	66	29	0	26.6	0.351	31	0
2	8	183	64	0	0	23.3	0.672	32	1
3	1	89	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1
...	...	...	...	...	...	...	...	...	...
763	10	101	76	48	180	32.9	0.171	63	0
764	2	122	70	27	0	36.8	0.340	27	0
765	5	121	72	23	112	26.2	0.245	30	0
766	1	126	60	0	0	30.1	0.349	47	1
767	1	93	70	31	0	30.4	0.315	23	0

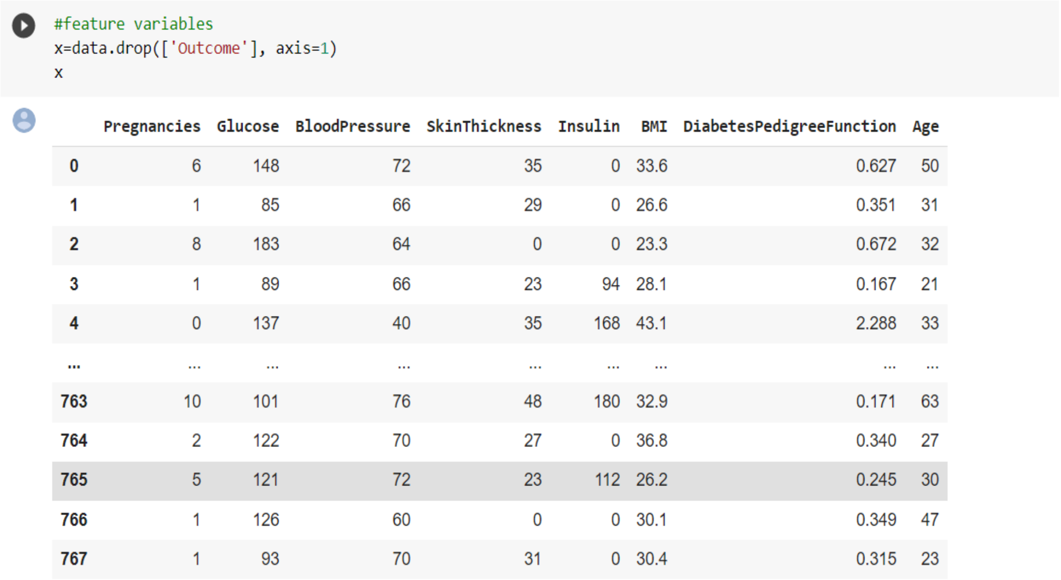
768 rows × 9 columns



```
#target variable
y=data.Outcome
y
```

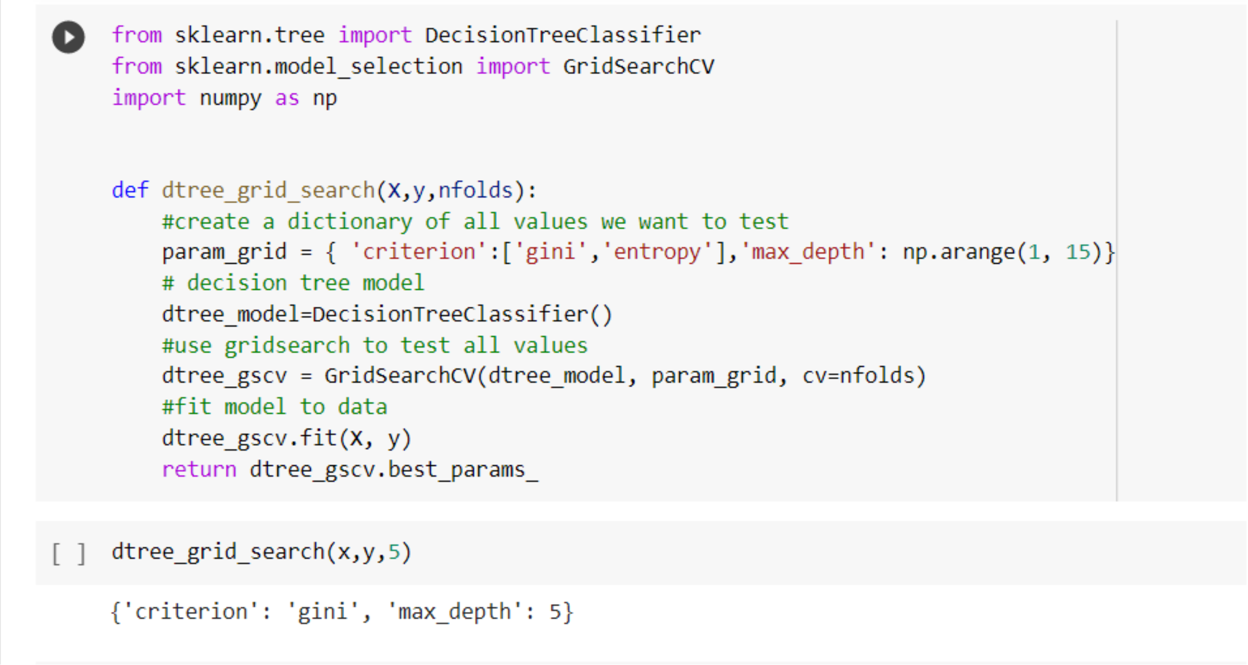
```
0      1
1      0
2      1
3      0
4      1
      ..
763    0
764    0
765    0
766    1
767    0
Name: Outcome, Length: 768, dtype: int64
```

```
[ ]  from sklearn.tree import DecisionTreeClassifier # Import Decision Tree Classifier
     from sklearn.model_selection import train_test_split # Import train_test_split function
     x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=1)
```



```
#feature variables
x=data.drop(['Outcome'], axis=1)
x
```

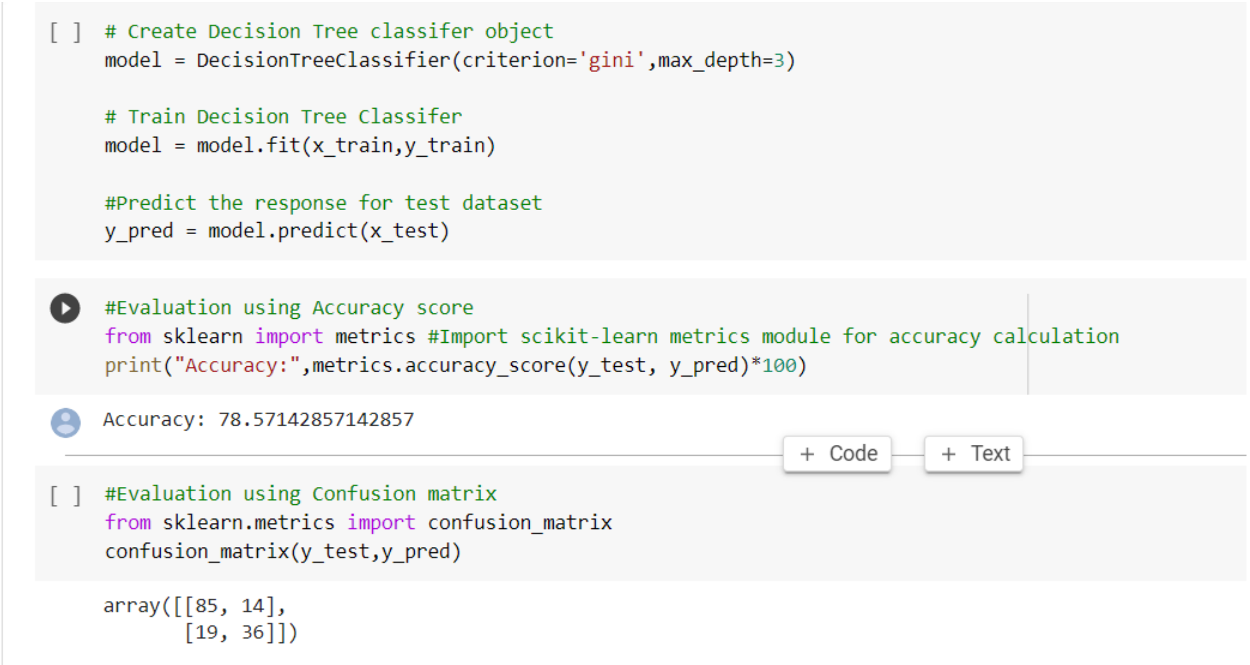
	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age
0	6	148	72	35	0	33.6	0.627	50
1	1	85	66	29	0	26.6	0.351	31
2	8	183	64	0	0	23.3	0.672	32
3	1	89	66	23	94	28.1	0.167	21
4	0	137	40	35	168	43.1	2.288	33
...	...	...	...	...	...	...	...	...
763	10	101	76	48	180	32.9	0.171	63
764	2	122	70	27	0	36.8	0.340	27
765	5	121	72	23	112	26.2	0.245	30
766	1	126	60	0	0	30.1	0.349	47
767	1	93	70	31	0	30.4	0.315	23



```python
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import GridSearchCV
import numpy as np


def dtree_grid_search(X,y,nfolds):
    #create a dictionary of all values we want to test
    param_grid = { 'criterion':['gini','entropy'],'max_depth': np.arange(1, 15)}
    # decision tree model
    dtree_model=DecisionTreeClassifier()
    #use gridsearch to test all values
    dtree_gscv = GridSearchCV(dtree_model, param_grid, cv=nfolds)
    #fit model to data
    dtree_gscv.fit(X, y)
    return dtree_gscv.best_params_
```

```python
dtree_grid_search(x,y,5)
```

```
{'criterion': 'gini', 'max_depth': 5}
```



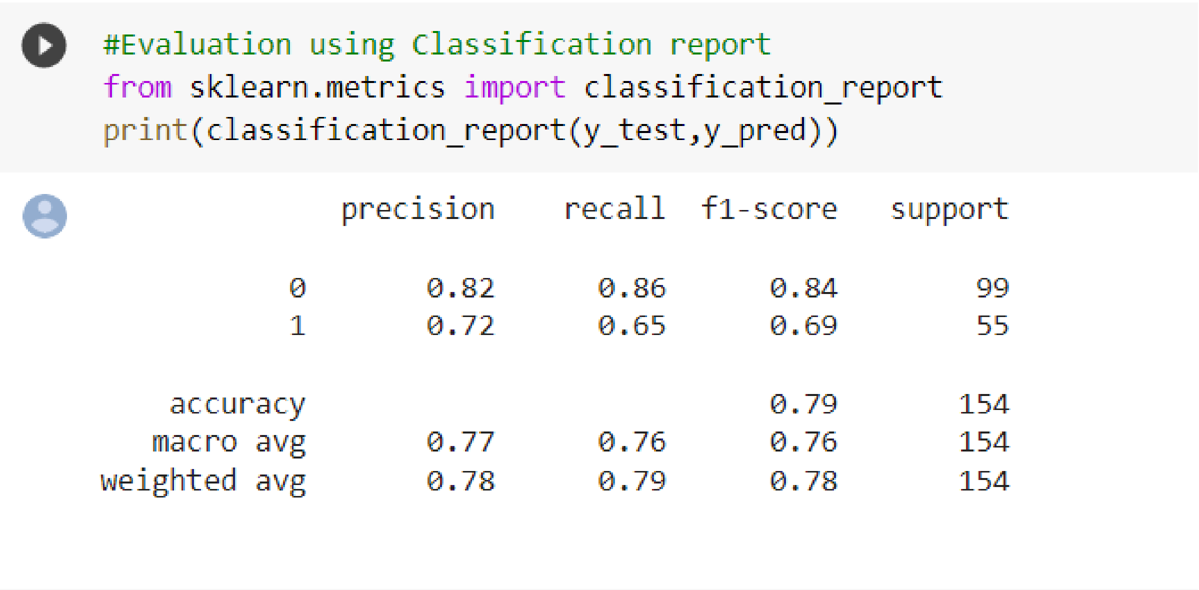
```python
# Create Decision Tree classifer object
model = DecisionTreeClassifier(criterion='gini',max_depth=3)

# Train Decision Tree Classifer
model = model.fit(x_train,y_train)

#Predict the response for test dataset
y_pred = model.predict(x_test)
```

```python
#Evaluation using Accuracy score
from sklearn import metrics #Import scikit-learn metrics module for accuracy calculation
print("Accuracy:",metrics.accuracy_score(y_test, y_pred)*100)
```

```
Accuracy: 78.57142857142857
```

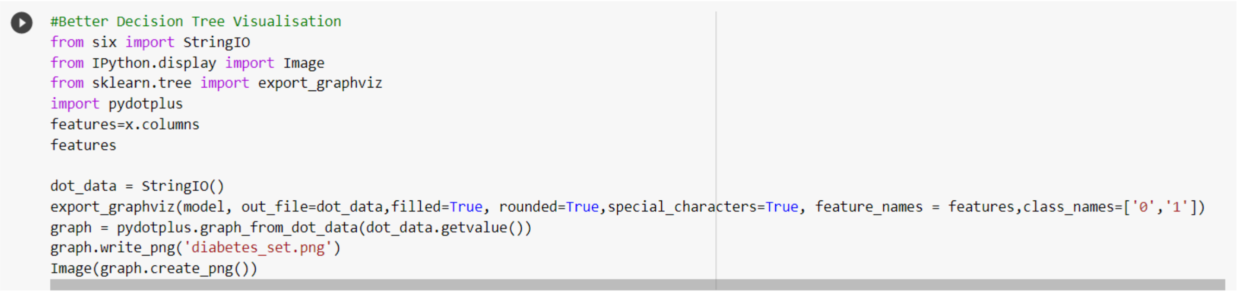
```python
#Evaluation using Confusion matrix
from sklearn.metrics import confusion_matrix
confusion_matrix(y_test,y_pred)
```

```
array([[85, 14],
       [19, 36]])
```

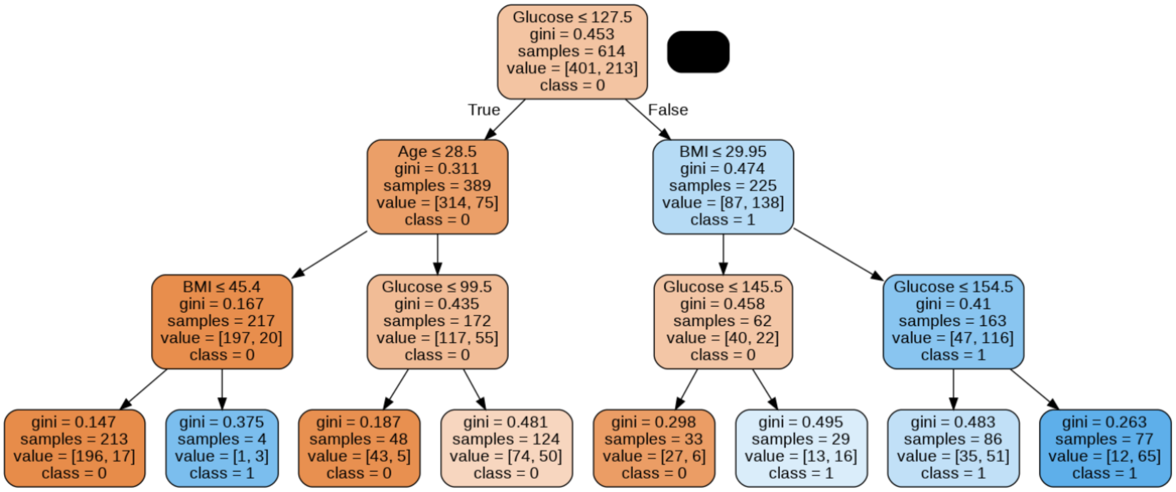


```python
#Evaluation using Classification report
from sklearn.metrics import classification_report
print(classification_report(y_test,y_pred))
```

```
              precision    recall  f1-score   support

           0       0.82      0.86      0.84        99
           1       0.72      0.65      0.69        55

    accuracy                           0.79       154
   macro avg       0.77      0.76      0.76       154
weighted avg       0.78      0.79      0.78       154
```



```python
#Better Decision Tree Visualisation
from six import StringIO
from IPython.display import Image
from sklearn.tree import export_graphviz
import pydotplus
features=x.columns
features

dot_data = StringIO()
export_graphviz(model, out_file=dot_data,filled=True, rounded=True,special_characters=True, feature_names = features,class_names=['0','1'])
graph = pydotplus.graph_from_dot_data(dot_data.getvalue())
graph.write_png('diabetes_set.png')
Image(graph.create_png())
```



[redacted]