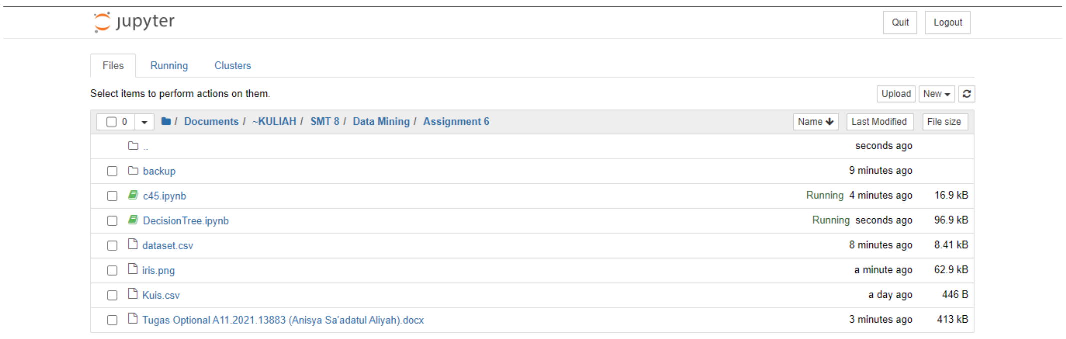
Nama : Anisya Sa’adatul Aliyah
NIM : A11.2021.13883
Kelp : A11.4619

TUGAS OPTIONAL

- Dataset

OUTLOOK	TEMPERATURE	HUMIDITY	WINDY	PLAY
Sunny	Hot	High	No	Don’t Play
Sunny	Hot	High	Yes	Don’t Play
Cloudy	Hot	High	No	Play
Rainy	Mild	High	No	Play
Rainy	Cool	Normal	No	Play
Rainy	Cool	Normal	Yes	Play
Cloudy	Cool	Normal	Yes	Play
Sunny	Mild	High	No	Don’t Play
Sunny	Cool	Normal	No	Play
Rainy	Mild	Normal	No	Play
Sunny	Mild	Normal	Yes	Play
Cloudy	Mild	High	Yes	Play
Cloudy	Hot	Normal	No	Play
Rainy	Mild	High	Yes	Don’t Play

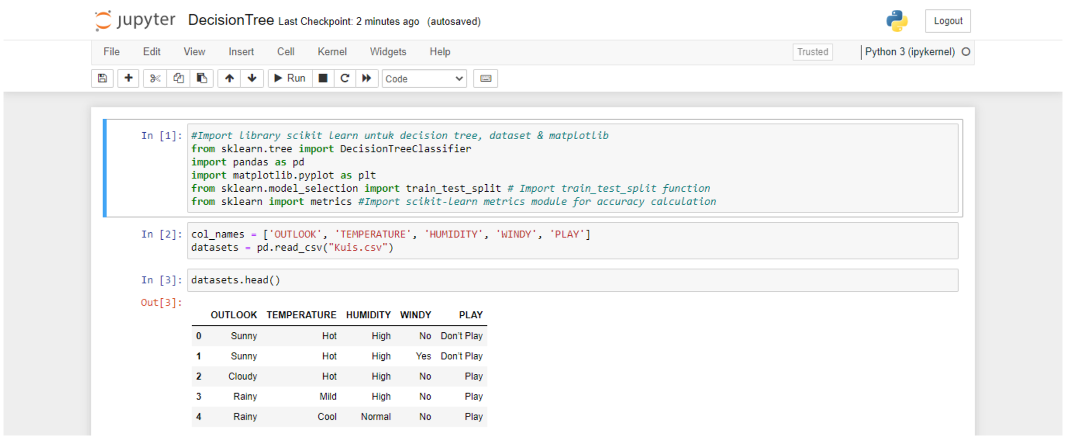
- Code



Select items to perform actions on them.

/ Documents / ~KULIAH / SMT 8 / Data Mining / Assignment 6

	Name	Status	Last Modified	File size
	..		seconds ago	
	backup		9 minutes ago	
	c45.ipynb	Running	4 minutes ago	16.9 kB
	DecisionTree.ipynb	Running	seconds ago	96.9 kB
	dataset.csv		8 minutes ago	8.41 kB
	iris.png		a minute ago	62.9 kB
	Kuis.csv		a day ago	446 B
	Tugas Optional A11.2021.13883 (Anisya Sa'adatul Aliyah).docx		3 minutes ago	413 kB



DecisionTree Last Checkpoint: 2 minutes ago (autosaved)

```
In [1]: #Import library scikit learn untuk decision tree, dataset & matplotlib
        from sklearn.tree import DecisionTreeClassifier
        import pandas as pd
        import matplotlib.pyplot as plt
        from sklearn.model_selection import train_test_split # Import train_test_split function
        from sklearn import metrics #Import scikit-learn metrics module for accuracy calculation

In [2]: col_names = ['OUTLOOK', 'TEMPERATURE', 'HUMIDITY', 'WINDY', 'PLAY']
        datasets = pd.read_csv("Kuis.csv")

In [3]: datasets.head()

Out[3]:
```

	OUTLOOK	TEMPERATURE	HUMIDITY	WINDY	PLAY
0	Sunny	Hot	High	No	Don't Play
1	Sunny	Hot	High	Yes	Don't Play
2	Cloudy	Hot	High	No	Play
3	Rainy	Mild	High	No	Play
4	Rainy	Cool	Normal	No	Play

In [4]:
```
datasets.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 14 entries, 0 to 13
Data columns (total 5 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   OUTLOOK      14 non-null     object
 1   TEMPERATURE  14 non-null     object
 2   HUMIDITY     14 non-null     object
 3   WINDY        14 non-null     object
 4   PLAY         14 non-null     object
dtypes: object(5)
memory usage: 688.0+ bytes
```

In [5]:
```
# Merubah kelas/kolom dari String ke Unique-Integer
datasets = datasets.apply(lambda x: pd.factorize(x)[0])
```

In [6]:
```
datasets
```

Out[6]:

	OUTLOOK	TEMPERATURE	HUMIDITY	WINDY	PLAY
0	0	0	0	0	0
1	0	0	0	1	0
2	1	0	0	0	1
3	2	1	0	0	1
4	2	2	1	0	1
5	2	2	1	1	1
6	1	2	1	1	1
7	0	1	0	0	0
8	0	2	1	0	1
9	2	1	1	0	1
10	0	1	1	1	1
11	1	1	0	1	1
12	1	0	1	0	1
13	2	1	0	1	0

In [7]:
```
#membagi data menjadi features dan target
feature_cols = ['OUTLOOK','TEMPERATURE','HUMIDITY','WINDY']
X = datasets[feature_cols] #features
y = datasets.PLAY #Target Variable
```

In [8]:
```
# # Membuat object model decision tree
decisiontree = DecisionTreeClassifier(random_state=0, max_depth=None,
                                      min_samples_split=2, min_samples_leaf=1,
                                      min_weight_fraction_leaf=0,
                                      max_leaf_nodes=None,
                                      min_impurity_decrease=0)
```

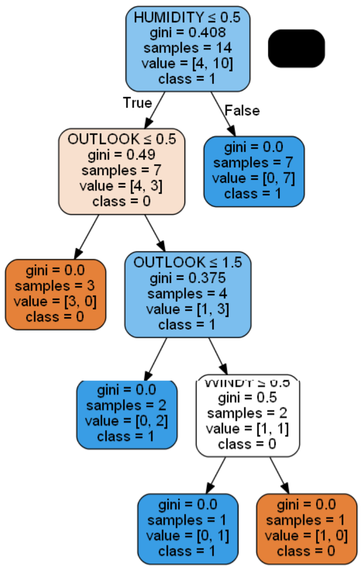
In [9]:
```
model = decisiontree.fit(X,y)
```

In [10]:
```
# #Mengambil sampel observasi dan membuat prediksi
# #fungsi predict() => memeriksa kelas yg dimilikinya
# #fungsi predict_proba() => memeriksa probabilitas kelas dari prediksi tersebut
observation = [[4, 3, 2, 1]]
model.predict(observation)
model.predict_proba(observation)
```

Out[10]:
```
array([[0., 1.]])
```

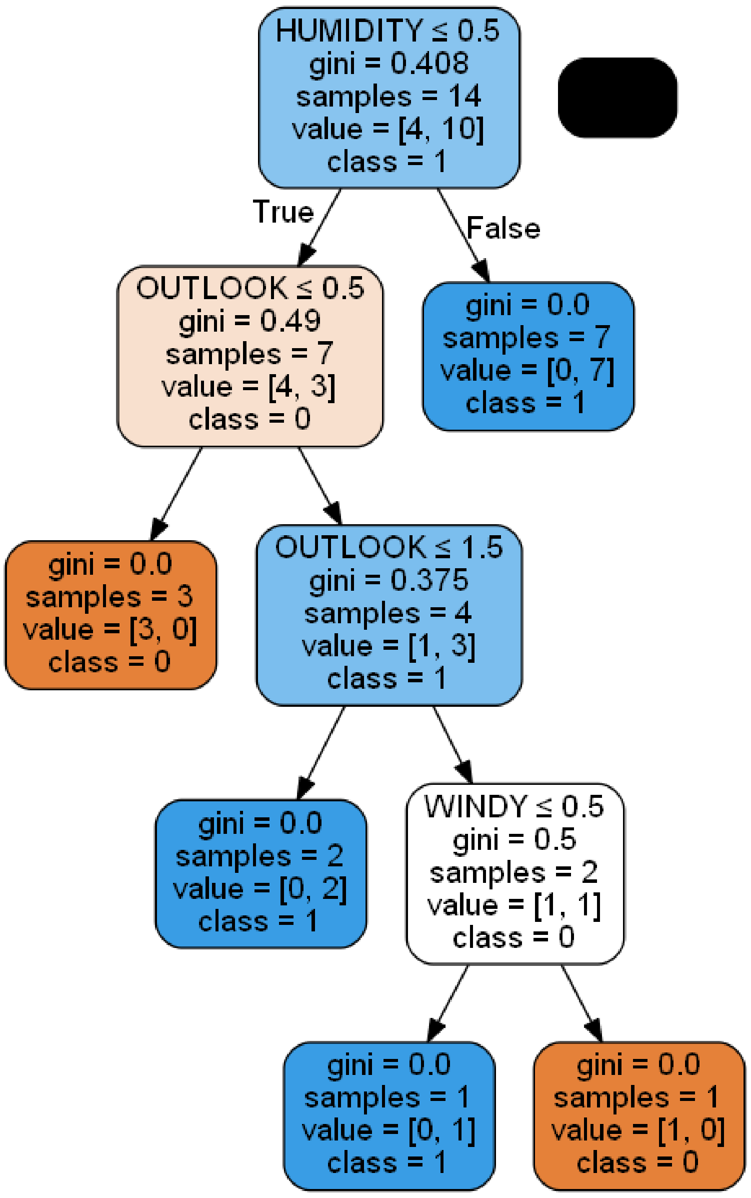
In [11]:
```
#membuat grafik visualisasi decision tree
from sklearn.tree import export_graphviz
from six import StringIO
from IPython.display import Image
import pydotplus

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

Out[11]:



In [ ]:

- Output


HUMIDITY ≤ 0.5
gini = 0.408
samples = 14
value = [4, 10]
class = 1
True
False
OUTLOOK ≤ 0.5
gini = 0.49
samples = 7
value = [4, 3]
class = 0
gini = 0.0
samples = 7
value = [0, 7]
class = 1
gini = 0.0
samples = 3
value = [3, 0]
class = 0
OUTLOOK ≤ 1.5
gini = 0.375
samples = 4
value = [1, 3]
class = 1
gini = 0.0
samples = 2
value = [0, 2]
class = 1
WINDY ≤ 0.5
gini = 0.5
samples = 2
value = [1, 1]
class = 0
gini = 0.0
samples = 1
value = [0, 1]
class = 1
gini = 0.0
samples = 1
value = [1, 0]
class = 0