In [1]:
```
#installing llibraries
conda install -c conda-forge pydotplus
```

```
  Input In [1]
    conda install -c conda-forge pydotplus
          ^
SyntaxError: invalid syntax
```

In [2]:
```
pip install graphviz
```

```
Requirement already satisfied: graphviz in c:\users\heena\anaconda3\lib\site-packages
(0.20.1)
Note: you may need to restart the kernel to use updated packages.
```

In [3]:
```
pip install pydotplus
```

```
Requirement already satisfied: pydotplus in c:\users\heena\anaconda3\lib\site-package
s (2.0.2)
Requirement already satisfied: pyparsing>=2.0.1 in c:\users\heena\anaconda3\lib\site-
packages (from pydotplus) (3.0.4)
Note: you may need to restart the kernel to use updated packages.
```

In [4]:
```
import numpy as np
import pandas as pd
import math
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import accuracy_score, roc_curve, auc
import matplotlib.pylab as plt
from dmba import regressionSummary, classificationSummary,plotDecisionTree
from dmba import liftChart, gainsChart
import seaborn as sns
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
from sklearn import tree
from IPython.display import Image
import pydotplus



#importing libraries
```

In [5]:
```
# reading the main dataset
```

```
df1= pd.read_excel('flightdelay1.xlsx',sheet_name="Sheet1")
```

In [6]:
```
df1.head(20)
```

Out[6]:

	CRS_DEP_TIME	CARRIER	DEP_TIME	DEST	DISTANCE	FL_DATE	FL_NUM	ORIGIN	Weather	DA
0	1455	DL	1458	JFK	213	2004-01-01	746	DCA	0	
1	1455	DL	1458	JFK	213	2004-01-02	746	DCA	0	
2	1455	DL	1505	JFK	213	2004-01-03	746	DCA	0	
3	1455	DL	1500	JFK	213	2004-01-04	746	DCA	0	
4	1455	DL	1459	JFK	213	2004-01-05	746	DCA	0	
5	1455	DL	1457	JFK	213	2004-01-06	746	DCA	0	
6	1455	DL	1501	JFK	213	2004-01-07	746	DCA	0	
7	1455	DL	1601	JFK	213	2004-01-08	746	DCA	0	
8	1455	DL	1506	JFK	213	2004-01-09	746	DCA	0	
9	1455	DL	1505	JFK	213	2004-01-10	746	DCA	0	
10	1455	DL	1456	JFK	213	2004-01-11	746	DCA	0	
11	1455	DL	1451	JFK	213	2004-01-12	746	DCA	0	
12	1455	DL	1453	JFK	213	2004-01-13	746	DCA	0	
13	1455	DL	1454	JFK	213	2004-01-14	746	DCA	0	
14	1455	DL	1501	JFK	213	2004-01-15	746	DCA	0	
15	1455	DL	1500	JFK	213	2004-01-16	746	DCA	0	
16	1455	DL	1509	JFK	213	2004-01-17	746	DCA	0	
17	1455	DL	1555	JFK	213	2004-01-18	746	DCA	0	
18	1455	DL	1506	JFK	213	2004-01-19	746	DCA	0	
19	1455	DL	1514	JFK	213	2004-01-20	746	DCA	0	

In [7]:

```
#converting categorical to numeric
from sklearn.preprocessing import LabelEncoder
from sklearn.feature_extraction.text import CountVectorizer
# Define the cleaning pipeline we defined earlier
lab_enc=LabelEncoder()
```

In [8]:
```
#selecting the data for encoding


df2 = df1.iloc[1: , :]
```

In [9]:
```
#making a copy for the numeric version of dataset


df1_enc=df2
```

In [10]:
```
for i in df1_enc:
    df1_enc[i]=lab_enc.fit_transform(df1_enc[i])
```

```
C:\Users\heena\AppData\Local\Temp\ipykernel_14152\4155074426.py:2: SettingWithCopyWar
ning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/us
er_guide/indexing.html#returning-a-view-versus-a-copy
  df1_enc[i]=lab_enc.fit_transform(df1_enc[i])
```

In [11]:
```
df1_enc
```

Out[11]:

	CRS_DEP_TIME	CARRIER	DEP_TIME	DEST	DISTANCE	FL_DATE	FL_NUM	ORIGIN	Weather
1	32	2	316	1	3	1	0	1	0
2	32	2	323	1	3	2	0	1	0
3	32	2	318	1	3	3	0	1	0
4	32	2	317	1	3	4	0	1	0
5	32	2	315	1	3	5	0	1	0
...	...	...	...	...	...	...	...	...	...
2196	57	1	595	2	6	1	102	2	0
2197	57	1	610	2	6	2	102	2	0
2198	57	1	593	2	6	3	102	2	0
2199	57	1	601	2	6	4	102	2	0
2200	57	1	595	2	6	5	102	2	0

2200 rows × 13 columns

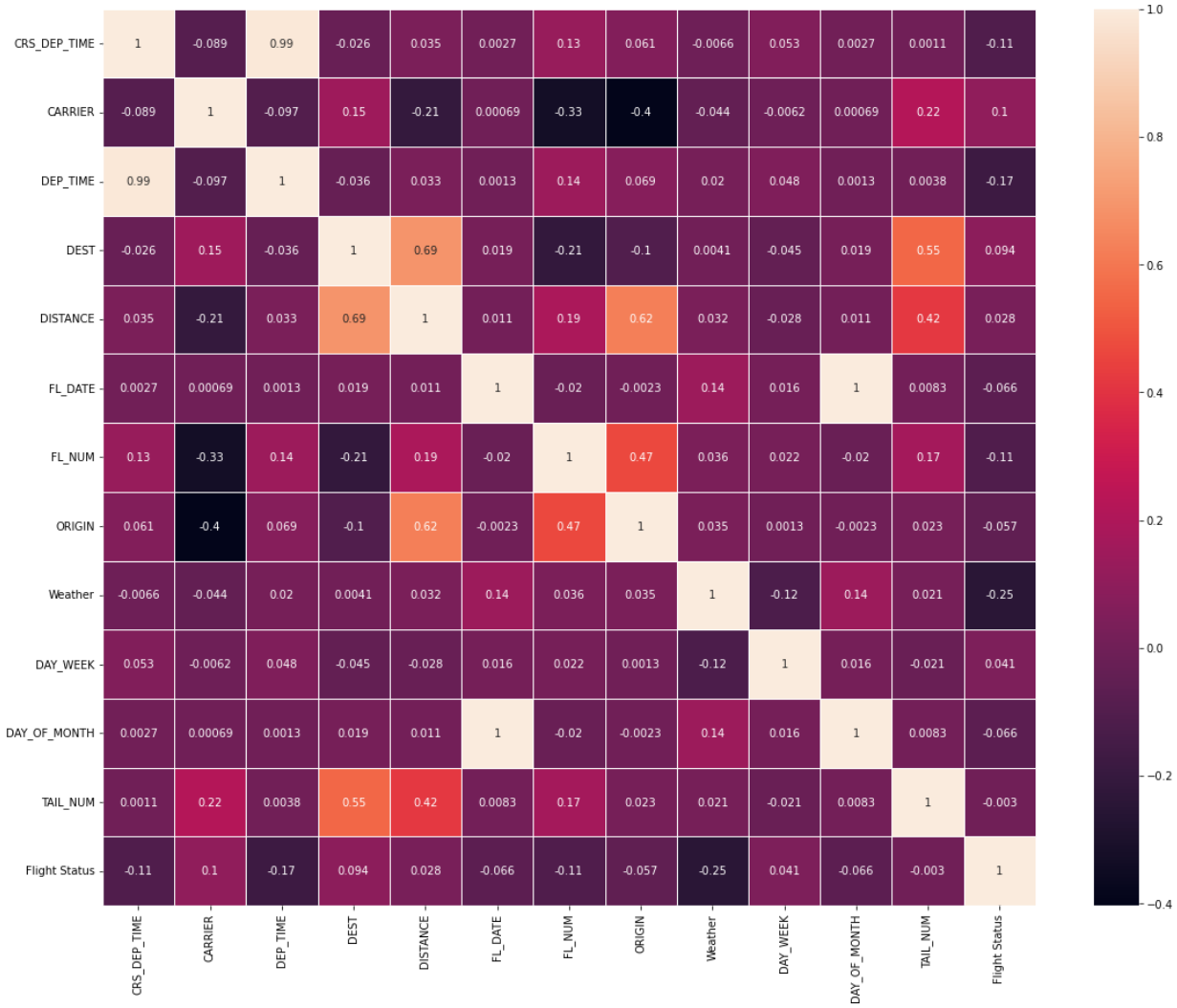
In [12]:

```
#corelation matrix using the numeric dataframe


plt.figure(figsize = (19,15))
sns.heatmap(df1_enc.corr(),annot=True,linewidths=1)
```

Out[12]:

```
<AxesSubplot:>
```



In [13]:
```
#from the corelation chart above we can eliminate the crs departure time
,carrier as they are not relevant
#we can see that distance and origin are corelated
#origin and flight number are corelated
#Distance, destination and origin are corelated
#Destination and tail number are corelated
```

In [14]:
```
#deleting the extra columns which will not be used for our analysis

df1=df1.drop(["CRS_DEP_TIME","CARRIER"],axis = 1)
```

In [15]:
```
#making a copy of dataframe for further data exploration

df3=df1
```

In [16]:
```
df1.to_excel('FlightDelaysTrainingData.xlsx', index=False)
df3.to_excel('FlightDelaysDataExploration.xlsx', index=False)
```

In [17]:
```
df3.head()
#final df with reduced columns
```

Out[17]:

	DEP_TIME	DEST	DISTANCE	FL_DATE	FL_NUM	ORIGIN	Weather	DAY_WEEK	DAY_OF_MONTH
0	1458	JFK	213	2004-01-01	746	DCA	0	4	1
1	1458	JFK	213	2004-01-02	746	DCA	0	5	2
2	1505	JFK	213	2004-01-03	746	DCA	0	6	3
3	1500	JFK	213	2004-01-04	746	DCA	0	7	4
4	1459	JFK	213	2004-01-05	746	DCA	0	1	5

In [18]:
```
df1_enc.head()
```

Out[18]:

	CRS_DEP_TIME	CARRIER	DEP_TIME	DEST	DISTANCE	FL_DATE	FL_NUM	ORIGIN	Weather	DAY
1	32	2	316	1	3	1	0	1	0	
2	32	2	323	1	3	2	0	1	0	
3	32	2	318	1	3	3	0	1	0	
4	32	2	317	1	3	4	0	1	0	
5	32	2	315	1	3	5	0	1	0	

In [19]:
```
df1_enc=df1_enc.drop(["CRS_DEP_TIME","CARRIER"],axis = 1)
```

In [20]:
```
df1_enc.head()
#final encoded dataframe with reduced columns
```

Out[20]:

	DEP_TIME	DEST	DISTANCE	FL_DATE	FL_NUM	ORIGIN	Weather	DAY_WEEK	DAY_OF_MONTH
1	316	1	3	1	0	1	0	4	1
2	323	1	3	2	0	1	0	5	2
3	318	1	3	3	0	1	0	6	3
4	317	1	3	4	0	1	0	0	4
5	315	1	3	5	0	1	0	1	5

In [21]:
```
df1_enc.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2200 entries, 1 to 2200
Data columns (total 11 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   DEP_TIME       2200 non-null   int64
 1   DEST           2200 non-null   int32
 2   DISTANCE       2200 non-null   int64
 3   FL_DATE        2200 non-null   int64
 4   FL_NUM         2200 non-null   int64
 5   ORIGIN         2200 non-null   int32
 6   Weather        2200 non-null   int64
 7   DAY_WEEK       2200 non-null   int64
 8   DAY_OF_MONTH   2200 non-null   int64
 9   TAIL_NUM       2200 non-null   int32
 10  Flight Status  2200 non-null   int32
dtypes: int32(4), int64(7)
memory usage: 154.8 KB
```

In [22]:
```
#this pivot table gives us information about the distance from origin to destinantion

pivot1 = df3.pivot_table(index=['ORIGIN','DEST'],
                         values=['DISTANCE'], aggfunc={'mean'})
pivot1
```

Out[22]:

		DISTANCE
		mean
ORIGIN	DEST	
BWI	EWR	169.0
	JFK	184.0
DCA	EWR	199.0
	JFK	213.0
	LGA	214.0
IAD	EWR	213.0
	JFK	228.0
	LGA	229.0

In [24]:
```
# table 2 counts for number of flights that were delayed (0)vs number of flights that were on time (1)
```

```
pivot2 = df3.pivot_table(index=['Flight Status'],
                         values=['DEST'], aggfunc={'count'})
pivot2
```

Out[24]:

	DEST
	count
Flight Status	
delayed	428
ontime	1773

In [25]:

```
# table 3 shows the effect of weather on the flight status

pivot3 = df3.pivot_table(index=['Weather','Flight Status'],
                         values=['DISTANCE'], aggfunc={'count'})
pivot3
```

Out[25]:

		DISTANCE
		count
Weather	Flight Status	
0	delayed	396
	ontime	1773
1	delayed	32

In [26]:

```
# Pivot4 shows us the flight status depending on Origin



pivot4=df3.pivot_table(index = ['ORIGIN','Flight Status'], values =
"DISTANCE",
aggfunc = [ len],
margins=True,
margins_name='Grand Totals')
pivot4
```

Out[26]:

		len
		DISTANCE
ORIGIN	Flight Status	
BWI	delayed	37
	ontime	108
DCA	delayed	221
	ontime	1149
IAD	delayed	170
	ontime	516
Grand Totals		2201

In [27]:

```
# Pivot 5 shows us the flight status depending on Destination

pivot5= df3.pivot_table(index = ['DEST','Flight Status'], values =
"DISTANCE",
aggfunc = [ len],
margins=True,
margins_name='Grand Totals')
pivot5
```

Out[27]:

		len
		DISTANCE
DEST	Flight Status	
EWR	delayed	161
	ontime	504
JFK	delayed	84
	ontime	302
LGA	delayed	183
	ontime	967
Grand Totals		2201

In [28]:

```
for i in df1_enc:
    df1_enc[i]=lab_enc.fit_transform(df1_enc[i])
```

In [29]:

```
print(df1_enc)
print ('\n')
```

```
print(df1)
```

```
      DEP_TIME  DEST  DISTANCE  FL_DATE  FL_NUM  ORIGIN  Weather  DAY_WEEK  \
1          316     1         3        1       0       1        0         4
2          323     1         3        2       0       1        0         5
3          318     1         3        3       0       1        0         6
4          317     1         3        4       0       1        0         0
5          315     1         3        5       0       1        0         1
...        ...   ...       ...      ...     ...     ...      ...       ...
2196       595     2         6        1     102       2        0         4
2197       610     2         6        2     102       2        0         5
2198       593     2         6        3     102       2        0         6
2199       601     2         6        4     102       2        0         0
2200       595     2         6        5     102       2        0         1

      DAY_OF_MONTH  TAIL_NUM  Flight Status
1                1       535              1
2                2       547              0
3                3       513              1
4                4       545              1
5                5       527              1
...            ...       ...            ...
2196             1       408              1
2197             2       374              1
2198             3       360              1
2199             4       385              1
2200             5       360              1

[2200 rows x 11 columns]


      DEP_TIME DEST  DISTANCE    FL_DATE  FL_NUM ORIGIN  Weather  DAY_WEEK  \
0         1458  JFK       213 2004-01-01     746    DCA        0         4
1         1458  JFK       213 2004-01-02     746    DCA        0         5
2         1505  JFK       213 2004-01-03     746    DCA        0         6
3         1500  JFK       213 2004-01-04     746    DCA        0         7
4         1459  JFK       213 2004-01-05     746    DCA        0         1
...        ...  ...       ...        ...     ...    ...      ...       ...
2196      2118  LGA       229 2004-01-02    7924    IAD        0         5
2197      2138  LGA       229 2004-01-03    7924    IAD        0         6
2198      2116  LGA       229 2004-01-04    7924    IAD        0         7
2199      2125  LGA       229 2004-01-05    7924    IAD        0         1
2200      2118  LGA       229 2004-01-06    7924    IAD        0         2

      DAY_OF_MONTH TAIL_NUM Flight Status
0                1   N918DE        ontime
1                2   N964DL        ontime
2                3   N997DL       delayed
3                4   N912DL        ontime
4                5   N994DL        ontime
...            ...      ...           ...
2196             2   N709BR        ontime
2197             3   N688BR        ontime
2198             4   N674BR        ontime
```

```
2199             5   N699BR        ontime
2200             6   N674BR        ontime

[2201 rows x 11 columns]
```

In [30]:
```
X=df1_enc.iloc[:,1:10]
y=df1_enc.iloc[:,10]
```

In [31]:
```
X,y
```

Out[31]:
```
(      DEST  DISTANCE  FL_DATE  FL_NUM  ORIGIN  Weather  DAY_WEEK  \
1        1         3        1       0       1        0         4
2        1         3        2       0       1        0         5
3        1         3        3       0       1        0         6
4        1         3        4       0       1        0         0
5        1         3        5       0       1        0         1
...    ...       ...      ...     ...     ...      ...       ...
2196     2         6        1     102       2        0         4
2197     2         6        2     102       2        0         5
2198     2         6        3     102       2        0         6
2199     2         6        4     102       2        0         0
2200     2         6        5     102       2        0         1

      DAY_OF_MONTH  TAIL_NUM
1                1       535
2                2       547
3                3       513
4                4       545
5                5       527
...            ...       ...
2196             1       408
2197             2       374
2198             3       360
2199             4       385
2200             5       360

[2200 rows x 9 columns],
1       1
2       0
3       1
4       1
5       1
       ..
2196    1
2197    1
2198    1
2199    1
2200    1
Name: Flight Status, Length: 2200, dtype: int64)
```

In [32]:
```
model= DecisionTreeClassifier(criterion="gini")
```

```
model.fit(X,y)
```

Out[32]:

▾ DecisionTreeClassifier

DecisionTreeClassifier()

In [33]:

```
model.predict([[1,3,1,0,1,0,0,0,535]])
```

```
C:\Users\heena\anaconda3\lib\site-packages\sklearn\base.py:450: UserWarning: X does n
ot have valid feature names, but DecisionTreeClassifier was fitted with feature names
  warnings.warn(
```

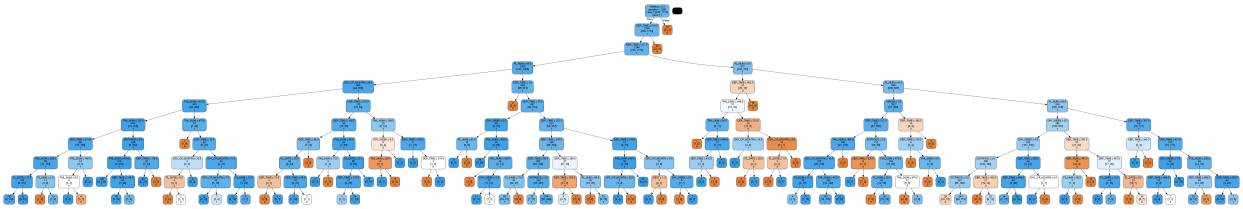
Out[33]:

```
array([1], dtype=int64)
```

In [34]:

```
classTree = DecisionTreeClassifier(random_state=1, max_depth=10)
classTree.fit(df1_enc.drop(columns=['Flight Status']), df1_enc['Flight
Status'])
plotDecisionTree(classTree, feature_names=df1_enc.columns[:10],
class_names=classTree.classes_)
```

Out[34]:



In [35]:

```
clf = tree.DecisionTreeClassifier()
clf = clf.fit(X, y)
```

In [36]:

```
tree.plot_tree(clf)
```

Out[36]:

```
[Text(0.4602664702119883, 0.9821428571428571, 'X[5] <= 0.5\ngini = 0.313\nsamples = 2200\nvalue = [428, 1772]'),
 Text(0.4579272889254386, 0.9464285714285714, 'X[3] <= 44.5\ngini = 0.299\nsamples = 2168\nvalue = [396, 1772]'),
 Text(0.16710754751461987, 0.9107142857142857, 'X[0] <= 1.5\ngini = 0.217\nsamples = 1004\nvalue = [124, 880]'),
 Text(0.0827485380116959, 0.875, 'X[8] <= 195.0\ngini = 0.387\nsamples = 217\nvalue = [57, 160]'),
 Text(0.05321637426900585, 0.8392857142857143, 'X[3] <= 1.5\ngini = 0.31\nsamples = 151\nvalue = [29, 122]'),
 Text(0.05087719298245614, 0.8035714285714286, 'gini = 0.0\nsamples = 15\nvalue = [0, 15]'),
 Text(0.05555555555555555, 0.8035714285714286, 'X[3] <= 31.0\ngini = 0.336\nsamples = 136\nvalue = [29, 107]'),
 Text(0.025730994152046785, 0.7678571428571429, 'X[6] <= 2.5\ngini = 0.393\nsamples = 82\nvalue = [22, 60]'),
 Text(0.007017543859649123, 0.7321428571428571, 'X[2] <= 4.5\ngini = 0.48\nsamples = 30\nvalue = [12, 18]'),
 Text(0.004678362573099415, 0.6964285714285714, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.00935672514619883, 0.6964285714285714, 'X[2] <= 19.5\ngini = 0.459\nsamples = 28\nvalue = [10, 18]'),
 Text(0.004678362573099415, 0.6607142857142857, 'X[3] <= 3.0\ngini = 0.36\nsamples = 17\nvalue = [4, 13]'),
 Text(0.0023391812865497076, 0.625, 'gini = 0.0\nsamples = 5\nvalue = [0, 5]'),
 Text(0.007017543859649123, 0.625, 'X[3] <= 4.5\ngini = 0.444\nsamples = 12\nvalue = [4, 8]'),
 Text(0.004678362573099415, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.00935672514619883, 0.5892857142857143, 'X[2] <= 12.5\ngini = 0.32\nsamples = 10\nvalue = [2, 8]'),
 Text(0.007017543859649123, 0.5535714285714286, 'X[6] <= 1.5\ngini = 0.48\nsamples = 5\nvalue = [2, 3]'),
 Text(0.004678362573099415, 0.5178571428571429, 'X[8] <= 146.0\ngini = 0.375\nsamples = 4\nvalue = [1, 3]'),
 Text(0.0023391812865497076, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0, 3]'),
 Text(0.007017543859649123, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.00935672514619883, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.011695906432748537, 0.5535714285714286, 'gini = 0.0\nsamples = 5\nvalue = [0, 5]'),
 Text(0.014035087719298246, 0.6607142857142857, 'X[6] <= 1.5\ngini = 0.496\nsamples = 11\nvalue = [6, 5]'),
 Text(0.011695906432748537, 0.625, 'gini = 0.0\nsamples = 3\nvalue = [3, 0]'),
 Text(0.016374269005847954, 0.625, 'X[3] <= 3.0\ngini = 0.469\nsamples = 8\nvalue = [3, 5]'),
 Text(0.014035087719298246, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.01871345029239766, 0.5892857142857143, 'X[8] <= 115.5\ngini = 0.5\nsamples = 6\nvalue = [3, 3]'),
```

```
 Text(0.016374269005847954, 0.5535714285714286, 'X[2] <= 23.5\ngini = 0.375\nsamples
= 4\nvalue = [1, 3]'),
 Text(0.014035087719298246, 0.5178571428571429, 'X[3] <= 4.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.011695906432748537, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue =
[1, 0]'),
 Text(0.016374269005847954, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue =
[0, 1]'),
 Text(0.01871345029239766, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.021052631578947368, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.044444444444444446, 0.7321428571428571, 'X[8] <= 49.5\ngini = 0.311\nsamples
= 52\nvalue = [10, 42]'),
 Text(0.03274853801169591, 0.6964285714285714, 'X[8] <= 20.5\ngini = 0.469\nsamples =
16\nvalue = [6, 10]'),
 Text(0.028070175438596492, 0.6607142857142857, 'X[7] <= 1.5\ngini = 0.32\nsamples =
10\nvalue = [2, 8]'),
 Text(0.025730994152046785, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.0304093567251462, 0.625, 'X[6] <= 3.5\ngini = 0.198\nsamples = 9\nvalue = [1,
8]'),
 Text(0.028070175438596492, 0.5892857142857143, 'X[8] <= 11.5\ngini = 0.5\nsamples =
2\nvalue = [1, 1]'),
 Text(0.025730994152046785, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.0304093567251462, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.03274853801169591, 0.5892857142857143, 'gini = 0.0\nsamples = 7\nvalue = [0,
7]'),
 Text(0.03742690058479532, 0.6607142857142857, 'X[4] <= 1.5\ngini = 0.444\nsamples =
6\nvalue = [4, 2]'),
 Text(0.03508771929824561, 0.625, 'gini = 0.0\nsamples = 3\nvalue = [3, 0]'),
 Text(0.03976608187134503, 0.625, 'X[2] <= 12.0\ngini = 0.444\nsamples = 3\nvalue =
[1, 2]'),
 Text(0.03742690058479532, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.042105263157894736, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.056140350877192984, 0.6964285714285714, 'X[6] <= 5.5\ngini = 0.198\nsamples =
36\nvalue = [4, 32]'),
 Text(0.05146198830409357, 0.6607142857142857, 'X[8] <= 97.5\ngini = 0.074\nsamples =
26\nvalue = [1, 25]'),
 Text(0.04912280701754386, 0.625, 'X[3] <= 3.0\ngini = 0.219\nsamples = 8\nvalue =
[1, 7]'),
 Text(0.04678362573099415, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.05146198830409357, 0.5892857142857143, 'gini = 0.0\nsamples = 7\nvalue = [0,
7]'),
 Text(0.05380116959064327, 0.625, 'gini = 0.0\nsamples = 18\nvalue = [0, 18]'),
 Text(0.0608187134502924, 0.6607142857142857, 'X[7] <= 6.5\ngini = 0.42\nsamples = 10
\nvalue = [3, 7]'),
 Text(0.05847953216374269, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
```

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 Text(0.06315789473684211, 0.625, 'X[3] <= 13.5\ngini = 0.219\nsamples = 8\nvalue =
[1, 7]'),
 Text(0.0608187134502924, 0.5892857142857143, 'X[8] <= 173.5\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.05847953216374269, 0.5535714285714286, 'X[7] <= 20.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.056140350877192984, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.0608187134502924, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.06315789473684211, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.06549707602339182, 0.5892857142857143, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.08538011695906433, 0.7678571428571429, 'X[2] <= 27.5\ngini = 0.226\nsamples =
54\nvalue = [7, 47]'),
 Text(0.07719298245614035, 0.7321428571428571, 'X[8] <= 66.5\ngini = 0.183\nsamples =
49\nvalue = [5, 44]'),
 Text(0.07485380116959064, 0.6964285714285714, 'gini = 0.0\nsamples = 20\nvalue = [0,
20]'),
 Text(0.07953216374269007, 0.6964285714285714, 'X[8] <= 96.5\ngini = 0.285\nsamples =
29\nvalue = [5, 24]'),
 Text(0.07485380116959064, 0.6607142857142857, 'X[7] <= 13.5\ngini = 0.48\nsamples =
5\nvalue = [3, 2]'),
 Text(0.07251461988304093, 0.625, 'X[7] <= 6.0\ngini = 0.444\nsamples = 3\nvalue =
[1, 2]'),
 Text(0.07017543859649122, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.07485380116959064, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.07719298245614035, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.08421052631578947, 0.6607142857142857, 'X[8] <= 154.5\ngini = 0.153\nsamples
= 24\nvalue = [2, 22]'),
 Text(0.08187134502923976, 0.625, 'gini = 0.0\nsamples = 16\nvalue = [0, 16]'),
 Text(0.08654970760233918, 0.625, 'X[8] <= 168.0\ngini = 0.375\nsamples = 8\nvalue =
[2, 6]'),
 Text(0.08421052631578947, 0.5892857142857143, 'X[6] <= 2.0\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.08187134502923976, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.08654970760233918, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.08888888888888889, 0.5892857142857143, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.0935672514619883, 0.7321428571428571, 'X[6] <= 4.5\ngini = 0.48\nsamples = 5
\nvalue = [2, 3]'),
 Text(0.0912280701754386, 0.6964285714285714, 'X[3] <= 39.5\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.08888888888888889, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.0935672514619883, 0.6607142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
```

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 Text(0.09590643274853801, 0.6964285714285714, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.11228070175438597, 0.8392857142857143, 'X[8] <= 221.5\ngini = 0.489\nsamples
= 66\nvalue = [28, 38]'),
 Text(0.10760233918128655, 0.8035714285714286, 'X[3] <= 31.0\ngini = 0.42\nsamples =
10\nvalue = [7, 3]'),
 Text(0.10526315789473684, 0.7678571428571429, 'X[6] <= 4.5\ngini = 0.346\nsamples =
9\nvalue = [7, 2]'),
 Text(0.10292397660818714, 0.7321428571428571, 'X[3] <= 3.0\ngini = 0.219\nsamples =
8\nvalue = [7, 1]'),
 Text(0.10058479532163743, 0.6964285714285714, 'X[7] <= 12.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.09824561403508772, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.10292397660818714, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.10526315789473684, 0.6964285714285714, 'gini = 0.0\nsamples = 6\nvalue = [6,
0]'),
 Text(0.10760233918128655, 0.7321428571428571, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.10994152046783626, 0.7678571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.11695906432748537, 0.8035714285714286, 'X[8] <= 254.5\ngini = 0.469\nsamples
= 56\nvalue = [21, 35]'),
 Text(0.11461988304093568, 0.7678571428571429, 'gini = 0.0\nsamples = 9\nvalue = [0,
9]'),
 Text(0.11929824561403508, 0.7678571428571429, 'X[6] <= 4.5\ngini = 0.494\nsamples =
47\nvalue = [21, 26]'),
 Text(0.11345029239766082, 0.7321428571428571, 'X[8] <= 533.5\ngini = 0.472\nsamples
= 34\nvalue = [13, 21]'),
 Text(0.1111111111111111, 0.6964285714285714, 'X[8] <= 528.5\ngini = 0.497\nsamples =
28\nvalue = [13, 15]'),
 Text(0.10877192982456141, 0.6607142857142857, 'X[8] <= 526.0\ngini = 0.488\nsamples
= 26\nvalue = [11, 15]'),
 Text(0.1064327485380117, 0.625, 'X[8] <= 256.5\ngini = 0.497\nsamples = 24\nvalue =
[11, 13]'),
 Text(0.10409356725146199, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.10877192982456141, 0.5892857142857143, 'X[8] <= 293.0\ngini = 0.491\nsamples
= 23\nvalue = [10, 13]'),
 Text(0.1023391812865497, 0.5535714285714286, 'X[8] <= 262.0\ngini = 0.278\nsamples =
6\nvalue = [1, 5]'),
 Text(0.1, 0.5178571428571429, 'X[8] <= 258.5\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.0976608187134503, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.1023391812865497, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.10467836257309941, 0.5178571428571429, 'gini = 0.0\nsamples = 4\nvalue = [0,
4]'),
 Text(0.1152046783625731, 0.5535714285714286, 'X[6] <= 1.5\ngini = 0.498\nsamples = 1
7\nvalue = [9, 8]'),
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 Text(0.10935672514619883, 0.5178571428571429, 'X[2] <= 15.0\ngini = 0.278\nsamples =
6\nvalue = [5, 1]'),
 Text(0.10701754385964912, 0.48214285714285715, 'X[1] <= 2.5\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.10467836257309941, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.10935672514619883, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.11169590643274854, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.12105263157894737, 0.5178571428571429, 'X[7] <= 17.5\ngini = 0.463\nsamples =
11\nvalue = [4, 7]'),
 Text(0.11637426900584795, 0.48214285714285715, 'X[8] <= 508.0\ngini = 0.48\nsamples
= 5\nvalue = [3, 2]'),
 Text(0.11403508771929824, 0.44642857142857145, 'X[2] <= 7.0\ngini = 0.375\nsamples =
4\nvalue = [3, 1]'),
 Text(0.11169590643274854, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.11637426900584795, 0.4107142857142857, 'X[0] <= 0.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.11403508771929824, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.11871345029239766, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.11871345029239766, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.12573099415204678, 0.48214285714285715, 'X[7] <= 28.0\ngini = 0.278\nsamples
= 6\nvalue = [1, 5]'),
 Text(0.12339181286549708, 0.44642857142857145, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.1280701754385965, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.1111111111111111, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.11345029239766082, 0.6607142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.11578947368421053, 0.6964285714285714, 'gini = 0.0\nsamples = 6\nvalue = [0,
6]'),
 Text(0.12514619883040937, 0.7321428571428571, 'X[3] <= 1.0\ngini = 0.473\nsamples =
13\nvalue = [8, 5]'),
 Text(0.12046783625730995, 0.6964285714285714, 'X[7] <= 27.0\ngini = 0.346\nsamples =
9\nvalue = [7, 2]'),
 Text(0.11812865497076024, 0.6607142857142857, 'X[2] <= 6.0\ngini = 0.219\nsamples =
8\nvalue = [7, 1]'),
 Text(0.11578947368421053, 0.625, 'X[2] <= 2.5\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.11345029239766082, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.11812865497076024, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.12046783625730995, 0.625, 'gini = 0.0\nsamples = 6\nvalue = [6, 0]'),
 Text(0.12280701754385964, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.12982456140350876, 0.6964285714285714, 'X[7] <= 16.5\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
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 Text(0.12748538011695906, 0.6607142857142857, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.13216374269005848, 0.6607142857142857, 'X[4] <= 1.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.12982456140350876, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.13450292397660818, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.25146655701754383, 0.875, 'X[7] <= 10.5\ngini = 0.156\nsamples = 787\nvalue =
[67, 720]'),
 Text(0.1783625730994152, 0.8392857142857143, 'X[8] <= 484.5\ngini = 0.074\nsamples =
261\nvalue = [10, 251]'),
 Text(0.16842105263157894, 0.8035714285714286, 'X[3] <= 38.5\ngini = 0.067\nsamples =
259\nvalue = [9, 250]'),
 Text(0.15555555555555556, 0.7678571428571429, 'X[3] <= 9.5\ngini = 0.05\nsamples = 2
34\nvalue = [6, 228]'),
 Text(0.14385964912280702, 0.7321428571428571, 'X[8] <= 480.5\ngini = 0.204\nsamples
= 26\nvalue = [3, 23]'),
 Text(0.1391812865497076, 0.6964285714285714, 'X[7] <= 7.5\ngini = 0.153\nsamples = 2
4\nvalue = [2, 22]'),
 Text(0.1368421052631579, 0.6607142857142857, 'gini = 0.0\nsamples = 17\nvalue = [0,
17]'),
 Text(0.1415204678362573, 0.6607142857142857, 'X[8] <= 201.5\ngini = 0.408\nsamples =
7\nvalue = [2, 5]'),
 Text(0.1391812865497076, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.14385964912280702, 0.625, 'X[4] <= 1.5\ngini = 0.278\nsamples = 6\nvalue =
[1, 5]'),
 Text(0.1415204678362573, 0.5892857142857143, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.14619883040935672, 0.5892857142857143, 'X[6] <= 4.5\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.14385964912280702, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.14853801169590644, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.14853801169590644, 0.6964285714285714, 'X[8] <= 482.0\ngini = 0.5\nsamples =
2\nvalue = [1, 1]'),
 Text(0.14619883040935672, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.15087719298245614, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.1672514619883041, 0.7321428571428571, 'X[6] <= 2.5\ngini = 0.028\nsamples = 2
08\nvalue = [3, 205]'),
 Text(0.1649122807017544, 0.6964285714285714, 'X[3] <= 33.5\ngini = 0.078\nsamples =
74\nvalue = [3, 71]'),
 Text(0.16023391812865498, 0.6607142857142857, 'X[6] <= 0.5\ngini = 0.032\nsamples =
62\nvalue = [1, 61]'),
 Text(0.15789473684210525, 0.625, 'X[8] <= 211.0\ngini = 0.095\nsamples = 20\nvalue =
[1, 19]'),
 Text(0.15555555555555556, 0.5892857142857143, 'X[3] <= 20.5\ngini = 0.219\nsamples =
8\nvalue = [1, 7]'),
 Text(0.15321637426900586, 0.5535714285714286, 'gini = 0.0\nsamples = 7\nvalue = [0,
7]'),
 Text(0.15789473684210525, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
```

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0]'),
 Text(0.16023391812865498, 0.5892857142857143, 'gini = 0.0\nsamples = 12\nvalue = [0,
12]'),
 Text(0.16257309941520467, 0.625, 'gini = 0.0\nsamples = 42\nvalue = [0, 42]'),
 Text(0.1695906432748538, 0.6607142857142857, 'X[6] <= 1.5\ngini = 0.278\nsamples = 1
2\nvalue = [2, 10]'),
 Text(0.1672514619883041, 0.625, 'gini = 0.0\nsamples = 8\nvalue = [0, 8]'),
 Text(0.17192982456140352, 0.625, 'X[3] <= 35.5\ngini = 0.5\nsamples = 4\nvalue = [2,
2]'),
 Text(0.1695906432748538, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.1742690058479532, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.1695906432748538, 0.6964285714285714, 'gini = 0.0\nsamples = 134\nvalue = [0,
134]'),
 Text(0.18128654970760233, 0.7678571428571429, 'X[2] <= 5.5\ngini = 0.211\nsamples =
25\nvalue = [3, 22]'),
 Text(0.17894736842105263, 0.7321428571428571, 'gini = 0.0\nsamples = 13\nvalue = [0,
13]'),
 Text(0.18362573099415205, 0.7321428571428571, 'X[2] <= 7.5\ngini = 0.375\nsamples =
12\nvalue = [3, 9]'),
 Text(0.18128654970760233, 0.6964285714285714, 'X[2] <= 6.5\ngini = 0.48\nsamples = 5
\nvalue = [3, 2]'),
 Text(0.17894736842105263, 0.6607142857142857, 'X[8] <= 437.0\ngini = 0.444\nsamples
= 3\nvalue = [1, 2]'),
 Text(0.17660818713450294, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.18128654970760233, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.18362573099415205, 0.6607142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.18596491228070175, 0.6964285714285714, 'gini = 0.0\nsamples = 7\nvalue = [0,
7]'),
 Text(0.18830409356725147, 0.8035714285714286, 'X[3] <= 38.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.18596491228070175, 0.7678571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.19064327485380117, 0.7678571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.3245705409356725, 0.8392857142857143, 'X[7] <= 17.5\ngini = 0.193\nsamples =
526\nvalue = [57, 469]'),
 Text(0.282328216374269, 0.8035714285714286, 'X[8] <= 473.5\ngini = 0.269\nsamples =
187\nvalue = [30, 157]'),
 Text(0.25588450292397663, 0.7678571428571429, 'X[8] <= 414.5\ngini = 0.244\nsamples
= 176\nvalue = [25, 151]'),
 Text(0.2263888888888889, 0.7321428571428571, 'X[3] <= 20.5\ngini = 0.301\nsamples =
103\nvalue = [19, 84]'),
 Text(0.20248538011695907, 0.6964285714285714, 'X[6] <= 1.5\ngini = 0.252\nsamples =
81\nvalue = [12, 69]'),
 Text(0.18830409356725147, 0.6607142857142857, 'X[8] <= 199.5\ngini = 0.133\nsamples
= 28\nvalue = [2, 26]'),
 Text(0.18596491228070175, 0.625, 'X[3] <= 17.5\ngini = 0.278\nsamples = 12\nvalue =
[2, 10]'),
 Text(0.18128654970760233, 0.5892857142857143, 'X[3] <= 12.0\ngini = 0.18\nsamples =
```

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10\nvalue = [1, 9]'),
 Text(0.17894736842105263, 0.5535714285714286, 'X[3] <= 10.5\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
 Text(0.17660818713450294, 0.5178571428571429, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.18128654970760233, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.18362573099415205, 0.5535714285714286, 'gini = 0.0\nsamples = 6\nvalue = [0,
6]'),
 Text(0.19064327485380117, 0.5892857142857143, 'X[2] <= 11.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.18830409356725147, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.19298245614035087, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.19064327485380117, 0.625, 'gini = 0.0\nsamples = 16\nvalue = [0, 16]'),
 Text(0.21666666666666667, 0.6607142857142857, 'X[8] <= 204.5\ngini = 0.306\nsamples
= 53\nvalue = [10, 43]'),
 Text(0.2064327485380117, 0.625, 'X[3] <= 17.5\ngini = 0.229\nsamples = 38\nvalue =
[5, 33]'),
 Text(0.204093567251462, 0.5892857142857143, 'X[7] <= 16.5\ngini = 0.285\nsamples = 2
9\nvalue = [5, 24]'),
 Text(0.1976608187134503, 0.5535714285714286, 'X[8] <= 200.5\ngini = 0.252\nsamples =
27\nvalue = [4, 23]'),
 Text(0.19181286549707602, 0.5178571428571429, 'X[3] <= 9.5\ngini = 0.133\nsamples =
14\nvalue = [1, 13]'),
 Text(0.18947368421052632, 0.48214285714285715, 'X[8] <= 199.0\ngini = 0.444\nsamples
= 3\nvalue = [1, 2]'),
 Text(0.1871345029239766, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.19181286549707602, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.19415204678362574, 0.48214285714285715, 'gini = 0.0\nsamples = 11\nvalue =
[0, 11]'),
 Text(0.20350877192982456, 0.5178571428571429, 'X[6] <= 2.5\ngini = 0.355\nsamples =
13\nvalue = [3, 10]'),
 Text(0.19883040935672514, 0.48214285714285715, 'X[8] <= 202.5\ngini = 0.48\nsamples
= 5\nvalue = [2, 3]'),
 Text(0.19649122807017544, 0.44642857142857145, 'X[3] <= 11.0\ngini = 0.444\nsamples
= 3\nvalue = [2, 1]'),
 Text(0.19415204678362574, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.19883040935672514, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.20116959064327486, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.20818713450292398, 0.48214285714285715, 'X[3] <= 10.5\ngini = 0.219\nsamples
= 8\nvalue = [1, 7]'),
 Text(0.20584795321637428, 0.44642857142857145, 'X[8] <= 201.5\ngini = 0.5\nsamples =
2\nvalue = [1, 1]'),
 Text(0.20350877192982456, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
```

```
 Text(0.20818713450292398, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.21052631578947367, 0.44642857142857145, 'gini = 0.0\nsamples = 6\nvalue = [0,
6]'),
 Text(0.21052631578947367, 0.5535714285714286, 'X[3] <= 12.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.20818713450292398, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.2128654970760234, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.20877192982456141, 0.5892857142857143, 'gini = 0.0\nsamples = 9\nvalue = [0,
9]'),
 Text(0.22690058479532163, 0.625, 'X[3] <= 17.0\ngini = 0.444\nsamples = 15\nvalue =
[5, 10]'),
 Text(0.2222222222222222, 0.5892857142857143, 'X[2] <= 15.5\ngini = 0.397\nsamples =
11\nvalue = [3, 8]'),
 Text(0.2198830409356725, 0.5535714285714286, 'X[8] <= 292.0\ngini = 0.5\nsamples = 6
\nvalue = [3, 3]'),
 Text(0.21754385964912282, 0.5178571428571429, 'X[7] <= 14.0\ngini = 0.48\nsamples =
5\nvalue = [2, 3]'),
 Text(0.2152046783625731, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.2198830409356725, 0.48214285714285715, 'X[1] <= 5.0\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
 Text(0.21754385964912282, 0.44642857142857145, 'X[3] <= 10.0\ngini = 0.444\nsamples
= 3\nvalue = [1, 2]'),
 Text(0.2152046783625731, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.2198830409356725, 0.4107142857142857, 'X[3] <= 14.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.21754385964912282, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.2222222222222222, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.2222222222222222, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.2222222222222222, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.22456140350877193, 0.5535714285714286, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.23157894736842105, 0.5892857142857143, 'X[2] <= 15.5\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
 Text(0.22923976608187135, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.23391812865497075, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.25029239766081873, 0.6964285714285714, 'X[6] <= 3.5\ngini = 0.434\nsamples =
22\nvalue = [7, 15]'),
 Text(0.247953216374269, 0.6607142857142857, 'X[8] <= 295.5\ngini = 0.475\nsamples =
18\nvalue = [7, 11]'),
 Text(0.2432748538011696, 0.625, 'X[6] <= 1.5\ngini = 0.469\nsamples = 8\nvalue = [5,
3]'),
 Text(0.2409356725146199, 0.5892857142857143, 'X[3] <= 22.0\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
```

```
 Text(0.23859649122807017, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.2432748538011696, 0.5535714285714286, 'X[6] <= 0.5\ngini = 0.5\nsamples = 2\n
value = [1, 1]'),
 Text(0.2409356725146199, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.24561403508771928, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.24561403508771928, 0.5892857142857143, 'gini = 0.0\nsamples = 4\nvalue = [4,
0]'),
 Text(0.25263157894736843, 0.625, 'X[3] <= 35.0\ngini = 0.32\nsamples = 10\nvalue =
[2, 8]'),
 Text(0.25029239766081873, 0.5892857142857143, 'gini = 0.0\nsamples = 6\nvalue = [0,
6]'),
 Text(0.2549707602339181, 0.5892857142857143, 'X[3] <= 37.0\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
 Text(0.25263157894736843, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.2573099415204678, 0.5535714285714286, 'X[6] <= 2.5\ngini = 0.444\nsamples = 3
\nvalue = [1, 2]'),
 Text(0.2549707602339181, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.2596491228070175, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.25263157894736843, 0.6607142857142857, 'gini = 0.0\nsamples = 4\nvalue = [0,
4]'),
 Text(0.28538011695906434, 0.7321428571428571, 'X[7] <= 16.5\ngini = 0.151\nsamples =
73\nvalue = [6, 67]'),
 Text(0.2760233918128655, 0.6964285714285714, 'X[3] <= 38.5\ngini = 0.116\nsamples =
65\nvalue = [4, 61]'),
 Text(0.26666666666666666, 0.6607142857142857, 'X[8] <= 461.5\ngini = 0.071\nsamples
= 54\nvalue = [2, 52]'),
 Text(0.26432748538011697, 0.625, 'gini = 0.0\nsamples = 29\nvalue = [0, 29]'),
 Text(0.26900584795321636, 0.625, 'X[8] <= 463.0\ngini = 0.147\nsamples = 25\nvalue =
[2, 23]'),
 Text(0.26432748538011697, 0.5892857142857143, 'X[3] <= 33.0\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.26198830409356727, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.26666666666666666, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.2736842105263158, 0.5892857142857143, 'X[3] <= 29.0\ngini = 0.087\nsamples =
22\nvalue = [1, 21]'),
 Text(0.27134502923976606, 0.5535714285714286, 'X[3] <= 27.5\ngini = 0.245\nsamples =
7\nvalue = [1, 6]'),
 Text(0.26900584795321636, 0.5178571428571429, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.2736842105263158, 0.5178571428571429, 'X[7] <= 15.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.27134502923976606, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.2760233918128655, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
```

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1]'),
 Text(0.2760233918128655, 0.5535714285714286, 'gini = 0.0\nsamples = 15\nvalue = [0,
15]'),
 Text(0.28538011695906434, 0.6607142857142857, 'X[8] <= 445.5\ngini = 0.298\nsamples
= 11\nvalue = [2, 9]'),
 Text(0.2807017543859649, 0.625, 'X[3] <= 39.5\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.2783625730994152, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.2830409356725146, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.29005847953216374, 0.625, 'X[8] <= 469.5\ngini = 0.198\nsamples = 9\nvalue =
[1, 8]'),
 Text(0.28771929824561404, 0.5892857142857143, 'gini = 0.0\nsamples = 7\nvalue = [0,
7]'),
 Text(0.29239766081871343, 0.5892857142857143, 'X[7] <= 12.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.29005847953216374, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.29473684210526313, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.29473684210526313, 0.6964285714285714, 'X[3] <= 31.5\ngini = 0.375\nsamples =
8\nvalue = [2, 6]'),
 Text(0.29239766081871343, 0.6607142857142857, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.2970760233918129, 0.6607142857142857, 'X[3] <= 37.0\ngini = 0.48\nsamples = 5
\nvalue = [2, 3]'),
 Text(0.29473684210526313, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.2994152046783626, 0.625, 'gini = 0.0\nsamples = 3\nvalue = [0, 3]'),
 Text(0.3087719298245614, 0.7678571428571429, 'X[3] <= 28.5\ngini = 0.496\nsamples =
11\nvalue = [5, 6]'),
 Text(0.3064327485380117, 0.7321428571428571, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.3111111111111111, 0.7321428571428571, 'X[3] <= 40.0\ngini = 0.375\nsamples =
8\nvalue = [2, 6]'),
 Text(0.3087719298245614, 0.6964285714285714, 'X[3] <= 31.5\ngini = 0.245\nsamples =
7\nvalue = [1, 6]'),
 Text(0.3064327485380117, 0.6607142857142857, 'X[2] <= 14.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.30409356725146197, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.3087719298245614, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.3111111111111111, 0.6607142857142857, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.3134502923976608, 0.6964285714285714, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.36681286549707603, 0.8035714285714286, 'X[2] <= 24.5\ngini = 0.147\nsamples =
339\nvalue = [27, 312]'),
 Text(0.34093567251461987, 0.7678571428571429, 'X[3] <= 40.5\ngini = 0.079\nsamples =
195\nvalue = [8, 187]'),
 Text(0.3333333333333333, 0.7321428571428571, 'X[3] <= 19.5\ngini = 0.061\nsamples =
189\nvalue = [6, 183]'),
 Text(0.32514619883040935, 0.6964285714285714, 'X[3] <= 17.5\ngini = 0.116\nsamples =
```

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81\nvalue = [5, 76]'),
 Text(0.3157894736842105, 0.6607142857142857, 'X[3] <= 15.5\ngini = 0.029\nsamples =
69\nvalue = [1, 68]'),
 Text(0.3134502923976608, 0.625, 'gini = 0.0\nsamples = 56\nvalue = [0, 56]'),
 Text(0.31812865497076026, 0.625, 'X[8] <= 204.5\ngini = 0.142\nsamples = 13\nvalue =
[1, 12]'),
 Text(0.3157894736842105, 0.5892857142857143, 'gini = 0.0\nsamples = 10\nvalue = [0,
10]'),
 Text(0.32046783625730996, 0.5892857142857143, 'X[8] <= 208.5\ngini = 0.444\nsamples
= 3\nvalue = [1, 2]'),
 Text(0.31812865497076026, 0.5535714285714286, 'X[7] <= 21.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.3157894736842105, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.32046783625730996, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.32280701754385965, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.3345029239766082, 0.6607142857142857, 'X[6] <= 3.5\ngini = 0.444\nsamples = 1
2\nvalue = [4, 8]'),
 Text(0.3321637426900585, 0.625, 'X[8] <= 202.5\ngini = 0.49\nsamples = 7\nvalue =
[4, 3]'),
 Text(0.3298245614035088, 0.5892857142857143, 'X[3] <= 18.5\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
 Text(0.32748538011695905, 0.5535714285714286, 'X[7] <= 18.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.32514619883040935, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.3298245614035088, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.3321637426900585, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.3345029239766082, 0.5892857142857143, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.3368421052631579, 0.625, 'gini = 0.0\nsamples = 5\nvalue = [0, 5]'),
 Text(0.34152046783625734, 0.6964285714285714, 'X[8] <= 483.5\ngini = 0.018\nsamples
= 108\nvalue = [1, 107]'),
 Text(0.3391812865497076, 0.6607142857142857, 'gini = 0.0\nsamples = 103\nvalue = [0,
103]'),
 Text(0.34385964912280703, 0.6607142857142857, 'X[7] <= 23.0\ngini = 0.32\nsamples =
5\nvalue = [1, 4]'),
 Text(0.34152046783625734, 0.625, 'X[3] <= 30.0\ngini = 0.444\nsamples = 3\nvalue =
[1, 2]'),
 Text(0.3391812865497076, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.34385964912280703, 0.5892857142857143, 'X[3] <= 34.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.34152046783625734, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.34619883040935673, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.34619883040935673, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
```

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 Text(0.3485380116959064, 0.7321428571428571, 'X[2] <= 20.5\ngini = 0.444\nsamples =
6\nvalue = [2, 4]'),
 Text(0.34619883040935673, 0.6964285714285714, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.3508771929824561, 0.6964285714285714, 'X[8] <= 480.5\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.3485380116959064, 0.6607142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.3532163742690059, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.39269005847953214, 0.7678571428571429, 'X[6] <= 2.5\ngini = 0.229\nsamples =
144\nvalue = [19, 125]'),
 Text(0.37953216374269005, 0.7321428571428571, 'X[8] <= 482.0\ngini = 0.355\nsamples
= 65\nvalue = [15, 50]'),
 Text(0.37719298245614036, 0.6964285714285714, 'X[8] <= 403.0\ngini = 0.328\nsamples
= 63\nvalue = [13, 50]'),
 Text(0.36608187134502923, 0.6607142857142857, 'X[3] <= 22.0\ngini = 0.408\nsamples =
35\nvalue = [10, 25]'),
 Text(0.35789473684210527, 0.625, 'X[7] <= 26.5\ngini = 0.278\nsamples = 24\nvalue =
[4, 20]'),
 Text(0.35555555555555557, 0.5892857142857143, 'X[7] <= 25.5\ngini = 0.375\nsamples =
16\nvalue = [4, 12]'),
 Text(0.3508771929824561, 0.5535714285714286, 'X[8] <= 200.0\ngini = 0.198\nsamples =
9\nvalue = [1, 8]'),
 Text(0.3485380116959064, 0.5178571428571429, 'X[3] <= 14.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.34619883040935673, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.3508771929824561, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.3532163742690059, 0.5178571428571429, 'gini = 0.0\nsamples = 7\nvalue = [0,
7]'),
 Text(0.36023391812865496, 0.5535714285714286, 'X[3] <= 17.0\ngini = 0.49\nsamples =
7\nvalue = [3, 4]'),
 Text(0.35789473684210527, 0.5178571428571429, 'X[8] <= 208.5\ngini = 0.32\nsamples =
5\nvalue = [1, 4]'),
 Text(0.35555555555555557, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.36023391812865496, 0.48214285714285715, 'X[3] <= 12.0\ngini = 0.5\nsamples =
2\nvalue = [1, 1]'),
 Text(0.35789473684210527, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.36257309941520466, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.36257309941520466, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.36023391812865496, 0.5892857142857143, 'gini = 0.0\nsamples = 8\nvalue = [0,
8]'),
 Text(0.3742690058479532, 0.625, 'X[2] <= 26.5\ngini = 0.496\nsamples = 11\nvalue =
[6, 5]'),
 Text(0.3719298245614035, 0.5892857142857143, 'X[3] <= 30.5\ngini = 0.469\nsamples =
8\nvalue = [3, 5]'),
```

```
 Text(0.3695906432748538, 0.5535714285714286, 'X[8] <= 208.5\ngini = 0.48\nsamples =
5\nvalue = [3, 2]'),
 Text(0.3672514619883041, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.3719298245614035, 0.5178571428571429, 'X[8] <= 304.0\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
 Text(0.3695906432748538, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.3742690058479532, 0.48214285714285715, 'X[6] <= 0.5\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.3719298245614035, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.37660818713450295, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.3742690058479532, 0.5535714285714286, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.37660818713450295, 0.5892857142857143, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.3883040935672515, 0.6607142857142857, 'X[3] <= 40.5\ngini = 0.191\nsamples =
28\nvalue = [3, 25]'),
 Text(0.38362573099415204, 0.625, 'X[2] <= 26.5\ngini = 0.142\nsamples = 26\nvalue =
[2, 24]'),
 Text(0.38128654970760234, 0.5892857142857143, 'gini = 0.0\nsamples = 16\nvalue = [0,
16]'),
 Text(0.38596491228070173, 0.5892857142857143, 'X[3] <= 35.0\ngini = 0.32\nsamples =
10\nvalue = [2, 8]'),
 Text(0.38362573099415204, 0.5535714285714286, 'X[3] <= 33.0\ngini = 0.408\nsamples =
7\nvalue = [2, 5]'),
 Text(0.38128654970760234, 0.5178571428571429, 'X[8] <= 448.0\ngini = 0.278\nsamples
= 6\nvalue = [1, 5]'),
 Text(0.37894736842105264, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.38362573099415204, 0.48214285714285715, 'X[8] <= 468.5\ngini = 0.444\nsamples
= 3\nvalue = [1, 2]'),
 Text(0.38128654970760234, 0.44642857142857145, 'X[3] <= 30.0\ngini = 0.5\nsamples =
2\nvalue = [1, 1]'),
 Text(0.37894736842105264, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.38362573099415204, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.38596491228070173, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.38596491228070173, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.3883040935672515, 0.5535714285714286, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.3929824561403509, 0.625, 'X[7] <= 26.0\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.3906432748538012, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.3953216374269006, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
```

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 Text(0.38187134502923975, 0.6964285714285714, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.4058479532163743, 0.7321428571428571, 'X[3] <= 10.5\ngini = 0.096\nsamples =
79\nvalue = [4, 75]'),
 Text(0.39766081871345027, 0.6964285714285714, 'X[3] <= 9.5\ngini = 0.26\nsamples = 1
3\nvalue = [2, 11]'),
 Text(0.3953216374269006, 0.6607142857142857, 'gini = 0.0\nsamples = 10\nvalue = [0,
10]'),
 Text(0.4, 0.6607142857142857, 'X[6] <= 3.5\ngini = 0.444\nsamples = 3\nvalue = [2,
1]'),
 Text(0.39766081871345027, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.4023391812865497, 0.625, 'X[8] <= 203.5\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.4, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.4046783625730994, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.41403508771929826, 0.6964285714285714, 'X[8] <= 419.5\ngini = 0.059\nsamples
= 66\nvalue = [2, 64]'),
 Text(0.41169590643274856, 0.6607142857142857, 'gini = 0.0\nsamples = 42\nvalue = [0,
42]'),
 Text(0.41637426900584795, 0.6607142857142857, 'X[3] <= 26.5\ngini = 0.153\nsamples =
24\nvalue = [2, 22]'),
 Text(0.41169590643274856, 0.625, 'X[7] <= 29.0\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.4093567251461988, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.41403508771929826, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.42105263157894735, 0.625, 'X[8] <= 429.0\ngini = 0.087\nsamples = 22\nvalue =
[1, 21]'),
 Text(0.41871345029239765, 0.5892857142857143, 'X[3] <= 34.0\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
 Text(0.41637426900584795, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.42105263157894735, 0.5535714285714286, 'X[3] <= 38.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.41871345029239765, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.4233918128654971, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.4233918128654971, 0.5892857142857143, 'gini = 0.0\nsamples = 18\nvalue = [0,
18]'),
 Text(0.7487470303362573, 0.9107142857142857, 'X[6] <= 5.5\ngini = 0.358\nsamples = 1
164\nvalue = [272, 892]'),
 Text(0.5444969846491228, 0.875, 'X[6] <= 0.5\ngini = 0.337\nsamples = 1034\nvalue =
[222, 812]'),
 Text(0.460233918128655, 0.8392857142857143, 'X[7] <= 7.5\ngini = 0.436\nsamples = 15
6\nvalue = [50, 106]'),
 Text(0.43742690058479533, 0.8035714285714286, 'X[8] <= 390.5\ngini = 0.493\nsamples
= 41\nvalue = [23, 18]'),
 Text(0.4327485380116959, 0.7678571428571429, 'X[3] <= 59.5\ngini = 0.437\nsamples =
31\nvalue = [21, 10]'),
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 Text(0.4304093567251462, 0.7321428571428571, 'gini = 0.0\nsamples = 7\nvalue = [7,
0]'),
 Text(0.43508771929824563, 0.7321428571428571, 'X[8] <= 205.0\ngini = 0.486\nsamples
= 24\nvalue = [14, 10]'),
 Text(0.4327485380116959, 0.6964285714285714, 'gini = 0.0\nsamples = 4\nvalue = [0,
4]'),
 Text(0.43742690058479533, 0.6964285714285714, 'X[3] <= 89.5\ngini = 0.42\nsamples =
20\nvalue = [14, 6]'),
 Text(0.4327485380116959, 0.6607142857142857, 'X[8] <= 321.0\ngini = 0.18\nsamples =
10\nvalue = [9, 1]'),
 Text(0.4304093567251462, 0.625, 'X[8] <= 291.0\ngini = 0.444\nsamples = 3\nvalue =
[2, 1]'),
 Text(0.4280701754385965, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.4327485380116959, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.43508771929824563, 0.625, 'gini = 0.0\nsamples = 7\nvalue = [7, 0]'),
 Text(0.4421052631578947, 0.6607142857142857, 'X[8] <= 237.5\ngini = 0.5\nsamples = 1
0\nvalue = [5, 5]'),
 Text(0.439766081871345, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.4444444444444444, 0.625, 'X[8] <= 290.0\ngini = 0.469\nsamples = 8\nvalue =
[3, 5]'),
 Text(0.4421052631578947, 0.5892857142857143, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.44678362573099417, 0.5892857142857143, 'X[0] <= 1.5\ngini = 0.48\nsamples = 5
\nvalue = [3, 2]'),
 Text(0.4444444444444444, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.44912280701754387, 0.5535714285714286, 'X[3] <= 92.5\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.44678362573099417, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.45146198830409356, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.4421052631578947, 0.7678571428571429, 'X[3] <= 77.5\ngini = 0.32\nsamples = 1
0\nvalue = [2, 8]'),
 Text(0.439766081871345, 0.7321428571428571, 'gini = 0.0\nsamples = 8\nvalue = [0,
8]'),
 Text(0.4444444444444444, 0.7321428571428571, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.4830409356725146, 0.8035714285714286, 'X[2] <= 21.5\ngini = 0.359\nsamples =
115\nvalue = [27, 88]'),
 Text(0.4666666666666667, 0.7678571428571429, 'X[8] <= 315.0\ngini = 0.263\nsamples =
90\nvalue = [14, 76]'),
 Text(0.45614035087719296, 0.7321428571428571, 'X[3] <= 52.5\ngini = 0.136\nsamples =
41\nvalue = [3, 38]'),
 Text(0.44912280701754387, 0.6964285714285714, 'X[3] <= 49.0\ngini = 0.375\nsamples =
8\nvalue = [2, 6]'),
 Text(0.44678362573099417, 0.6607142857142857, 'gini = 0.0\nsamples = 4\nvalue = [0,
4]'),
 Text(0.45146198830409356, 0.6607142857142857, 'X[8] <= 85.0\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
```

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 Text(0.44912280701754387, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.45380116959064326, 0.625, 'X[8] <= 155.5\ngini = 0.444\nsamples = 3\nvalue =
[2, 1]'),
 Text(0.45146198830409356, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.45614035087719296, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.4631578947368421, 0.6964285714285714, 'X[3] <= 95.5\ngini = 0.059\nsamples =
33\nvalue = [1, 32]'),
 Text(0.4608187134502924, 0.6607142857142857, 'gini = 0.0\nsamples = 25\nvalue = [0,
25]'),
 Text(0.4654970760233918, 0.6607142857142857, 'X[8] <= 242.0\ngini = 0.219\nsamples =
8\nvalue = [1, 7]'),
 Text(0.4631578947368421, 0.625, 'X[3] <= 96.5\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.4608187134502924, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.4654970760233918, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.4678362573099415, 0.625, 'gini = 0.0\nsamples = 6\nvalue = [0, 6]'),
 Text(0.47719298245614034, 0.7321428571428571, 'X[8] <= 319.0\ngini = 0.348\nsamples
= 49\nvalue = [11, 38]'),
 Text(0.47485380116959064, 0.6964285714285714, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.47953216374269003, 0.6964285714285714, 'X[3] <= 70.5\ngini = 0.287\nsamples =
46\nvalue = [8, 38]'),
 Text(0.47485380116959064, 0.6607142857142857, 'X[3] <= 67.0\ngini = 0.48\nsamples =
10\nvalue = [4, 6]'),
 Text(0.47251461988304094, 0.625, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
 Text(0.47719298245614034, 0.625, 'X[8] <= 421.5\ngini = 0.444\nsamples = 6\nvalue =
[4, 2]'),
 Text(0.47485380116959064, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.47953216374269003, 0.5892857142857143, 'gini = 0.0\nsamples = 4\nvalue = [4,
0]'),
 Text(0.4842105263157895, 0.6607142857142857, 'X[8] <= 359.5\ngini = 0.198\nsamples =
36\nvalue = [4, 32]'),
 Text(0.4818713450292398, 0.625, 'gini = 0.0\nsamples = 9\nvalue = [0, 9]'),
 Text(0.4865497076023392, 0.625, 'X[8] <= 437.0\ngini = 0.252\nsamples = 27\nvalue =
[4, 23]'),
 Text(0.4842105263157895, 0.5892857142857143, 'X[8] <= 434.0\ngini = 0.346\nsamples =
18\nvalue = [4, 14]'),
 Text(0.4818713450292398, 0.5535714285714286, 'X[8] <= 396.5\ngini = 0.291\nsamples =
17\nvalue = [3, 14]'),
 Text(0.47953216374269003, 0.5178571428571429, 'X[3] <= 92.5\ngini = 0.397\nsamples =
11\nvalue = [3, 8]'),
 Text(0.47719298245614034, 0.48214285714285715, 'X[3] <= 91.5\ngini = 0.469\nsamples
= 8\nvalue = [3, 5]'),
 Text(0.47485380116959064, 0.44642857142857145, 'X[1] <= 5.0\ngini = 0.408\nsamples =
7\nvalue = [2, 5]'),
 Text(0.47251461988304094, 0.4107142857142857, 'X[3] <= 85.5\ngini = 0.48\nsamples =
5\nvalue = [2, 3]'),
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 Text(0.47017543859649125, 0.375, 'X[2] <= 14.5\ngini = 0.375\nsamples = 4\nvalue =
[1, 3]'),
 Text(0.4678362573099415, 0.3392857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.47251461988304094, 0.3392857142857143, 'X[0] <= 1.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.47017543859649125, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.47485380116959064, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.47485380116959064, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.47719298245614034, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.47953216374269003, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.4818713450292398, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.4842105263157895, 0.5178571428571429, 'gini = 0.0\nsamples = 6\nvalue = [0,
6]'),
 Text(0.4865497076023392, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.4888888888888889, 0.5892857142857143, 'gini = 0.0\nsamples = 9\nvalue = [0,
9]'),
 Text(0.4994152046783626, 0.7678571428571429, 'X[8] <= 242.0\ngini = 0.499\nsamples =
25\nvalue = [13, 12]'),
 Text(0.4935672514619883, 0.7321428571428571, 'X[8] <= 136.5\ngini = 0.375\nsamples =
8\nvalue = [2, 6]'),
 Text(0.49122807017543857, 0.6964285714285714, 'X[1] <= 1.0\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.4888888888888889, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.4935672514619883, 0.6607142857142857, 'X[3] <= 53.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.49122807017543857, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.495906432748538, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.495906432748538, 0.6964285714285714, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.5052631578947369, 0.7321428571428571, 'X[8] <= 330.0\ngini = 0.457\nsamples =
17\nvalue = [11, 6]'),
 Text(0.5029239766081871, 0.6964285714285714, 'gini = 0.0\nsamples = 6\nvalue = [6,
0]'),
 Text(0.5076023391812865, 0.6964285714285714, 'X[1] <= 5.5\ngini = 0.496\nsamples = 1
1\nvalue = [5, 6]'),
 Text(0.5029239766081871, 0.6607142857142857, 'X[0] <= 0.5\ngini = 0.278\nsamples = 6
\nvalue = [1, 5]'),
 Text(0.5005847953216375, 0.625, 'X[8] <= 356.5\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(0.4982456140350877, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.5029239766081871, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.5052631578947369, 0.625, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
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 Text(0.512280701754386, 0.6607142857142857, 'X[3] <= 81.5\ngini = 0.32\nsamples = 5
\nvalue = [4, 1]'),
 Text(0.5099415204678363, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.5146198830409356, 0.625, 'gini = 0.0\nsamples = 4\nvalue = [4, 0]'),
 Text(0.6287600511695907, 0.8392857142857143, 'X[2] <= 3.5\ngini = 0.315\nsamples = 8
78\nvalue = [172, 706]'),
 Text(0.5210526315789473, 0.8035714285714286, 'X[3] <= 81.5\ngini = 0.159\nsamples =
103\nvalue = [9, 94]'),
 Text(0.512280701754386, 0.7678571428571429, 'X[8] <= 447.0\ngini = 0.033\nsamples =
59\nvalue = [1, 58]'),
 Text(0.5099415204678363, 0.7321428571428571, 'gini = 0.0\nsamples = 52\nvalue = [0,
52]'),
 Text(0.5146198830409356, 0.7321428571428571, 'X[3] <= 65.5\ngini = 0.245\nsamples =
7\nvalue = [1, 6]'),
 Text(0.512280701754386, 0.6964285714285714, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.5169590643274854, 0.6964285714285714, 'gini = 0.0\nsamples = 6\nvalue = [0,
6]'),
 Text(0.5298245614035088, 0.7678571428571429, 'X[8] <= 337.0\ngini = 0.298\nsamples =
44\nvalue = [8, 36]'),
 Text(0.5239766081871345, 0.7321428571428571, 'X[8] <= 232.5\ngini = 0.091\nsamples =
21\nvalue = [1, 20]'),
 Text(0.5216374269005848, 0.6964285714285714, 'X[1] <= 4.0\ngini = 0.375\nsamples = 4
\nvalue = [1, 3]'),
 Text(0.519298245614035, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.5239766081871345, 0.6607142857142857, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.5263157894736842, 0.6964285714285714, 'gini = 0.0\nsamples = 17\nvalue = [0,
17]'),
 Text(0.5356725146198831, 0.7321428571428571, 'X[8] <= 361.5\ngini = 0.423\nsamples =
23\nvalue = [7, 16]'),
 Text(0.5309941520467836, 0.6964285714285714, 'X[2] <= 0.5\ngini = 0.278\nsamples = 6
\nvalue = [5, 1]'),
 Text(0.5286549707602339, 0.6607142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.5333333333333333, 0.6607142857142857, 'gini = 0.0\nsamples = 5\nvalue = [5,
0]'),
 Text(0.5403508771929825, 0.6964285714285714, 'X[3] <= 86.5\ngini = 0.208\nsamples =
17\nvalue = [2, 15]'),
 Text(0.5380116959064327, 0.6607142857142857, 'X[2] <= 0.5\ngini = 0.408\nsamples = 7
\nvalue = [2, 5]'),
 Text(0.5356725146198831, 0.625, 'gini = 0.0\nsamples = 3\nvalue = [0, 3]'),
 Text(0.5403508771929825, 0.625, 'X[3] <= 85.5\ngini = 0.5\nsamples = 4\nvalue = [2,
2]'),
 Text(0.5380116959064327, 0.5892857142857143, 'X[2] <= 1.5\ngini = 0.444\nsamples = 3
\nvalue = [1, 2]'),
 Text(0.5356725146198831, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.5403508771929825, 0.5535714285714286, 'X[3] <= 84.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.5380116959064327, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
```

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0]'),
 Text(0.5426900584795321, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.5426900584795321, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.5426900584795321, 0.6607142857142857, 'gini = 0.0\nsamples = 10\nvalue = [0,
10]'),
 Text(0.7364674707602339, 0.8035714285714286, 'X[0] <= 1.5\ngini = 0.332\nsamples = 7
75\nvalue = [163, 612]'),
 Text(0.6215826023391813, 0.7678571428571429, 'X[8] <= 71.5\ngini = 0.297\nsamples =
540\nvalue = [98, 442]'),
 Text(0.5798245614035088, 0.7321428571428571, 'X[8] <= 66.0\ngini = 0.451\nsamples =
67\nvalue = [23, 44]'),
 Text(0.5690058479532164, 0.6964285714285714, 'X[7] <= 13.5\ngini = 0.425\nsamples =
62\nvalue = [19, 43]'),
 Text(0.5543859649122806, 0.6607142857142857, 'X[3] <= 59.5\ngini = 0.26\nsamples = 2
6\nvalue = [4, 22]'),
 Text(0.5497076023391813, 0.625, 'X[2] <= 5.5\ngini = 0.1\nsamples = 19\nvalue = [1,
18]'),
 Text(0.5473684210526316, 0.5892857142857143, 'X[3] <= 46.0\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.5450292397660819, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.5497076023391813, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.552046783625731, 0.5892857142857143, 'gini = 0.0\nsamples = 16\nvalue = [0, 1
6]'),
 Text(0.5590643274853802, 0.625, 'X[1] <= 1.0\ngini = 0.49\nsamples = 7\nvalue = [3,
4]'),
 Text(0.5567251461988304, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.5614035087719298, 0.5892857142857143, 'X[6] <= 2.5\ngini = 0.48\nsamples = 5
\nvalue = [3, 2]'),
 Text(0.5590643274853802, 0.5535714285714286, 'X[4] <= 1.5\ngini = 0.444\nsamples = 3
\nvalue = [1, 2]'),
 Text(0.5567251461988304, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.5614035087719298, 0.5178571428571429, 'X[2] <= 9.5\ngini = 0.5\nsamples = 2\n
value = [1, 1]'),
 Text(0.5590643274853802, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.5637426900584795, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.5637426900584795, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.583625730994152, 0.6607142857142857, 'X[3] <= 63.0\ngini = 0.486\nsamples = 3
6\nvalue = [15, 21]'),
 Text(0.5812865497076023, 0.625, 'X[8] <= 9.5\ngini = 0.463\nsamples = 33\nvalue = [1
2, 21]'),
 Text(0.5789473684210527, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.583625730994152, 0.5892857142857143, 'X[3] <= 59.5\ngini = 0.437\nsamples = 3
```

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1\nvalue = [10, 21]'),
 Text(0.5812865497076023, 0.5535714285714286, 'X[6] <= 3.5\ngini = 0.473\nsamples = 2
6\nvalue = [10, 16]'),
 Text(0.5730994152046783, 0.5178571428571429, 'X[8] <= 35.5\ngini = 0.415\nsamples =
17\nvalue = [5, 12]'),
 Text(0.5684210526315789, 0.48214285714285715, 'X[8] <= 11.5\ngini = 0.49\nsamples =
7\nvalue = [4, 3]'),
 Text(0.5660818713450292, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.5707602339181287, 0.44642857142857145, 'X[3] <= 46.0\ngini = 0.32\nsamples =
5\nvalue = [4, 1]'),
 Text(0.5684210526315789, 0.4107142857142857, 'X[2] <= 23.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.5660818713450292, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.5707602339181287, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.5730994152046783, 0.4107142857142857, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.5777777777777777, 0.48214285714285715, 'X[8] <= 64.0\ngini = 0.18\nsamples =
10\nvalue = [1, 9]'),
 Text(0.5754385964912281, 0.44642857142857145, 'gini = 0.0\nsamples = 9\nvalue = [0,
9]'),
 Text(0.5801169590643275, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.5894736842105263, 0.5178571428571429, 'X[2] <= 29.5\ngini = 0.494\nsamples =
9\nvalue = [5, 4]'),
 Text(0.5871345029239766, 0.48214285714285715, 'X[3] <= 52.5\ngini = 0.408\nsamples =
7\nvalue = [5, 2]'),
 Text(0.5847953216374269, 0.44642857142857145, 'gini = 0.0\nsamples = 4\nvalue = [4,
0]'),
 Text(0.5894736842105263, 0.44642857142857145, 'X[2] <= 22.5\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.5871345029239766, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.591812865497076, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.591812865497076, 0.48214285714285715, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.5859649122807018, 0.5535714285714286, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.5859649122807018, 0.625, 'gini = 0.0\nsamples = 3\nvalue = [3, 0]'),
 Text(0.5906432748538012, 0.6964285714285714, 'X[7] <= 21.5\ngini = 0.32\nsamples = 5
\nvalue = [4, 1]'),
 Text(0.5883040935672514, 0.6607142857142857, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.5929824561403508, 0.6607142857142857, 'X[8] <= 67.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.5906432748538012, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.5953216374269006, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.6633406432748538, 0.7321428571428571, 'X[3] <= 46.0\ngini = 0.267\nsamples =
473\nvalue = [75, 398]'),
 Text(0.6162280701754386, 0.6964285714285714, 'X[2] <= 14.5\ngini = 0.49\nsamples = 7
\nvalue = [3, 4]'),
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 Text(0.6138888888888889, 0.6607142857142857, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.6185672514619883, 0.6607142857142857, 'X[8] <= 102.5\ngini = 0.375\nsamples =
4\nvalue = [3, 1]'),
 Text(0.6162280701754386, 0.625, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.620906432748538, 0.625, 'gini = 0.0\nsamples = 3\nvalue = [3, 0]'),
 Text(0.7104532163742691, 0.6964285714285714, 'X[7] <= 24.5\ngini = 0.261\nsamples =
466\nvalue = [72, 394]'),
 Text(0.6682748538011696, 0.6607142857142857, 'X[2] <= 17.5\ngini = 0.236\nsamples =
366\nvalue = [50, 316]'),
 Text(0.6255847953216375, 0.625, 'X[1] <= 0.5\ngini = 0.271\nsamples = 241\nvalue =
[39, 202]'),
 Text(0.6035087719298246, 0.5892857142857143, 'X[3] <= 61.5\ngini = 0.42\nsamples = 2
0\nvalue = [6, 14]'),
 Text(0.5964912280701754, 0.5535714285714286, 'X[8] <= 160.0\ngini = 0.153\nsamples =
12\nvalue = [1, 11]'),
 Text(0.5941520467836258, 0.5178571428571429, 'gini = 0.0\nsamples = 9\nvalue = [0,
9]'),
 Text(0.5988304093567252, 0.5178571428571429, 'X[8] <= 190.5\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.5964912280701754, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6011695906432749, 0.48214285714285715, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.6105263157894737, 0.5535714285714286, 'X[8] <= 168.0\ngini = 0.469\nsamples =
8\nvalue = [5, 3]'),
 Text(0.6081871345029239, 0.5178571428571429, 'X[8] <= 102.5\ngini = 0.48\nsamples =
5\nvalue = [2, 3]'),
 Text(0.6058479532163743, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6105263157894737, 0.48214285714285715, 'X[2] <= 14.0\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
 Text(0.6081871345029239, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.6128654970760234, 0.44642857142857145, 'X[2] <= 15.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.6105263157894737, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6152046783625731, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.6128654970760234, 0.5178571428571429, 'gini = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(0.6476608187134503, 0.5892857142857143, 'X[8] <= 151.5\ngini = 0.254\nsamples =
221\nvalue = [33, 188]'),
 Text(0.624561403508772, 0.5535714285714286, 'X[3] <= 52.0\ngini = 0.413\nsamples = 2
4\nvalue = [7, 17]'),
 Text(0.6198830409356725, 0.5178571428571429, 'X[3] <= 50.5\ngini = 0.32\nsamples = 5
\nvalue = [4, 1]'),
 Text(0.6175438596491228, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.6222222222222222, 0.48214285714285715, 'gini = 0.0\nsamples = 4\nvalue = [4,
0]'),
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 Text(0.6292397660818714, 0.5178571428571429, 'X[8] <= 143.5\ngini = 0.266\nsamples = 19\nvalue = [3, 16]'),
 Text(0.6269005847953216, 0.48214285714285715, 'X[6] <= 1.5\ngini = 0.198\nsamples = 18\nvalue = [2, 16]'),
 Text(0.6222222222222222, 0.44642857142857145, 'X[8] <= 103.0\ngini = 0.5\nsamples = 2\nvalue = [1, 1]'),
 Text(0.6198830409356725, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.624561403508772, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.631578947368421, 0.44642857142857145, 'X[7] <= 13.5\ngini = 0.117\nsamples = 16\nvalue = [1, 15]'),
 Text(0.6292397660818714, 0.4107142857142857, 'gini = 0.0\nsamples = 11\nvalue = [0, 11]'),
 Text(0.6339181286549708, 0.4107142857142857, 'X[6] <= 3.5\ngini = 0.32\nsamples = 5\nvalue = [1, 4]'),
 Text(0.631578947368421, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.6362573099415205, 0.375, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
 Text(0.631578947368421, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.6707602339181287, 0.5535714285714286, 'X[1] <= 2.5\ngini = 0.229\nsamples = 197\nvalue = [26, 171]'),
 Text(0.6684210526315789, 0.5178571428571429, 'gini = 0.0\nsamples = 22\nvalue = [0, 22]'),
 Text(0.6730994152046783, 0.5178571428571429, 'X[8] <= 503.0\ngini = 0.253\nsamples = 175\nvalue = [26, 149]'),
 Text(0.6707602339181287, 0.48214285714285715, 'X[6] <= 4.5\ngini = 0.246\nsamples = 174\nvalue = [25, 149]'),
 Text(0.6479532163742691, 0.44642857142857145, 'X[8] <= 222.5\ngini = 0.209\nsamples = 143\nvalue = [17, 126]'),
 Text(0.6432748538011696, 0.4107142857142857, 'X[2] <= 13.5\ngini = 0.397\nsamples = 11\nvalue = [3, 8]'),
 Text(0.6409356725146199, 0.375, 'gini = 0.0\nsamples = 8\nvalue = [0, 8]'),
 Text(0.6456140350877193, 0.375, 'gini = 0.0\nsamples = 3\nvalue = [3, 0]'),
 Text(0.6526315789473685, 0.4107142857142857, 'X[3] <= 67.0\ngini = 0.19\nsamples = 132\nvalue = [14, 118]'),
 Text(0.6502923976608187, 0.375, 'gini = 0.0\nsamples = 17\nvalue = [0, 17]'),
 Text(0.6549707602339181, 0.375, 'X[3] <= 74.0\ngini = 0.214\nsamples = 115\nvalue = [14, 101]'),
 Text(0.6432748538011696, 0.3392857142857143, 'X[6] <= 3.5\ngini = 0.49\nsamples = 7\nvalue = [3, 4]'),
 Text(0.6409356725146199, 0.30357142857142855, 'X[8] <= 390.5\ngini = 0.32\nsamples = 5\nvalue = [1, 4]'),
 Text(0.6385964912280702, 0.26785714285714285, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.6432748538011696, 0.26785714285714285, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
 Text(0.6456140350877193, 0.30357142857142855, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.6666666666666666, 0.3392857142857143, 'X[6] <= 2.5\ngini = 0.183\nsamples = 108\nvalue = [11, 97]'),
 Text(0.6549707602339181, 0.30357142857142855, 'X[3] <= 97.5\ngini = 0.249\nsamples =
```

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55\nvalue = [8, 47]'),
 Text(0.6479532163742691, 0.26785714285714285, 'X[0] <= 0.5\ngini = 0.169\nsamples =
43\nvalue = [4, 39]'),
 Text(0.6456140350877193, 0.23214285714285715, 'X[3] <= 88.5\ngini = 0.278\nsamples =
24\nvalue = [4, 20]'),
 Text(0.6409356725146199, 0.19642857142857142, 'X[6] <= 1.5\ngini = 0.188\nsamples =
19\nvalue = [2, 17]'),
 Text(0.6385964912280702, 0.16071428571428573, 'gini = 0.0\nsamples = 9\nvalue = [0,
9]'),
 Text(0.6432748538011696, 0.16071428571428573, 'X[3] <= 85.5\ngini = 0.32\nsamples =
10\nvalue = [2, 8]'),
 Text(0.6409356725146199, 0.125, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
 Text(0.6456140350877193, 0.125, 'X[8] <= 318.5\ngini = 0.444\nsamples = 6\nvalue =
[2, 4]'),
 Text(0.6432748538011696, 0.08928571428571429, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.6479532163742691, 0.08928571428571429, 'X[8] <= 349.0\ngini = 0.444\nsamples
= 3\nvalue = [2, 1]'),
 Text(0.6456140350877193, 0.05357142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6502923976608187, 0.05357142857142857, 'X[7] <= 9.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.6479532163742691, 0.017857142857142856, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6526315789473685, 0.017857142857142856, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.6502923976608187, 0.19642857142857142, 'X[7] <= 9.0\ngini = 0.48\nsamples = 5
\nvalue = [2, 3]'),
 Text(0.6479532163742691, 0.16071428571428573, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.6526315789473685, 0.16071428571428573, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.6502923976608187, 0.23214285714285715, 'gini = 0.0\nsamples = 19\nvalue = [0,
19]'),
 Text(0.6619883040935672, 0.26785714285714285, 'X[2] <= 5.5\ngini = 0.444\nsamples =
12\nvalue = [4, 8]'),
 Text(0.6573099415204678, 0.23214285714285715, 'X[3] <= 99.5\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.6549707602339181, 0.19642857142857142, 'gini = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(0.6596491228070176, 0.19642857142857142, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.6666666666666666, 0.23214285714285715, 'X[8] <= 249.5\ngini = 0.346\nsamples
= 9\nvalue = [2, 7]'),
 Text(0.664327485380117, 0.19642857142857142, 'X[8] <= 241.0\ngini = 0.48\nsamples =
5\nvalue = [2, 3]'),
 Text(0.6619883040935672, 0.16071428571428573, 'gini = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(0.6666666666666666, 0.16071428571428573, 'X[8] <= 246.0\ngini = 0.444\nsamples
= 3\nvalue = [2, 1]'),
 Text(0.664327485380117, 0.125, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.6690058479532164, 0.125, 'X[8] <= 248.0\ngini = 0.5\nsamples = 2\nvalue = [1,
```

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1]'),
 Text(0.6666666666666666, 0.08928571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.6713450292397661, 0.08928571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6690058479532164, 0.19642857142857142, 'gini = 0.0\nsamples = 4\nvalue = [0,
4]'),
 Text(0.6783625730994152, 0.30357142857142855, 'X[4] <= 1.5\ngini = 0.107\nsamples =
53\nvalue = [3, 50]'),
 Text(0.6736842105263158, 0.26785714285714285, 'X[2] <= 7.5\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
 Text(0.6713450292397661, 0.23214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6760233918128655, 0.23214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0,
3]'),
 Text(0.6830409356725147, 0.26785714285714285, 'X[3] <= 94.5\ngini = 0.078\nsamples =
49\nvalue = [2, 47]'),
 Text(0.6807017543859649, 0.23214285714285715, 'X[3] <= 87.5\ngini = 0.147\nsamples =
25\nvalue = [2, 23]'),
 Text(0.6783625730994152, 0.19642857142857142, 'gini = 0.0\nsamples = 15\nvalue = [0,
15]'),
 Text(0.6830409356725147, 0.19642857142857142, 'X[6] <= 3.5\ngini = 0.32\nsamples = 1
0\nvalue = [2, 8]'),
 Text(0.6807017543859649, 0.16071428571428573, 'gini = 0.0\nsamples = 5\nvalue = [0,
5]'),
 Text(0.6853801169590643, 0.16071428571428573, 'X[8] <= 230.0\ngini = 0.48\nsamples =
5\nvalue = [2, 3]'),
 Text(0.6830409356725147, 0.125, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.6877192982456141, 0.125, 'X[3] <= 88.5\ngini = 0.5\nsamples = 4\nvalue = [2,
2]'),
 Text(0.6853801169590643, 0.08928571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6900584795321637, 0.08928571428571429, 'X[3] <= 91.5\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.6877192982456141, 0.05357142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.6923976608187135, 0.05357142857142857, 'X[8] <= 361.5\ngini = 0.5\nsamples =
2\nvalue = [1, 1]'),
 Text(0.6900584795321637, 0.017857142857142856, 'gini = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(0.6947368421052632, 0.017857142857142856, 'gini = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(0.6853801169590643, 0.23214285714285715, 'gini = 0.0\nsamples = 24\nvalue = [0,
24]'),
 Text(0.6935672514619883, 0.44642857142857145, 'X[3] <= 86.5\ngini = 0.383\nsamples =
31\nvalue = [8, 23]'),
 Text(0.6877192982456141, 0.4107142857142857, 'X[7] <= 12.5\ngini = 0.208\nsamples =
 17\nvalue = [2, 15]'),
 Text(0.6853801169590643, 0.375, 'X[0] <= 0.5\ngini = 0.375\nsamples = 8\nvalue = [2,
6]'),
 Text(0.6830409356725147, 0.3392857142857143, 'gini = 0.0\nsamples = 4\nvalue = [0,
 4]'),
```

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 Text(0.6877192982456141, 0.3392857142857143, 'X[8] <= 340.0\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
 Text(0.6853801169590643, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.6900584795321637, 0.30357142857142855, 'X[8] <= 417.5\ngini = 0.444\nsamples
 = 3\nvalue = [1, 2]'),
 Text(0.6877192982456141, 0.26785714285714285, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.6923976608187135, 0.26785714285714285, 'X[8] <= 463.5\ngini = 0.5\nsamples =
 2\nvalue = [1, 1]'),
 Text(0.6900584795321637, 0.23214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.6947368421052632, 0.23214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.6900584795321637, 0.375, 'gini = 0.0\nsamples = 9\nvalue = [0, 9]'),
 Text(0.6994152046783626, 0.4107142857142857, 'X[8] <= 234.0\ngini = 0.49\nsamples =
 14\nvalue = [6, 8]'),
 Text(0.6970760233918128, 0.375, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.7017543859649122, 0.375, 'X[8] <= 236.0\ngini = 0.5\nsamples = 12\nvalue =
 [6, 6]'),
 Text(0.6994152046783626, 0.3392857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.704093567251462, 0.3392857142857143, 'X[2] <= 12.5\ngini = 0.48\nsamples = 10
\nvalue = [4, 6]'),
 Text(0.6994152046783626, 0.30357142857142855, 'X[8] <= 349.0\ngini = 0.32\nsamples =
5\nvalue = [1, 4]'),
 Text(0.6970760233918128, 0.26785714285714285, 'gini = 0.0\nsamples = 4\nvalue = [0,
 4]'),
 Text(0.7017543859649122, 0.26785714285714285, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7087719298245614, 0.30357142857142855, 'X[3] <= 97.0\ngini = 0.48\nsamples =
 5\nvalue = [3, 2]'),
 Text(0.7064327485380117, 0.26785714285714285, 'X[8] <= 343.0\ngini = 0.444\nsamples
 = 3\nvalue = [1, 2]'),
 Text(0.704093567251462, 0.23214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7087719298245614, 0.23214285714285715, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.7111111111111111, 0.26785714285714285, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.6754385964912281, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7109649122807018, 0.625, 'X[8] <= 500.5\ngini = 0.161\nsamples = 125\nvalue =
[11, 114]'),
 Text(0.7062865497076023, 0.5892857142857143, 'X[3] <= 60.5\ngini = 0.137\nsamples =
 122\nvalue = [9, 113]'),
 Text(0.7039473684210527, 0.5535714285714286, 'gini = 0.0\nsamples = 29\nvalue = [0,
 29]'),
 Text(0.708625730994152, 0.5535714285714286, 'X[3] <= 61.5\ngini = 0.175\nsamples = 9
3\nvalue = [9, 84]'),
 Text(0.6982456140350877, 0.5178571428571429, 'X[2] <= 19.5\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
```

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 Text(0.695906432748538, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7005847953216374, 0.48214285714285715, 'X[2] <= 22.0\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.6982456140350877, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.7029239766081872, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7190058479532164, 0.5178571428571429, 'X[1] <= 1.5\ngini = 0.145\nsamples = 8
9\nvalue = [7, 82]'),
 Text(0.7099415204678362, 0.48214285714285715, 'X[8] <= 123.5\ngini = 0.444\nsamples
 = 6\nvalue = [2, 4]'),
 Text(0.7076023391812866, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.712280701754386, 0.44642857142857145, 'X[0] <= 0.5\ngini = 0.32\nsamples = 5
\nvalue = [1, 4]'),
 Text(0.7099415204678362, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.7146198830409357, 0.4107142857142857, 'X[8] <= 275.0\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.712280701754386, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.7169590643274854, 0.375, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.7280701754385965, 0.48214285714285715, 'X[8] <= 335.0\ngini = 0.113\nsamples
 = 83\nvalue = [5, 78]'),
 Text(0.7216374269005847, 0.44642857142857145, 'X[7] <= 22.5\ngini = 0.039\nsamples =
50\nvalue = [1, 49]'),
 Text(0.7192982456140351, 0.4107142857142857, 'gini = 0.0\nsamples = 43\nvalue = [0,
 43]'),
 Text(0.7239766081871345, 0.4107142857142857, 'X[8] <= 234.5\ngini = 0.245\nsamples =
7\nvalue = [1, 6]'),
 Text(0.7216374269005847, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.7263157894736842, 0.375, 'gini = 0.0\nsamples = 6\nvalue = [0, 6]'),
 Text(0.7345029239766082, 0.44642857142857145, 'X[3] <= 84.5\ngini = 0.213\nsamples =
33\nvalue = [4, 29]'),
 Text(0.7321637426900585, 0.4107142857142857, 'gini = 0.0\nsamples = 15\nvalue = [0,
 15]'),
 Text(0.7368421052631579, 0.4107142857142857, 'X[3] <= 85.5\ngini = 0.346\nsamples =
 18\nvalue = [4, 14]'),
 Text(0.7309941520467836, 0.375, 'X[2] <= 22.5\ngini = 0.444\nsamples = 3\nvalue =
 [2, 1]'),
 Text(0.7286549707602339, 0.3392857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.7333333333333333, 0.3392857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7426900584795322, 0.375, 'X[2] <= 19.5\ngini = 0.231\nsamples = 15\nvalue =
 [2, 13]'),
 Text(0.7380116959064328, 0.3392857142857143, 'X[3] <= 91.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.735672514619883, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7403508771929824, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
```

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 Text(0.7473684210526316, 0.3392857142857143, 'X[8] <= 342.0\ngini = 0.142\nsamples =
13\nvalue = [1, 12]'),
 Text(0.7450292397660818, 0.30357142857142855, 'X[6] <= 4.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.7426900584795322, 0.26785714285714285, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7473684210526316, 0.26785714285714285, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7497076023391813, 0.30357142857142855, 'gini = 0.0\nsamples = 11\nvalue = [0,
11]'),
 Text(0.7156432748538012, 0.5892857142857143, 'X[6] <= 2.0\ngini = 0.444\nsamples = 3
\nvalue = [2, 1]'),
 Text(0.7133040935672514, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7179824561403508, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.7526315789473684, 0.6607142857142857, 'X[6] <= 1.5\ngini = 0.343\nsamples = 1
00\nvalue = [22, 78]'),
 Text(0.7415204678362574, 0.625, 'X[1] <= 2.5\ngini = 0.346\nsamples = 9\nvalue = [7,
2]'),
 Text(0.7391812865497076, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.743859649122807, 0.5892857142857143, 'gini = 0.0\nsamples = 7\nvalue = [7,
 0]'),
 Text(0.7637426900584795, 0.625, 'X[8] <= 324.0\ngini = 0.275\nsamples = 91\nvalue =
 [15, 76]'),
 Text(0.7485380116959064, 0.5892857142857143, 'X[2] <= 27.5\ngini = 0.163\nsamples =
 56\nvalue = [5, 51]'),
 Text(0.7403508771929824, 0.5535714285714286, 'X[1] <= 2.5\ngini = 0.355\nsamples = 1
3\nvalue = [3, 10]'),
 Text(0.735672514619883, 0.5178571428571429, 'X[3] <= 57.0\ngini = 0.444\nsamples = 3
\nvalue = [2, 1]'),
 Text(0.7333333333333333, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7380116959064328, 0.48214285714285715, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.7450292397660818, 0.5178571428571429, 'X[3] <= 97.5\ngini = 0.18\nsamples = 1
0\nvalue = [1, 9]'),
 Text(0.7426900584795322, 0.48214285714285715, 'gini = 0.0\nsamples = 8\nvalue = [0,
 8]'),
 Text(0.7473684210526316, 0.48214285714285715, 'X[8] <= 247.0\ngini = 0.5\nsamples =
 2\nvalue = [1, 1]'),
 Text(0.7450292397660818, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7497076023391813, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7567251461988304, 0.5535714285714286, 'X[3] <= 53.5\ngini = 0.089\nsamples =
 43\nvalue = [2, 41]'),
 Text(0.7543859649122807, 0.5178571428571429, 'X[3] <= 51.5\ngini = 0.444\nsamples =
 6\nvalue = [2, 4]'),
 Text(0.752046783625731, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
```

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 Text(0.7567251461988304, 0.48214285714285715, 'X[7] <= 29.5\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.7543859649122807, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.7590643274853801, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7590643274853801, 0.5178571428571429, 'gini = 0.0\nsamples = 37\nvalue = [0,
 37]'),
 Text(0.7789473684210526, 0.5892857142857143, 'X[8] <= 381.0\ngini = 0.408\nsamples =
35\nvalue = [10, 25]'),
 Text(0.7730994152046784, 0.5535714285714286, 'X[8] <= 372.5\ngini = 0.498\nsamples =
17\nvalue = [9, 8]'),
 Text(0.7707602339181286, 0.5178571428571429, 'X[3] <= 94.5\ngini = 0.498\nsamples =
 15\nvalue = [7, 8]'),
 Text(0.7684210526315789, 0.48214285714285715, 'X[8] <= 366.5\ngini = 0.486\nsamples
 = 12\nvalue = [7, 5]'),
 Text(0.7637426900584795, 0.44642857142857145, 'X[8] <= 362.0\ngini = 0.375\nsamples
 = 8\nvalue = [6, 2]'),
 Text(0.7614035087719299, 0.4107142857142857, 'X[8] <= 353.0\ngini = 0.444\nsamples =
6\nvalue = [4, 2]'),
 Text(0.7590643274853801, 0.375, 'X[7] <= 27.5\ngini = 0.32\nsamples = 5\nvalue = [4,
1]'),
 Text(0.7567251461988304, 0.3392857142857143, 'X[1] <= 4.0\ngini = 0.5\nsamples = 2\n
value = [1, 1]'),
 Text(0.7543859649122807, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7590643274853801, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7614035087719299, 0.3392857142857143, 'gini = 0.0\nsamples = 3\nvalue = [3,
 0]'),
 Text(0.7637426900584795, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.7660818713450293, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.7730994152046784, 0.44642857142857145, 'X[8] <= 369.5\ngini = 0.375\nsamples
 = 4\nvalue = [1, 3]'),
 Text(0.7707602339181286, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.775438596491228, 0.4107142857142857, 'X[3] <= 85.5\ngini = 0.5\nsamples = 2\n
value = [1, 1]'),
 Text(0.7730994152046784, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.7777777777777778, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.7730994152046784, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
 Text(0.775438596491228, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.7847953216374269, 0.5535714285714286, 'X[3] <= 65.5\ngini = 0.105\nsamples =
 18\nvalue = [1, 17]'),
 Text(0.7824561403508772, 0.5178571428571429, 'X[6] <= 3.5\ngini = 0.375\nsamples = 4
\nvalue = [1, 3]'),
 Text(0.7801169590643274, 0.48214285714285715, 'X[7] <= 27.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.7777777777777778, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
```

```
 1]'),
 Text(0.7824561403508772, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7847953216374269, 0.48214285714285715, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.7871345029239766, 0.5178571428571429, 'gini = 0.0\nsamples = 14\nvalue = [0,
 14]'),
 Text(0.8513523391812865, 0.7678571428571429, 'X[3] <= 92.5\ngini = 0.4\nsamples = 23
5\nvalue = [65, 170]'),
 Text(0.8490131578947369, 0.7321428571428571, 'X[3] <= 75.5\ngini = 0.415\nsamples =
 221\nvalue = [65, 156]'),
 Text(0.8116959064327486, 0.6964285714285714, 'X[8] <= 419.5\ngini = 0.325\nsamples =
103\nvalue = [21, 82]'),
 Text(0.8, 0.6607142857142857, 'X[8] <= 392.5\ngini = 0.42\nsamples = 40\nvalue = [1
2, 28]'),
 Text(0.7941520467836257, 0.625, 'X[2] <= 21.5\ngini = 0.198\nsamples = 9\nvalue =
 [1, 8]'),
 Text(0.791812865497076, 0.5892857142857143, 'gini = 0.0\nsamples = 4\nvalue = [0,
 4]'),
 Text(0.7964912280701755, 0.5892857142857143, 'X[7] <= 22.5\ngini = 0.32\nsamples = 5
\nvalue = [1, 4]'),
 Text(0.7941520467836257, 0.5535714285714286, 'X[8] <= 390.0\ngini = 0.444\nsamples =
3\nvalue = [1, 2]'),
 Text(0.791812865497076, 0.5178571428571429, 'X[3] <= 72.0\ngini = 0.5\nsamples = 2\n
value = [1, 1]'),
 Text(0.7894736842105263, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7941520467836257, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7964912280701755, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.7988304093567251, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.8058479532163743, 0.625, 'X[8] <= 394.5\ngini = 0.458\nsamples = 31\nvalue =
 [11, 20]'),
 Text(0.8035087719298246, 0.5892857142857143, 'gini = 0.0\nsamples = 3\nvalue = [3,
 0]'),
 Text(0.808187134502924, 0.5892857142857143, 'X[7] <= 27.5\ngini = 0.408\nsamples = 2
8\nvalue = [8, 20]'),
 Text(0.8058479532163743, 0.5535714285714286, 'X[8] <= 417.5\ngini = 0.444\nsamples =
24\nvalue = [8, 16]'),
 Text(0.8035087719298246, 0.5178571428571429, 'X[7] <= 12.5\ngini = 0.397\nsamples =
 22\nvalue = [6, 16]'),
 Text(0.7988304093567251, 0.48214285714285715, 'X[8] <= 396.5\ngini = 0.165\nsamples
 = 11\nvalue = [1, 10]'),
 Text(0.7964912280701755, 0.44642857142857145, 'X[2] <= 8.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.7941520467836257, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.7988304093567251, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.8011695906432749, 0.44642857142857145, 'gini = 0.0\nsamples = 9\nvalue = [0,
```

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 9]'),
 Text(0.808187134502924, 0.48214285714285715, 'X[7] <= 17.0\ngini = 0.496\nsamples =
 11\nvalue = [5, 6]'),
 Text(0.8058479532163743, 0.44642857142857145, 'gini = 0.0\nsamples = 3\nvalue = [3,
 0]'),
 Text(0.8105263157894737, 0.44642857142857145, 'X[7] <= 22.5\ngini = 0.375\nsamples =
8\nvalue = [2, 6]'),
 Text(0.808187134502924, 0.4107142857142857, 'gini = 0.0\nsamples = 5\nvalue = [0,
 5]'),
 Text(0.8128654970760234, 0.4107142857142857, 'X[3] <= 73.0\ngini = 0.444\nsamples =
 3\nvalue = [2, 1]'),
 Text(0.8105263157894737, 0.375, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.8152046783625732, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.808187134502924, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.8105263157894737, 0.5535714285714286, 'gini = 0.0\nsamples = 4\nvalue = [0,
 4]'),
 Text(0.8233918128654971, 0.6607142857142857, 'X[8] <= 453.5\ngini = 0.245\nsamples =
63\nvalue = [9, 54]'),
 Text(0.8152046783625732, 0.625, 'X[6] <= 2.5\ngini = 0.153\nsamples = 48\nvalue =
 [4, 44]'),
 Text(0.8128654970760234, 0.5892857142857143, 'gini = 0.0\nsamples = 25\nvalue = [0,
 25]'),
 Text(0.8175438596491228, 0.5892857142857143, 'X[3] <= 69.5\ngini = 0.287\nsamples =
 23\nvalue = [4, 19]'),
 Text(0.8152046783625732, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8198830409356725, 0.5535714285714286, 'X[7] <= 15.5\ngini = 0.236\nsamples =
 22\nvalue = [3, 19]'),
 Text(0.8152046783625732, 0.5178571428571429, 'X[8] <= 436.5\ngini = 0.375\nsamples =
8\nvalue = [2, 6]'),
 Text(0.8128654970760234, 0.48214285714285715, 'gini = 0.0\nsamples = 5\nvalue = [0,
 5]'),
 Text(0.8175438596491228, 0.48214285714285715, 'X[6] <= 3.5\ngini = 0.444\nsamples =
 3\nvalue = [2, 1]'),
 Text(0.8152046783625732, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.8198830409356725, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.8245614035087719, 0.5178571428571429, 'X[8] <= 429.0\ngini = 0.133\nsamples =
14\nvalue = [1, 13]'),
 Text(0.8222222222222222, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8269005847953217, 0.48214285714285715, 'gini = 0.0\nsamples = 13\nvalue = [0,
13]'),
 Text(0.8315789473684211, 0.625, 'X[7] <= 13.0\ngini = 0.444\nsamples = 15\nvalue =
 [5, 10]'),
 Text(0.8292397660818713, 0.5892857142857143, 'gini = 0.0\nsamples = 4\nvalue = [0,
 4]'),
 Text(0.8339181286549707, 0.5892857142857143, 'X[8] <= 457.0\ngini = 0.496\nsamples =
11\nvalue = [5, 6]'),
 Text(0.8315789473684211, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
```

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 0]'),
 Text(0.8362573099415205, 0.5535714285714286, 'X[3] <= 74.5\ngini = 0.444\nsamples =
 9\nvalue = [3, 6]'),
 Text(0.8339181286549707, 0.5178571428571429, 'X[2] <= 24.0\ngini = 0.49\nsamples = 7
\nvalue = [3, 4]'),
 Text(0.8315789473684211, 0.48214285714285715, 'X[2] <= 15.5\ngini = 0.444\nsamples =
6\nvalue = [2, 4]'),
 Text(0.8292397660818713, 0.44642857142857145, 'X[3] <= 71.0\ngini = 0.444\nsamples =
3\nvalue = [2, 1]'),
 Text(0.8269005847953217, 0.4107142857142857, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.8315789473684211, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.8339181286549707, 0.44642857142857145, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
 Text(0.8362573099415205, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8385964912280702, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.8863304093567251, 0.6964285714285714, 'X[6] <= 4.5\ngini = 0.468\nsamples = 1
18\nvalue = [44, 74]'),
 Text(0.8755847953216375, 0.6607142857142857, 'X[7] <= 5.5\ngini = 0.482\nsamples = 1
06\nvalue = [43, 63]'),
 Text(0.8732456140350877, 0.625, 'gini = 0.0\nsamples = 7\nvalue = [0, 7]'),
 Text(0.8779239766081871, 0.625, 'X[7] <= 17.0\ngini = 0.491\nsamples = 99\nvalue =
 [43, 56]'),
 Text(0.8634502923976608, 0.5892857142857143, 'X[8] <= 439.0\ngini = 0.497\nsamples =
48\nvalue = [26, 22]'),
 Text(0.8508771929824561, 0.5535714285714286, 'X[3] <= 81.5\ngini = 0.497\nsamples =
 37\nvalue = [17, 20]'),
 Text(0.8432748538011696, 0.5178571428571429, 'X[3] <= 79.5\ngini = 0.408\nsamples =
 14\nvalue = [4, 10]'),
 Text(0.8409356725146199, 0.48214285714285715, 'X[7] <= 13.5\ngini = 0.5\nsamples = 8
\nvalue = [4, 4]'),
 Text(0.8385964912280702, 0.44642857142857145, 'X[8] <= 424.5\ngini = 0.444\nsamples
 = 6\nvalue = [2, 4]'),
 Text(0.8362573099415205, 0.4107142857142857, 'X[6] <= 3.0\ngini = 0.444\nsamples = 3
\nvalue = [2, 1]'),
 Text(0.8339181286549707, 0.375, 'gini = 0.0\nsamples = 2\nvalue = [2, 0]'),
 Text(0.8385964912280702, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.8409356725146199, 0.4107142857142857, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
 Text(0.8432748538011696, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.8456140350877193, 0.48214285714285715, 'gini = 0.0\nsamples = 6\nvalue = [0,
 6]'),
 Text(0.8584795321637427, 0.5178571428571429, 'X[3] <= 87.0\ngini = 0.491\nsamples =
 23\nvalue = [13, 10]'),
 Text(0.8502923976608188, 0.48214285714285715, 'X[6] <= 2.5\ngini = 0.298\nsamples =
 11\nvalue = [9, 2]'),
 Text(0.847953216374269, 0.44642857142857145, 'X[6] <= 1.5\ngini = 0.5\nsamples = 4\n
value = [2, 2]'),
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 Text(0.8456140350877193, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8502923976608188, 0.4107142857142857, 'X[2] <= 9.5\ngini = 0.444\nsamples = 3
\nvalue = [1, 2]'),
 Text(0.847953216374269, 0.375, 'X[3] <= 82.5\ngini = 0.5\nsamples = 2\nvalue = [1,
 1]'),
 Text(0.8456140350877193, 0.3392857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.8502923976608188, 0.3392857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8526315789473684, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.8526315789473684, 0.44642857142857145, 'gini = 0.0\nsamples = 7\nvalue = [7,
 0]'),
 Text(0.8666666666666667, 0.48214285714285715, 'X[2] <= 14.5\ngini = 0.444\nsamples =
12\nvalue = [4, 8]'),
 Text(0.8643274853801169, 0.44642857142857145, 'X[6] <= 2.5\ngini = 0.48\nsamples = 1
0\nvalue = [4, 6]'),
 Text(0.8596491228070176, 0.4107142857142857, 'X[8] <= 374.5\ngini = 0.32\nsamples =
 5\nvalue = [1, 4]'),
 Text(0.8573099415204678, 0.375, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
 Text(0.8619883040935673, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.8690058479532163, 0.4107142857142857, 'X[8] <= 332.0\ngini = 0.48\nsamples =
 5\nvalue = [3, 2]'),
 Text(0.8666666666666667, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(0.8713450292397661, 0.375, 'X[8] <= 378.5\ngini = 0.375\nsamples = 4\nvalue =
 [3, 1]'),
 Text(0.8690058479532163, 0.3392857142857143, 'gini = 0.0\nsamples = 3\nvalue = [3,
 0]'),
 Text(0.8736842105263158, 0.3392857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.8690058479532163, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.8760233918128655, 0.5535714285714286, 'X[3] <= 77.5\ngini = 0.298\nsamples =
 11\nvalue = [9, 2]'),
 Text(0.8736842105263158, 0.5178571428571429, 'gini = 0.0\nsamples = 5\nvalue = [5,
 0]'),
 Text(0.8783625730994152, 0.5178571428571429, 'X[8] <= 451.0\ngini = 0.444\nsamples =
6\nvalue = [4, 2]'),
 Text(0.8760233918128655, 0.48214285714285715, 'X[6] <= 3.5\ngini = 0.444\nsamples =
 3\nvalue = [1, 2]'),
 Text(0.8736842105263158, 0.44642857142857145, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.8783625730994152, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8807017543859649, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [3,
 0]'),
 Text(0.8923976608187134, 0.5892857142857143, 'X[8] <= 279.0\ngini = 0.444\nsamples =
51\nvalue = [17, 34]'),
 Text(0.8900584795321638, 0.5535714285714286, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.8947368421052632, 0.5535714285714286, 'X[8] <= 356.0\ngini = 0.425\nsamples =
49\nvalue = [15, 34]'),
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 Text(0.887719298245614, 0.5178571428571429, 'X[6] <= 1.5\ngini = 0.488\nsamples = 19
\nvalue = [8, 11]'),
 Text(0.8853801169590644, 0.48214285714285715, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
 Text(0.8900584795321638, 0.48214285714285715, 'X[7] <= 28.5\ngini = 0.5\nsamples = 1
6\nvalue = [8, 8]'),
 Text(0.887719298245614, 0.44642857142857145, 'X[8] <= 312.0\ngini = 0.473\nsamples =
13\nvalue = [8, 5]'),
 Text(0.8853801169590644, 0.4107142857142857, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.8900584795321638, 0.4107142857142857, 'X[7] <= 27.5\ngini = 0.444\nsamples =
 12\nvalue = [8, 4]'),
 Text(0.887719298245614, 0.375, 'X[8] <= 314.5\ngini = 0.5\nsamples = 8\nvalue = [4,
 4]'),
 Text(0.8853801169590644, 0.3392857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8900584795321638, 0.3392857142857143, 'X[8] <= 347.0\ngini = 0.49\nsamples =
 7\nvalue = [3, 4]'),
 Text(0.887719298245614, 0.30357142857142855, 'X[2] <= 21.5\ngini = 0.444\nsamples =
 6\nvalue = [2, 4]'),
 Text(0.8853801169590644, 0.26785714285714285, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.8900584795321638, 0.26785714285714285, 'X[8] <= 339.0\ngini = 0.48\nsamples =
5\nvalue = [2, 3]'),
 Text(0.887719298245614, 0.23214285714285715, 'X[8] <= 328.5\ngini = 0.375\nsamples =
4\nvalue = [1, 3]'),
 Text(0.8853801169590644, 0.19642857142857142, 'X[2] <= 24.5\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.8830409356725146, 0.16071428571428573, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.887719298245614, 0.16071428571428573, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8900584795321638, 0.19642857142857142, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.8923976608187134, 0.23214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8923976608187134, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.8923976608187134, 0.375, 'gini = 0.0\nsamples = 4\nvalue = [4, 0]'),
 Text(0.8923976608187134, 0.44642857142857145, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
 Text(0.9017543859649123, 0.5178571428571429, 'X[8] <= 373.5\ngini = 0.358\nsamples =
30\nvalue = [7, 23]'),
 Text(0.8994152046783626, 0.48214285714285715, 'gini = 0.0\nsamples = 4\nvalue = [0,
 4]'),
 Text(0.904093567251462, 0.48214285714285715, 'X[8] <= 376.0\ngini = 0.393\nsamples =
26\nvalue = [7, 19]'),
 Text(0.9017543859649123, 0.44642857142857145, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9064327485380117, 0.44642857142857145, 'X[7] <= 24.5\ngini = 0.365\nsamples =
25\nvalue = [6, 19]'),
 Text(0.8994152046783626, 0.4107142857142857, 'X[8] <= 423.5\ngini = 0.278\nsamples =
```

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18\nvalue = [3, 15]'),
 Text(0.8970760233918129, 0.375, 'X[3] <= 77.5\ngini = 0.397\nsamples = 11\nvalue =
 [3, 8]'),
 Text(0.8947368421052632, 0.3392857142857143, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.8994152046783626, 0.3392857142857143, 'X[4] <= 1.5\ngini = 0.444\nsamples = 9
\nvalue = [3, 6]'),
 Text(0.8970760233918129, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9017543859649123, 0.30357142857142855, 'X[2] <= 19.5\ngini = 0.375\nsamples =
8\nvalue = [2, 6]'),
 Text(0.8994152046783626, 0.26785714285714285, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.904093567251462, 0.26785714285714285, 'X[7] <= 21.5\ngini = 0.444\nsamples =
 6\nvalue = [2, 4]'),
 Text(0.9017543859649123, 0.23214285714285715, 'X[8] <= 381.0\ngini = 0.48\nsamples =
5\nvalue = [2, 3]'),
 Text(0.8994152046783626, 0.19642857142857142, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.904093567251462, 0.19642857142857142, 'X[3] <= 87.0\ngini = 0.5\nsamples = 4
\nvalue = [2, 2]'),
 Text(0.9017543859649123, 0.16071428571428573, 'X[6] <= 2.5\ngini = 0.444\nsamples =
 3\nvalue = [1, 2]'),
 Text(0.8994152046783626, 0.125, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.904093567251462, 0.125, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.9064327485380117, 0.16071428571428573, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9064327485380117, 0.23214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.9017543859649123, 0.375, 'gini = 0.0\nsamples = 7\nvalue = [0, 7]'),
 Text(0.9134502923976608, 0.4107142857142857, 'X[8] <= 455.0\ngini = 0.49\nsamples =
 7\nvalue = [3, 4]'),
 Text(0.9111111111111111, 0.375, 'X[7] <= 27.5\ngini = 0.444\nsamples = 6\nvalue =
 [2, 4]'),
 Text(0.9087719298245615, 0.3392857142857143, 'X[3] <= 76.5\ngini = 0.444\nsamples =
 3\nvalue = [2, 1]'),
 Text(0.9064327485380117, 0.30357142857142855, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.9111111111111111, 0.30357142857142855, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.9134502923976608, 0.3392857142857143, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
 Text(0.9157894736842105, 0.375, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(0.8970760233918129, 0.6607142857142857, 'X[8] <= 366.5\ngini = 0.153\nsamples =
12\nvalue = [1, 11]'),
 Text(0.8947368421052632, 0.625, 'gini = 0.0\nsamples = 8\nvalue = [0, 8]'),
 Text(0.8994152046783626, 0.625, 'X[8] <= 373.0\ngini = 0.375\nsamples = 4\nvalue =
 [1, 3]'),
 Text(0.8970760233918129, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9017543859649123, 0.5892857142857143, 'gini = 0.0\nsamples = 3\nvalue = [0,
 3]'),
```

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 Text(0.8536915204678363, 0.7321428571428571, 'gini = 0.0\nsamples = 14\nvalue = [0,
 14]'),
 Text(0.9529970760233918, 0.875, 'X[3] <= 90.0\ngini = 0.473\nsamples = 130\nvalue =
 [50, 80]'),
 Text(0.9258771929824562, 0.8392857142857143, 'X[7] <= 6.5\ngini = 0.491\nsamples = 9
7\nvalue = [42, 55]'),
 Text(0.9111111111111111, 0.8035714285714286, 'X[4] <= 0.5\ngini = 0.453\nsamples = 2
6\nvalue = [17, 9]'),
 Text(0.9087719298245615, 0.7678571428571429, 'gini = 0.0\nsamples = 5\nvalue = [5,
 0]'),
 Text(0.9134502923976608, 0.7678571428571429, 'X[3] <= 84.5\ngini = 0.49\nsamples = 2
1\nvalue = [12, 9]'),
 Text(0.9111111111111111, 0.7321428571428571, 'X[3] <= 52.5\ngini = 0.498\nsamples =
 17\nvalue = [8, 9]'),
 Text(0.9087719298245615, 0.6964285714285714, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.9134502923976608, 0.6964285714285714, 'X[8] <= 322.0\ngini = 0.48\nsamples =
 15\nvalue = [6, 9]'),
 Text(0.9111111111111111, 0.6607142857142857, 'gini = 0.0\nsamples = 4\nvalue = [0,
 4]'),
 Text(0.9157894736842105, 0.6607142857142857, 'X[8] <= 449.0\ngini = 0.496\nsamples =
11\nvalue = [6, 5]'),
 Text(0.9134502923976608, 0.625, 'X[0] <= 0.5\ngini = 0.444\nsamples = 9\nvalue = [6,
3]'),
 Text(0.9111111111111111, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.9157894736842105, 0.5892857142857143, 'X[3] <= 77.5\ngini = 0.375\nsamples =
 8\nvalue = [6, 2]'),
 Text(0.9134502923976608, 0.5535714285714286, 'X[8] <= 434.5\ngini = 0.48\nsamples =
 5\nvalue = [3, 2]'),
 Text(0.9111111111111111, 0.5178571428571429, 'X[3] <= 66.0\ngini = 0.444\nsamples =
 3\nvalue = [1, 2]'),
 Text(0.9087719298245615, 0.48214285714285715, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9134502923976608, 0.48214285714285715, 'gini = 0.0\nsamples = 2\nvalue = [0,
 2]'),
 Text(0.9157894736842105, 0.5178571428571429, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.9181286549707602, 0.5535714285714286, 'gini = 0.0\nsamples = 3\nvalue = [3,
 0]'),
 Text(0.9181286549707602, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.9157894736842105, 0.7321428571428571, 'gini = 0.0\nsamples = 4\nvalue = [4,
 0]'),
 Text(0.9406432748538012, 0.8035714285714286, 'X[7] <= 13.5\ngini = 0.456\nsamples =
 71\nvalue = [25, 46]'),
 Text(0.927485380116959, 0.7678571428571429, 'X[3] <= 88.0\ngini = 0.204\nsamples = 2
6\nvalue = [3, 23]'),
 Text(0.9251461988304094, 0.7321428571428571, 'X[8] <= 386.0\ngini = 0.147\nsamples =
25\nvalue = [2, 23]'),
 Text(0.9228070175438596, 0.6964285714285714, 'gini = 0.0\nsamples = 15\nvalue = [0,
 15]'),
 Text(0.927485380116959, 0.6964285714285714, 'X[8] <= 410.5\ngini = 0.32\nsamples = 1
```

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0\nvalue = [2, 8]'),
 Text(0.9251461988304094, 0.6607142857142857, 'X[3] <= 74.0\ngini = 0.48\nsamples = 5
\nvalue = [2, 3]'),
 Text(0.9228070175438596, 0.625, 'X[3] <= 67.5\ngini = 0.444\nsamples = 3\nvalue =
 [2, 1]'),
 Text(0.92046783625731, 0.5892857142857143, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.9251461988304094, 0.5892857142857143, 'gini = 0.0\nsamples = 2\nvalue = [2,
 0]'),
 Text(0.927485380116959, 0.625, 'gini = 0.0\nsamples = 2\nvalue = [0, 2]'),
 Text(0.9298245614035088, 0.6607142857142857, 'gini = 0.0\nsamples = 5\nvalue = [0,
 5]'),
 Text(0.9298245614035088, 0.7321428571428571, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9538011695906433, 0.7678571428571429, 'X[2] <= 20.5\ngini = 0.5\nsamples = 45
\nvalue = [22, 23]'),
 Text(0.9426900584795321, 0.7321428571428571, 'X[3] <= 86.5\ngini = 0.42\nsamples = 2
0\nvalue = [14, 6]'),
 Text(0.9403508771929825, 0.6964285714285714, 'X[8] <= 433.0\ngini = 0.388\nsamples =
19\nvalue = [14, 5]'),
 Text(0.9380116959064327, 0.6607142857142857, 'X[8] <= 335.5\ngini = 0.444\nsamples =
15\nvalue = [10, 5]'),
 Text(0.9321637426900585, 0.625, 'X[3] <= 56.5\ngini = 0.245\nsamples = 7\nvalue =
 [6, 1]'),
 Text(0.9298245614035088, 0.5892857142857143, 'X[4] <= 0.5\ngini = 0.5\nsamples = 2\n
value = [1, 1]'),
 Text(0.927485380116959, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9321637426900585, 0.5535714285714286, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 Text(0.9345029239766082, 0.5892857142857143, 'gini = 0.0\nsamples = 5\nvalue = [5,
 0]'),
 Text(0.9438596491228071, 0.625, 'X[3] <= 77.0\ngini = 0.5\nsamples = 8\nvalue = [4,
 4]'),
 Text(0.9391812865497076, 0.5892857142857143, 'X[1] <= 3.5\ngini = 0.375\nsamples = 4
\nvalue = [3, 1]'),
 Text(0.9368421052631579, 0.5535714285714286, 'X[8] <= 422.0\ngini = 0.5\nsamples = 2
\nvalue = [1, 1]'),
 Text(0.9345029239766082, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [1,
 0]'),
 Text(0.9391812865497076, 0.5178571428571429, 'gini = 0.0\nsamples = 1\nvalue = [0,
 1]'),
 ...]
```
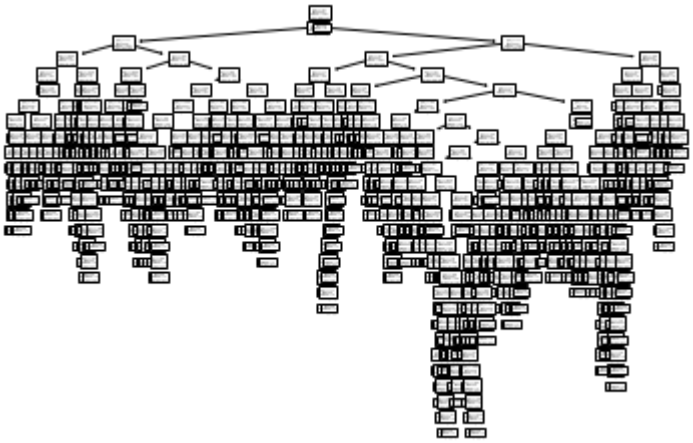



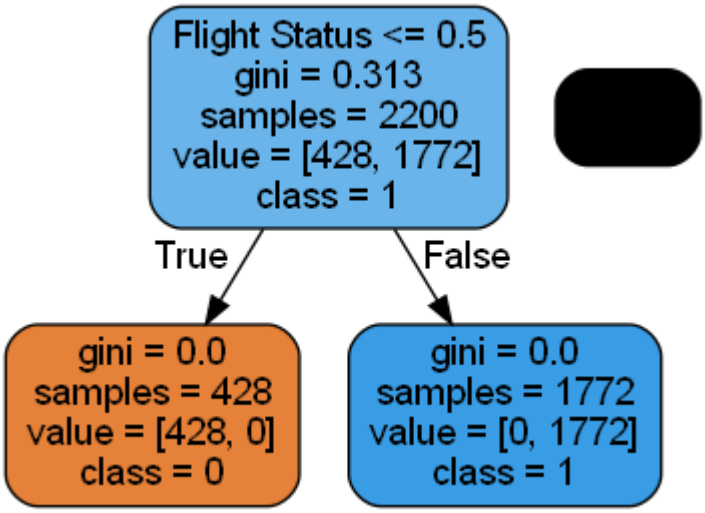
In [ ]:
```
#tree.plot_tree(classTree)
```

In [37]:
```
# The decision tree classifier.
clf = tree.DecisionTreeClassifier()
# Training the Decision Tree
clf_train = clf.fit(df1_enc, df1_enc['Flight Status'])
```

In [38]:
```
# Export/Print a decision tree in DOT format.
print(tree.export_graphviz(clf_train, None))

#Create Dot Data
dot_data = tree.export_graphviz(clf_train, out_file=None,
feature_names=list(df1_enc.columns.values),
                                class_names=['0', '1'], rounded=True,
filled=True) #Gini decides which attribute/feature should be placed at the
root node, which features will act as internal nodes or leaf nodes
#Create Graph from DOT data
graph = pydotplus.graph_from_dot_data(dot_data)

# Show graph
Image(graph.create_png())
```

```
digraph Tree {
node [shape=box, fontname="helvetica"] ;
edge [fontname="helvetica"] ;
0 [label="X[10] <= 0.5\ngini = 0.313\nsamples = 2200\nvalue = [428, 1772]"] ;
1 [label="gini = 0.0\nsamples = 428\nvalue = [428, 0]"] ;
0 -> 1 [labeldistance=2.5, labelangle=45, headlabel="True"] ;
2 [label="gini = 0.0\nsamples = 1772\nvalue = [0, 1772]"] ;
0 -> 2 [labeldistance=2.5, labelangle=-45, headlabel="False"] ;
}
```

Out[38]:



In [39]:

```
conda install -c conda-forge mord
```

```
Collecting package metadata (current_repodata.json): ...working... done
Solving environment: ...working... done

# All requested packages already installed.

Retrieving notices: ...working... done

Note: you may need to restart the kernel to use updated packages.
```

In [40]:

```
from sklearn.linear_model import LogisticRegression, LogisticRegressionCV
from sklearn.model_selection import train_test_split
import statsmodels.api as sm
from mord import LogisticIT
import matplotlib.pylab as plt
import seaborn as sns
from dmba import gainsChart, liftChart
from dmba.metric import AIC_score
```

In [41]:

```
df1_enc.columns = [c.replace(' ', '_') for c in df1_enc.columns]
```

In [42]:

```
# Treat fligh status as categorical, convert to dummy variables
df1_enc['Flight_Status'] = df1_enc['Flight_Status'].astype('category')
new_categories = {1: 'ontime', 0: 'delayed'}
df1_enc.Flight_Status.cat.rename_categories(new_categories, inplace=True)
df1_enc = pd.get_dummies(df1_enc, prefix_sep='_', drop_first=True)
```

```
C:\Users\heena\AppData\Local\Temp\ipykernel_14152\1922414456.py:4: FutureWarning: The
`inplace` parameter in pandas.Categorical.rename_categories is deprecated and will be
removed in a future version. Removing unused categories will always return a new Cate
gorical object.
  df1_enc.Flight_Status.cat.rename_categories(new_categories, inplace=True)
```

In [81]:
```
y
```

Out[81]:
```
1       1
2       0
3       1
4       1
5       1
       ..
2196    1
2197    1
2198    1
2199    1
2200    1
Name: Flight Status, Length: 2200, dtype: int64
```

In [82]:
```
# partition data
train_X, valid_X, train_y, valid_y = train_test_split(X, y, test_size=0.4,
random_state=1)
```

In [83]:
```
logit_reg = LogisticRegression(penalty="l2", C=1e42, solver='liblinear')
logit_reg.fit(train_X, train_y)
print('intercept ', logit_reg.intercept_[0])
print(pd.DataFrame({'coeff': logit_reg.coef_[0]},
index=X.columns).transpose())
print()
print('AIC', AIC_score(valid_y, logit_reg.predict(valid_X), df =
len(train_X.columns) + 1))
print()
print(logit_reg.fit(train_X, train_y))
```

```
intercept  1.8301581527507782
           DEST  DISTANCE   FL_DATE    FL_NUM    ORIGIN   Weather  DAY_WEEK  \
coeff  1.078001  -0.58214 -0.004549 -0.006326  0.981352 -4.040105  0.052181

       DAY_OF_MONTH  TAIL_NUM
coeff     -0.004549 -0.001352

AIC 1046.2325568971532

LogisticRegression(C=1e+42, solver='liblinear')
```

In [84]:

```
#predicting test results
logit_reg_pred = logit_reg.predict(valid_X)
logit_reg_proba = logit_reg.predict_proba(valid_X)
logit_result = pd.DataFrame({'actual': valid_y,
'p(0)': [p[0] for p in logit_reg_proba],
'p(1)': [p[1] for p in logit_reg_proba],
'predicted': logit_reg_pred })
```

In [78]:
```
logit_result
```

Out[78]:

	actual	p(0)	p(1)	predicted
1277	1	0.232733	0.767267	1
1447	1	0.193676	0.806324	1
336	1	0.082650	0.917350	1
1459	1	0.142561	0.857439	1
2039	1	0.306226	0.693774	1
...	...	...	...	...
1420	0	0.191152	0.808848	1
461	1	0.101104	0.898896	1
2064	1	0.299206	0.700794	1
160	1	0.123161	0.876839	1
2028	0	0.227853	0.772147	1

880 rows × 4 columns

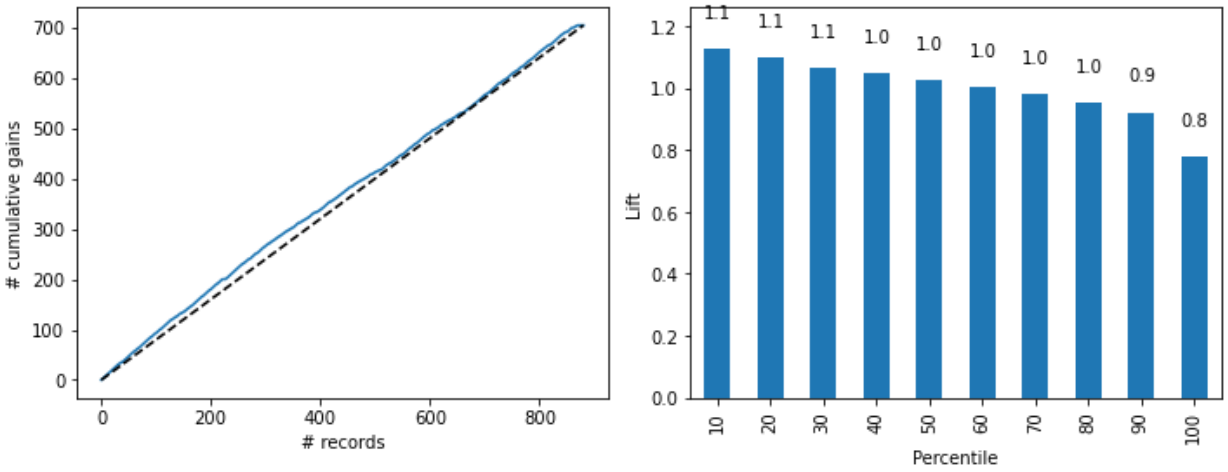
In [79]:
```
# training confusion matrix
cm=classificationSummary(train_y, logit_reg.predict(train_X))
```

```
Confusion Matrix (Accuracy 0.8250)

       Prediction
Actual    0    1
     0   21  231
     1    0 1068
```

In [95]:
```
# validation confusion matrix
classificationSummary(valid_y, logit_reg.predict(valid_X)
```

```
  Input In [95]
    classificationSummary(valid_y, logit_reg.predict(valid_X)
                                                             ^
SyntaxError: unexpected EOF while parsing
```

In [97]:
```
df = logit_result.sort_values(by=['p(1)'], ascending=False)
fig, axes = plt.subplots(nrows=1, ncols=2, figsize=(10, 4))
gainsChart(df.actual, ax=axes[0])
liftChart(df['p(1)'], title=False, ax=axes[1])
plt.tight_layout()
plt.show()
```



In [100…
```
from sklearn.metrics import confusion_matrix
```

In [101…
```
confusion_matrix = confusion_matrix(train_y,logit_reg.predict(train_X))
```

In [102…
```
#printing Confusion Matrix
print(confusion_matrix)
```

```
[[  21  231]
 [   0 1068]]
```

In [107…
```
#here True Positive value is : 21
#here True Negative value is : 1068
#here False Positive value is : 231
#here False Negative value is : 0

print('Confusion matrix\n\n', confusion_matrix)

print('\nActual Positives(AP) = ', confusion_matrix[0,0])

print('\nActual Negatives(AN) = ', confusion_matrix[1,1])

print('\nFalse Positives(FP) = ', confusion_matrix[0,1])
```

```
print('\nFalse Negatives(FN) = ', confusion_matrix[1,0])
```

```
Confusion matrix

 [[  21  231]
 [   0 1068]]

Actual Positives(AP) =  21

Actual Negatives(AN) =  1068

False Positives(FP) =  231

False Negatives(FN) =  0
```

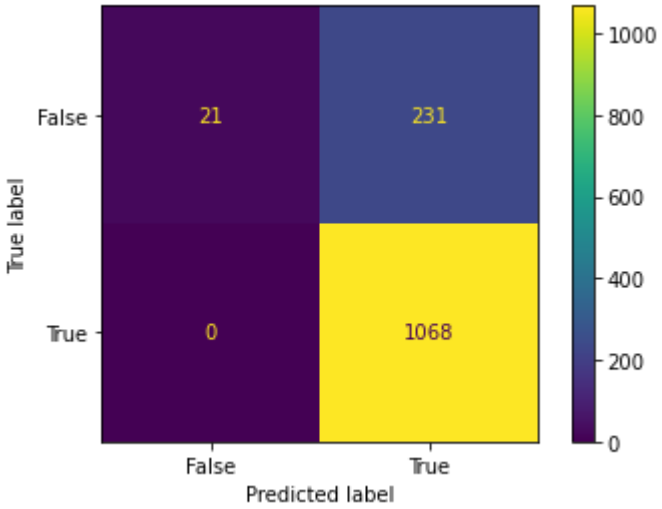
In [104…

```
#evaluating model using performance metrics
print(metrics.classification_report(train_y,logit_reg.predict(train_X)))
```

```
              precision    recall  f1-score   support

           0       1.00      0.08      0.15       252
           1       0.82      1.00      0.90      1068

    accuracy                           0.82      1320
   macro avg       0.91      0.54      0.53      1320
weighted avg       0.86      0.82      0.76      1320
```

In [117…

```
#displaying confution metrics Considering the actual and predicted value
of valid_Y using a heatmap

cm_display = metrics.ConfusionMatrixDisplay(confusion_matrix =
confusion_matrix, display_labels = [False, True])

cm_display.plot()
plt.show()
```



In [ ]:

In [109…
```
#Calculating accuracy
# (True Positive+True Negative)/Total Predictions
AP = confusion_matrix[0,0]
AN = confusion_matrix[1,1]
FP = confusion_matrix[0,1]
FN = confusion_matrix[1,0]
```

In [112…
```
#Finding Accuracy
accuracy = (AP + AN) / float(AP + AN + FP + FN)
```

In [111…
```
print('accuracy : {0:0.4f}'.format(accuracy))
```

```
accuracy : 0.8250
```

In [114…
```
#finding the error based on accuracy
error = 1-accuracy
```

In [115…
```
print('error : {0:0.4f}'.format(error))
```

```
error : 0.1750
```

In [71]:
```
# validation confusion matrix
classificationSummary(valid_y, logit_reg.predict(valid_X)
```

```
  Input In [71]
    classificationSummary(valid_y, logit_reg.predict(valid_X)
                                                             ^
SyntaxError: unexpected EOF while parsing
```

In [ ]: