Import Libraries

In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
from sklearn import metrics
%matplotlib inline
```

load dataset ¶

In [2]:

```
df = pd.read_csv("F:\dataset\datasets_228_482_diabetes.csv")
```

In [3]:

```
df.head()
```

Out[3]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunc
0	6	148	72	35	0	33.6	0.
1	1	85	66	29	0	26.6	0.
2	8	183	64	0	0	23.3	0.
3	1	89	66	23	94	28.1	0.
4	0	137	40	35	168	43.1	2.

In [4]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 768 entries, 0 to 767
Data columns (total 9 columns):
 #   Column                    Non-Null Count  Dtype  
---  ------                    --------------  -----  
 0   Pregnancies               768 non-null    int64  
 1   Glucose                   768 non-null    int64  
 2   BloodPressure             768 non-null    int64  
 3   SkinThickness             768 non-null    int64  
 4   Insulin                   768 non-null    int64  
 5   BMI                       768 non-null    float64
 6   DiabetesPedigreeFunction  768 non-null    float64
 7   Age                       768 non-null    int64  
 8   Outcome                   768 non-null    int64  
dtypes: float64(2), int64(7)
memory usage: 54.1 KB
```

In [5]:

```
df.describe()
```

Out[5]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	Diab
count	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	
mean	3.845052	120.894531	69.105469	20.536458	79.799479	31.992578	
std	3.369578	31.972618	19.355807	15.952218	115.244002	7.884160	
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	1.000000	99.000000	62.000000	0.000000	0.000000	27.300000	
50%	3.000000	117.000000	72.000000	23.000000	30.500000	32.000000	
75%	6.000000	140.250000	80.000000	32.000000	127.250000	36.600000	
max	17.000000	199.000000	122.000000	99.000000	846.000000	67.100000	

Exploretory Data Analysis

In [6]:

```
df.shape
```

Out[6]:

```
(768, 9)
```

In [7]:

```
sns.pairplot(df,kind='reg')
```

Out[7]:

```
<seaborn.axisgrid.PairGrid at 0x26031e78a88>
```

In [8]:

```
df["Outcome"].value_counts()
```

Out[8]:

```
0    500
1    268
Name: Outcome, dtype: int64
```

Split the dataset

In [9]:

```
x=df.drop(['Outcome'],1)
y=df['Outcome']
```

In [10]:

```
x.shape
```

Out[10]:

```
(768, 8)
```

In [11]:

```
y.shape
```

Out[11]:

```
(768,)
```

In [12]:

```
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.2,random_state=100)
```

In [13]:

```
print(x_train.shape)
print(y_train.shape)
print(x_test.shape)
print(y_test.shape)
```

```
(614, 8)
(614,)
(154, 8)
(154,)
```

In [14]:

```
x_train.head()
```

Out[14]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFu
660	10	162	84	0	0	27.7	
69	4	146	85	27	100	28.9	
85	2	110	74	29	125	32.4	
219	5	112	66	0	0	37.8	
712	10	129	62	36	0	41.2	

In [15]:

```
x_test.head()
```

Out[15]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFu
173	1	79	60	42	48	43.5	
253	0	86	68	32	0	35.8	
207	5	162	104	0	0	37.7	
737	8	65	72	23	0	32.0	
191	9	123	70	44	94	33.1	

In [16]:

```
y_train.head()
```

Out[16]:

```
660    0
69     0
85     0
219    1
712    1
Name: Outcome, dtype: int64
```

In [17]:

```
y_test.head()
```

Out[17]:

```
173    0
253    0
207    1
737    0
191    0
Name: Outcome, dtype: int64
```

Model

In [19]:

```
clf = DecisionTreeClassifier(criterion="entropy", max_depth=20)
clf = clf.fit(x_train,y_train)
y_pred = clf.predict(x_test)
print("Accuracy:",metrics.accuracy_score(y_test, y_pred))
```

```
Accuracy: 0.6883116883116883
```

In [20]:

```
from sklearn import tree
tree.plot_tree(clf)
```

Out[20]:

```
[Text(158.82902542372884, 209.07692307692307, 'X[1] <= 123.5\nentropy = 0.
934\nsamples = 614\nvalue = [399, 215]'),
 Text(65.73050847457628, 192.35076923076923, 'X[5] <= 26.95\nentropy = 0.6
47\nsamples = 357\nvalue = [298, 59]'),
 Text(61.94745762711865, 175.62461538461537, 'entropy = 0.0\nsamples = 111
\nvalue = [111, 0]'),
 Text(69.5135593220339, 175.62461538461537, 'X[7] <= 28.5\nentropy = 0.795
\nsamples = 246\nvalue = [187, 59]'),
 Text(37.83050847457628, 158.89846153846153, 'X[4] <= 91.0\nentropy = 0.43
5\nsamples = 123\nvalue = [112, 11]'),
 Text(22.698305084745765, 142.1723076923077, 'X[1] <= 111.5\nentropy = 0.5
57\nsamples = 77\nvalue = [67, 10]'),
 Text(11.349152542372883, 125.44615384615385, 'X[7] <= 24.5\nentropy = 0.3
53\nsamples = 60\nvalue = [56, 4]'),
 Text(7.566101694915255, 108.72, 'entropy = 0.0\nsamples = 38\nvalue = [3
8, 0]'),
 Text(15.13220338983051, 108.72, 'X[4] <= 84.5\nentropy = 0.684\nsamples =
22\nvalue = [18, 4]'),
 Text(11.349152542372883, 91.99384615384615, 'X[1] <= 106.5\nentropy = 0.4
69\nsamples = 20\nvalue = [18, 2]'),
 Text(7.566101694915255, 75.2676923076923, 'X[3] <= 40.5\nentropy = 0.297
\nsamples = 19\nvalue = [18, 1]'),
 Text(3.7830508474576274, 58.541538461538465, 'entropy = 0.0\nsamples = 17
\nvalue = [17, 0]'),
 Text(11.349152542372883, 58.541538461538465, 'X[5] <= 39.35\nentropy = 1.
0\nsamples = 2\nvalue = [1, 1]'),
 Text(7.566101694915255, 41.81538461538463, 'entropy = 0.0\nsamples = 1\nv
alue = [0, 1]'),
 Text(15.13220338983051, 41.81538461538463, 'entropy = 0.0\nsamples = 1\nv
alue = [1, 0]'),
 Text(15.13220338983051, 75.2676923076923, 'entropy = 0.0\nsamples = 1\nva
lue = [0, 1]'),
 Text(18.91525423728814, 91.99384615384615, 'entropy = 0.0\nsamples = 2\nv
alue = [0, 2]'),
 Text(34.047457627118646, 125.44615384615385, 'X[4] <= 26.5\nentropy = 0.9
37\nsamples = 17\nvalue = [11, 6]'),
 Text(30.26440677966102, 108.72, 'X[2] <= 75.5\nentropy = 1.0\nsamples = 1
2\nvalue = [6, 6]'),
 Text(26.481355932203392, 91.99384615384615, 'X[5] <= 30.25\nentropy = 0.9
18\nsamples = 9\nvalue = [6, 3]'),
 Text(22.698305084745765, 75.2676923076923, 'entropy = 0.0\nsamples = 3\nv
alue = [3, 0]'),
 Text(30.26440677966102, 75.2676923076923, 'X[5] <= 34.65\nentropy = 1.0\n
samples = 6\nvalue = [3, 3]'),
 Text(26.481355932203392, 58.541538461538465, 'entropy = 0.0\nsamples = 3
\nvalue = [0, 3]'),
 Text(34.047457627118646, 58.541538461538465, 'entropy = 0.0\nsamples = 3
\nvalue = [3, 0]'),
 Text(34.047457627118646, 91.99384615384615, 'entropy = 0.0\nsamples = 3\n
value = [0, 3]'),
 Text(37.83050847457628, 108.72, 'entropy = 0.0\nsamples = 5\nvalue = [5,
0]'),
 Text(52.962711864406785, 142.1723076923077, 'X[1] <= 93.5\nentropy = 0.15
1\nsamples = 46\nvalue = [45, 1]'),
 Text(49.179661016949154, 125.44615384615385, 'X[4] <= 142.5\nentropy = 0.
544\nsamples = 8\nvalue = [7, 1]'),
 Text(45.39661016949153, 108.72, 'entropy = 0.0\nsamples = 6\nvalue = [6,
0]'),
 Text(52.962711864406785, 108.72, 'X[7] <= 24.0\nentropy = 1.0\nsamples =
```

```
2\nvalue = [1, 1]'),
 Text(49.179661016949154, 91.99384615384615, 'entropy = 0.0\nsamples = 1\n
value = [0, 1]'),
 Text(56.74576271186441, 91.99384615384615, 'entropy = 0.0\nsamples = 1\nv
alue = [1, 0]'),
 Text(56.74576271186441, 125.44615384615385, 'entropy = 0.0\nsamples = 38
\nvalue = [38, 0]'),
 Text(101.19661016949154, 158.89846153846153, 'X[6] <= 0.625\nentropy = 0.
965\nsamples = 123\nvalue = [75, 48]'),
 Text(77.55254237288136, 142.1723076923077, 'X[1] <= 111.5\nentropy = 0.86
5\nsamples = 87\nvalue = [62, 25]'),
 Text(64.31186440677966, 125.44615384615385, 'X[5] <= 27.65\nentropy = 0.6
81\nsamples = 61\nvalue = [50, 11]'),
 Text(60.52881355932204, 108.72, 'entropy = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(68.09491525423729, 108.72, 'X[3] <= 36.5\nentropy = 0.616\nsamples =
59\nvalue = [50, 9]'),
 Text(64.31186440677966, 91.99384615384615, 'X[5] <= 34.7\nentropy = 0.722
\nsamples = 45\nvalue = [36, 9]'),
 Text(51.07118644067797, 75.2676923076923, 'X[7] <= 36.5\nentropy = 0.459
\nsamples = 31\nvalue = [28, 3]'),
 Text(47.288135593220346, 58.541538461538465, 'X[0] <= 5.5\nentropy = 0.77
9\nsamples = 13\nvalue = [10, 3]'),
 Text(43.505084745762716, 41.81538461538463, 'entropy = 0.0\nsamples = 9\n
value = [9, 0]'),
 Text(51.07118644067797, 41.81538461538463, 'X[6] <= 0.492\nentropy = 0.81
1\nsamples = 4\nvalue = [1, 3]'),
 Text(47.288135593220346, 25.089230769230767, 'entropy = 0.0\nsamples = 3
\nvalue = [0, 3]'),
 Text(54.8542372881356, 25.089230769230767, 'entropy = 0.0\nsamples = 1\nv
alue = [1, 0]'),
 Text(54.8542372881356, 58.541538461538465, 'entropy = 0.0\nsamples = 18\n
value = [18, 0]'),
 Text(77.55254237288136, 75.2676923076923, 'X[7] <= 53.5\nentropy = 0.985
\nsamples = 14\nvalue = [8, 6]'),
 Text(73.76949152542373, 58.541538461538465, 'X[3] <= 12.5\nentropy = 0.99
4\nsamples = 11\nvalue = [5, 6]'),
 Text(66.20338983050848, 41.81538461538463, 'X[1] <= 101.0\nentropy = 0.72
2\nsamples = 5\nvalue = [4, 1]'),
 Text(62.420338983050854, 25.089230769230767, 'entropy = 0.0\nsamples = 4
\nvalue = [4, 0]'),
 Text(69.9864406779661, 25.089230769230767, 'entropy = 0.0\nsamples = 1\nv
alue = [0, 1]'),
 Text(81.33559322033899, 41.81538461538463, 'X[1] <= 105.5\nentropy = 0.65
\nsamples = 6\nvalue = [1, 5]'),
 Text(77.55254237288136, 25.089230769230767, 'entropy = 0.0\nsamples = 5\n
value = [0, 5]'),
 Text(85.11864406779662, 25.089230769230767, 'entropy = 0.0\nsamples = 1\n
value = [1, 0]'),
 Text(81.33559322033899, 58.541538461538465, 'entropy = 0.0\nsamples = 3\n
value = [3, 0]'),
 Text(71.87796610169492, 91.99384615384615, 'entropy = 0.0\nsamples = 14\n
value = [14, 0]'),
 Text(90.79322033898306, 125.44615384615385, 'X[2] <= 67.0\nentropy = 0.99
6\nsamples = 26\nvalue = [12, 14]'),
 Text(83.2271186440678, 108.72, 'X[6] <= 0.159\nentropy = 0.544\nsamples =
8\nvalue = [1, 7]'),
 Text(79.44406779661017, 91.99384615384615, 'entropy = 0.0\nsamples = 1\nv
alue = [1, 0]'),
 Text(87.01016949152543, 91.99384615384615, 'entropy = 0.0\nsamples = 7\nv
alue = [0, 7]'),
```

```
 Text(98.35932203389831, 108.72, 'X[0] <= 1.5\nentropy = 0.964\nsamples =
18\nvalue = [11, 7]'),
 Text(94.57627118644069, 91.99384615384615, 'entropy = 0.0\nsamples = 3\nv
alue = [0, 3]'),
 Text(102.14237288135594, 91.99384615384615, 'X[1] <= 119.5\nentropy = 0.8
37\nsamples = 15\nvalue = [11, 4]'),
 Text(98.35932203389831, 75.2676923076923, 'X[2] <= 84.0\nentropy = 1.0\ns
amples = 8\nvalue = [4, 4]'),
 Text(94.57627118644069, 58.541538461538465, 'X[5] <= 36.8\nentropy = 0.72
2\nsamples = 5\nvalue = [1, 4]'),
 Text(90.79322033898306, 41.81538461538463, 'entropy = 0.0\nsamples = 4\nv
alue = [0, 4]'),
 Text(98.35932203389831, 41.81538461538463, 'entropy = 0.0\nsamples = 1\nv
alue = [1, 0]'),
 Text(102.14237288135594, 58.541538461538465, 'entropy = 0.0\nsamples = 3
\nvalue = [3, 0]'),
 Text(105.92542372881357, 75.2676923076923, 'entropy = 0.0\nsamples = 7\nv
alue = [7, 0]'),
 Text(124.84067796610171, 142.1723076923077, 'X[0] <= 8.5\nentropy = 0.944
\nsamples = 36\nvalue = [13, 23]'),
 Text(121.05762711864408, 125.44615384615385, 'X[1] <= 95.0\nentropy = 0.9
96\nsamples = 28\nvalue = [13, 15]'),
 Text(113.49152542372882, 108.72, 'X[4] <= 24.5\nentropy = 0.65\nsamples =
6\nvalue = [5, 1]'),
 Text(109.7084745762712, 91.99384615384615, 'entropy = 0.0\nsamples = 1\nv
alue = [0, 1]'),
 Text(117.27457627118645, 91.99384615384615, 'entropy = 0.0\nsamples = 5\n
value = [5, 0]'),
 Text(128.62372881355932, 108.72, 'X[0] <= 6.5\nentropy = 0.946\nsamples =
22\nvalue = [8, 14]'),
 Text(124.84067796610171, 91.99384615384615, 'X[4] <= 137.5\nentropy = 0.9
98\nsamples = 17\nvalue = [8, 9]'),
 Text(117.27457627118645, 75.2676923076923, 'X[7] <= 34.5\nentropy = 0.881
\nsamples = 10\nvalue = [7, 3]'),
 Text(113.49152542372882, 58.541538461538465, 'entropy = 0.0\nsamples = 5
\nvalue = [5, 0]'),
 Text(121.05762711864408, 58.541538461538465, 'X[5] <= 33.15\nentropy = 0.
971\nsamples = 5\nvalue = [2, 3]'),
 Text(117.27457627118645, 41.81538461538463, 'entropy = 0.0\nsamples = 3\n
value = [0, 3]'),
 Text(124.84067796610171, 41.81538461538463, 'entropy = 0.0\nsamples = 2\n
value = [2, 0]'),
 Text(132.40677966101697, 75.2676923076923, 'X[1] <= 122.5\nentropy = 0.59
2\nsamples = 7\nvalue = [1, 6]'),
 Text(128.62372881355932, 58.541538461538465, 'entropy = 0.0\nsamples = 6
\nvalue = [0, 6]'),
 Text(136.18983050847459, 58.541538461538465, 'entropy = 0.0\nsamples = 1
\nvalue = [1, 0]'),
 Text(132.40677966101697, 91.99384615384615, 'entropy = 0.0\nsamples = 5\n
value = [0, 5]'),
 Text(128.62372881355932, 125.44615384615385, 'entropy = 0.0\nsamples = 8
\nvalue = [0, 8]'),
 Text(251.9275423728814, 192.35076923076923, 'X[1] <= 166.5\nentropy = 0.9
67\nsamples = 257\nvalue = [101, 156]'),
 Text(199.31949152542376, 175.62461538461537, 'X[5] <= 29.95\nentropy = 0.
999\nsamples = 193\nvalue = [93, 100]'),
 Text(156.05084745762713, 158.89846153846153, 'X[0] <= 1.5\nentropy = 0.89
7\nsamples = 67\nvalue = [46, 21]'),
 Text(143.75593220338985, 142.1723076923077, 'X[7] <= 33.0\nentropy = 0.46
9\nsamples = 20\nvalue = [18, 2]'),
 Text(139.9728813559322, 125.44615384615385, 'entropy = 0.0\nsamples = 15
```

```
\nvalue = [15, 0]'),
 Text(147.53898305084746, 125.44615384615385, 'X[7] <= 50.5\nentropy = 0.9
71\nsamples = 5\nvalue = [3, 2]'),
 Text(143.75593220338985, 108.72, 'entropy = 0.0\nsamples = 2\nvalue = [0,
2]'),
 Text(151.3220338983051, 108.72, 'entropy = 0.0\nsamples = 3\nvalue = [3,
0]'),
 Text(168.3457627118644, 142.1723076923077, 'X[1] <= 125.5\nentropy = 0.97
3\nsamples = 47\nvalue = [28, 19]'),
 Text(164.5627118644068, 125.44615384615385, 'entropy = 0.0\nsamples = 5\n
value = [0, 5]'),
 Text(172.12881355932205, 125.44615384615385, 'X[7] <= 53.5\nentropy = 0.9
18\nsamples = 42\nvalue = [28, 14]'),
 Text(158.88813559322034, 108.72, 'X[7] <= 41.0\nentropy = 0.987\nsamples
= 30\nvalue = [17, 13]'),
 Text(151.3220338983051, 91.99384615384615, 'X[0] <= 3.5\nentropy = 0.863
\nsamples = 21\nvalue = [15, 6]'),
 Text(147.53898305084746, 75.2676923076923, 'X[5] <= 25.5\nentropy = 1.0\n
samples = 12\nvalue = [6, 6]'),
 Text(143.75593220338985, 58.541538461538465, 'entropy = 0.0\nsamples = 4
\nvalue = [4, 0]'),
 Text(151.3220338983051, 58.541538461538465, 'X[2] <= 74.5\nentropy = 0.81
1\nsamples = 8\nvalue = [2, 6]'),
 Text(147.53898305084746, 41.81538461538463, 'entropy = 0.0\nsamples = 5\n
value = [0, 5]'),
 Text(155.10508474576272, 41.81538461538463, 'X[4] <= 39.5\nentropy = 0.91
8\nsamples = 3\nvalue = [2, 1]'),
 Text(151.3220338983051, 25.089230769230767, 'entropy = 0.0\nsamples = 2\n
value = [2, 0]'),
 Text(158.88813559322034, 25.089230769230767, 'entropy = 0.0\nsamples = 1
\nvalue = [0, 1]'),
 Text(155.10508474576272, 75.2676923076923, 'entropy = 0.0\nsamples = 9\nv
alue = [9, 0]'),
 Text(166.4542372881356, 91.99384615384615, 'X[1] <= 141.5\nentropy = 0.76
4\nsamples = 9\nvalue = [2, 7]'),
 Text(162.67118644067799, 75.2676923076923, 'X[3] <= 30.5\nentropy = 0.918
\nsamples = 3\nvalue = [2, 1]'),
 Text(158.88813559322034, 58.541538461538465, 'entropy = 0.0\nsamples = 2
\nvalue = [2, 0]'),
 Text(166.4542372881356, 58.541538461538465, 'entropy = 0.0\nsamples = 1\n
value = [0, 1]'),
 Text(170.23728813559325, 75.2676923076923, 'entropy = 0.0\nsamples = 6\nv
alue = [0, 6]'),
 Text(185.36949152542374, 108.72, 'X[0] <= 4.5\nentropy = 0.414\nsamples =
12\nvalue = [11, 1]'),
 Text(181.58644067796612, 91.99384615384615, 'X[2] <= 75.0\nentropy = 0.91
8\nsamples = 3\nvalue = [2, 1]'),
 Text(177.80338983050848, 75.2676923076923, 'entropy = 0.0\nsamples = 1\nv
alue = [0, 1]'),
 Text(185.36949152542374, 75.2676923076923, 'entropy = 0.0\nsamples = 2\nv
alue = [2, 0]'),
 Text(189.15254237288138, 91.99384615384615, 'entropy = 0.0\nsamples = 9\n
value = [9, 0]'),
 Text(242.58813559322036, 158.89846153846153, 'X[6] <= 0.436\nentropy = 0.
953\nsamples = 126\nvalue = [47, 79]'),
 Text(216.57966101694916, 142.1723076923077, 'X[5] <= 41.8\nentropy = 1.0
\nsamples = 70\nvalue = [35, 35]'),
 Text(200.50169491525426, 125.44615384615385, 'X[5] <= 30.65\nentropy = 0.
973\nsamples = 52\nvalue = [31, 21]'),
 Text(196.71864406779662, 108.72, 'entropy = 0.0\nsamples = 5\nvalue = [0,
5]'),
```

```
 Text(204.28474576271188, 108.72, 'X[1] <= 130.0\nentropy = 0.925\nsamples
= 47\nvalue = [31, 16]'),
 Text(196.71864406779662, 91.99384615384615, 'X[7] <= 52.5\nentropy = 0.46
9\nsamples = 10\nvalue = [9, 1]'),
 Text(192.935593220339, 75.2676923076923, 'entropy = 0.0\nsamples = 9\nval
ue = [9, 0]'),
 Text(200.50169491525426, 75.2676923076923, 'entropy = 0.0\nsamples = 1\nv
alue = [0, 1]'),
 Text(211.85084745762714, 91.99384615384615, 'X[2] <= 61.0\nentropy = 0.97
4\nsamples = 37\nvalue = [22, 15]'),
 Text(208.0677966101695, 75.2676923076923, 'entropy = 0.0\nsamples = 4\nva
lue = [0, 4]'),
 Text(215.63389830508476, 75.2676923076923, 'X[5] <= 34.1\nentropy = 0.918
\nsamples = 33\nvalue = [22, 11]'),
 Text(206.1762711864407, 58.541538461538465, 'X[1] <= 160.5\nentropy = 0.7
02\nsamples = 21\nvalue = [17, 4]'),
 Text(198.61016949152545, 41.81538461538463, 'X[1] <= 135.0\nentropy = 0.5
03\nsamples = 18\nvalue = [16, 2]'),
 Text(194.8271186440678, 25.089230769230767, 'X[7] <= 38.0\nentropy = 0.97
1\nsamples = 5\nvalue = [3, 2]'),
 Text(191.0440677966102, 8.363076923076932, 'entropy = 0.0\nsamples = 3\nv
alue = [3, 0]'),
 Text(198.61016949152545, 8.363076923076932, 'entropy = 0.0\nsamples = 2\n
value = [0, 2]'),
 Text(202.39322033898307, 25.089230769230767, 'entropy = 0.0\nsamples = 13
\nvalue = [13, 0]'),
 Text(213.74237288135595, 41.81538461538463, 'X[6] <= 0.304\nentropy = 0.9
18\nsamples = 3\nvalue = [1, 2]'),
 Text(209.95932203389833, 25.089230769230767, 'entropy = 0.0\nsamples = 2
\nvalue = [0, 2]'),
 Text(217.52542372881356, 25.089230769230767, 'entropy = 0.0\nsamples = 1
\nvalue = [1, 0]'),
 Text(225.09152542372883, 58.541538461538465, 'X[2] <= 72.0\nentropy = 0.9
8\nsamples = 12\nvalue = [5, 7]'),
 Text(221.3084745762712, 41.81538461538463, 'entropy = 0.0\nsamples = 4\nv
alue = [0, 4]'),
 Text(228.87457627118647, 41.81538461538463, 'X[7] <= 32.5\nentropy = 0.95
4\nsamples = 8\nvalue = [5, 3]'),
 Text(225.09152542372883, 25.089230769230767, 'entropy = 0.0\nsamples = 4
\nvalue = [4, 0]'),
 Text(232.6576271186441, 25.089230769230767, 'X[6] <= 0.251\nentropy = 0.8
11\nsamples = 4\nvalue = [1, 3]'),
 Text(228.87457627118647, 8.363076923076932, 'entropy = 0.0\nsamples = 1\n
value = [1, 0]'),
 Text(236.4406779661017, 8.363076923076932, 'entropy = 0.0\nsamples = 3\nv
alue = [0, 3]'),
 Text(232.6576271186441, 125.44615384615385, 'X[6] <= 0.373\nentropy = 0.7
64\nsamples = 18\nvalue = [4, 14]'),
 Text(228.87457627118647, 108.72, 'X[6] <= 0.197\nentropy = 0.544\nsamples
= 16\nvalue = [2, 14]'),
 Text(225.09152542372883, 91.99384615384615, 'entropy = 0.0\nsamples = 1\n
value = [1, 0]'),
 Text(232.6576271186441, 91.99384615384615, 'X[1] <= 163.5\nentropy = 0.35
3\nsamples = 15\nvalue = [1, 14]'),
 Text(228.87457627118647, 75.2676923076923, 'entropy = 0.0\nsamples = 13\n
value = [0, 13]'),
 Text(236.4406779661017, 75.2676923076923, 'X[6] <= 0.3\nentropy = 1.0\nsa
mples = 2\nvalue = [1, 1]'),
 Text(232.6576271186441, 58.541538461538465, 'entropy = 0.0\nsamples = 1\n
value = [1, 0]'),
 Text(240.22372881355935, 58.541538461538465, 'entropy = 0.0\nsamples = 1
```

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\nvalue = [0, 1]'),
 Text(236.4406779661017, 108.72, 'entropy = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(268.59661016949156, 142.1723076923077, 'X[7] <= 29.5\nentropy = 0.75
\nsamples = 56\nvalue = [12, 44]'),
 Text(259.13898305084746, 125.44615384615385, 'X[2] <= 61.0\nentropy = 0.9
71\nsamples = 20\nvalue = [8, 12]'),
 Text(255.35593220338984, 108.72, 'entropy = 0.0\nsamples = 6\nvalue = [0,
6]'),
 Text(262.92203389830513, 108.72, 'X[6] <= 0.731\nentropy = 0.985\nsamples
= 14\nvalue = [8, 6]'),
 Text(255.35593220338984, 91.99384615384615, 'X[3] <= 5.5\nentropy = 0.764
\nsamples = 9\nvalue = [7, 2]'),
 Text(251.57288135593222, 75.2676923076923, 'X[6] <= 0.674\nentropy = 0.91
8\nsamples = 3\nvalue = [1, 2]'),
 Text(247.7898305084746, 58.541538461538465, 'entropy = 0.0\nsamples = 2\n
value = [0, 2]'),
 Text(255.35593220338984, 58.541538461538465, 'entropy = 0.0\nsamples = 1
\nvalue = [1, 0]'),
 Text(259.13898305084746, 75.2676923076923, 'entropy = 0.0\nsamples = 6\nv
alue = [6, 0]'),
 Text(270.48813559322036, 91.99384615384615, 'X[2] <= 66.0\nentropy = 0.72
2\nsamples = 5\nvalue = [1, 4]'),
 Text(266.70508474576275, 75.2676923076923, 'entropy = 0.0\nsamples = 1\nv
alue = [1, 0]'),
 Text(274.271186440678, 75.2676923076923, 'entropy = 0.0\nsamples = 4\nval
ue = [0, 4]'),
 Text(278.0542372881356, 125.44615384615385, 'X[5] <= 30.4\nentropy = 0.50
3\nsamples = 36\nvalue = [4, 32]'),
 Text(274.271186440678, 108.72, 'entropy = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(281.83728813559327, 108.72, 'X[2] <= 81.0\nentropy = 0.422\nsamples
= 35\nvalue = [3, 32]'),
 Text(278.0542372881356, 91.99384615384615, 'entropy = 0.0\nsamples = 21\n
value = [0, 21]'),
 Text(285.6203389830509, 91.99384615384615, 'X[5] <= 38.6\nentropy = 0.75
\nsamples = 14\nvalue = [3, 11]'),
 Text(281.83728813559327, 75.2676923076923, 'entropy = 0.0\nsamples = 9\nv
alue = [0, 9]'),
 Text(289.4033898305085, 75.2676923076923, 'X[1] <= 143.0\nentropy = 0.971
\nsamples = 5\nvalue = [3, 2]'),
 Text(285.6203389830509, 58.541538461538465, 'entropy = 0.0\nsamples = 2\n
value = [0, 2]'),
 Text(293.1864406779661, 58.541538461538465, 'entropy = 0.0\nsamples = 3\n
value = [3, 0]'),
 Text(304.535593220339, 175.62461538461537, 'X[5] <= 29.1\nentropy = 0.544
\nsamples = 64\nvalue = [8, 56]'),
 Text(293.1864406779661, 158.89846153846153, 'X[2] <= 79.0\nentropy = 0.97
1\nsamples = 10\nvalue = [4, 6]'),
 Text(289.4033898305085, 142.1723076923077, 'X[7] <= 28.0\nentropy = 0.592
\nsamples = 7\nvalue = [1, 6]'),
 Text(285.6203389830509, 125.44615384615385, 'entropy = 0.0\nsamples = 1\n
value = [1, 0]'),
 Text(293.1864406779661, 125.44615384615385, 'entropy = 0.0\nsamples = 6\n
value = [0, 6]'),
 Text(296.96949152542373, 142.1723076923077, 'entropy = 0.0\nsamples = 3\n
value = [3, 0]'),
 Text(315.8847457627119, 158.89846153846153, 'X[7] <= 56.0\nentropy = 0.38
1\nsamples = 54\nvalue = [4, 50]'),
 Text(304.535593220339, 142.1723076923077, 'X[1] <= 190.0\nentropy = 0.25
\nsamples = 48\nvalue = [2, 46]'),
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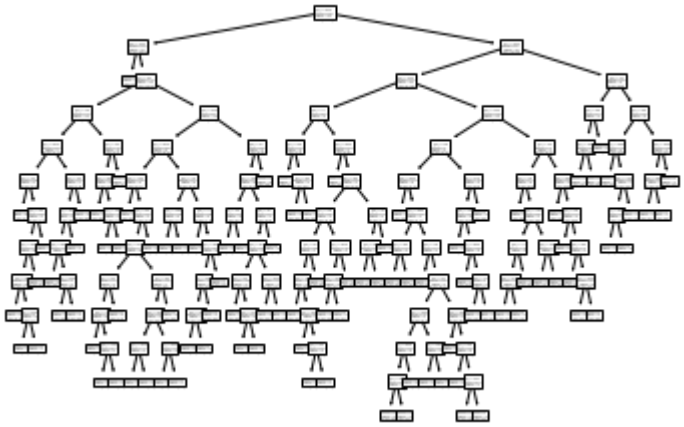
 Text(300.7525423728814, 125.44615384615385, 'entropy = 0.0\nsamples = 41
\nvalue = [0, 41]'),
 Text(308.31864406779664, 125.44615384615385, 'X[6] <= 1.862\nentropy = 0.
863\nsamples = 7\nvalue = [2, 5]'),
 Text(304.535593220339, 108.72, 'X[1] <= 192.5\nentropy = 0.65\nsamples =
6\nvalue = [1, 5]'),
 Text(300.7525423728814, 91.99384615384615, 'entropy = 0.0\nsamples = 1\nv
alue = [1, 0]'),
 Text(308.31864406779664, 91.99384615384615, 'entropy = 0.0\nsamples = 5\n
value = [0, 5]'),
 Text(312.10169491525426, 108.72, 'entropy = 0.0\nsamples = 1\nvalue = [1,
0]'),
 Text(327.2338983050848, 142.1723076923077, 'X[4] <= 282.5\nentropy = 0.91
8\nsamples = 6\nvalue = [2, 4]'),
 Text(323.45084745762716, 125.44615384615385, 'X[2] <= 74.0\nentropy = 0.9
18\nsamples = 3\nvalue = [2, 1]'),
 Text(319.66779661016955, 108.72, 'entropy = 0.0\nsamples = 1\nvalue = [0,
1]'),
 Text(327.2338983050848, 108.72, 'entropy = 0.0\nsamples = 2\nvalue = [2,
0]'),
 Text(331.0169491525424, 125.44615384615385, 'entropy = 0.0\nsamples = 3\n
value = [0, 3]')]
```



In [ ]: