```python
In [1]:  import numpy as np
         import pandas as pd
```

```python
In [2]:  df=pd.read_csv("C:/Users/user/Downloads/heart.csv")
         df
```

Out[2]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
0	63	1	3	145	233	1	0	150	0	2.3	0	0	1	1
1	37	1	2	130	250	0	1	187	0	3.5	0	0	2	1
2	41	0	1	130	204	0	0	172	0	1.4	2	0	2	1
3	56	1	1	120	236	0	1	178	0	0.8	2	0	2	1
4	57	0	0	120	354	0	1	163	1	0.6	2	0	2	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
298	57	0	0	140	241	0	1	123	1	0.2	1	0	3	0
299	45	1	3	110	264	0	1	132	0	1.2	1	0	3	0
300	68	1	0	144	193	1	1	141	0	3.4	1	2	3	0
301	57	1	0	130	131	0	1	115	1	1.2	1	1	3	0
302	57	0	1	130	236	0	0	174	0	0.0	1	1	2	0

303 rows × 14 columns

```python
In [3]:  df.head()
```

Out[3]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
0	63	1	3	145	233	1	0	150	0	2.3	0	0	1	1
1	37	1	2	130	250	0	1	187	0	3.5	0	0	2	1
2	41	0	1	130	204	0	0	172	0	1.4	2	0	2	1
3	56	1	1	120	236	0	1	178	0	0.8	2	0	2	1
4	57	0	0	120	354	0	1	163	1	0.6	2	0	2	1

```python
In [4]:  df.tail()
```

Out[4]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
298	57	0	0	140	241	0	1	123	1	0.2	1	0	3	0
299	45	1	3	110	264	0	1	132	0	1.2	1	0	3	0
300	68	1	0	144	193	1	1	141	0	3.4	1	2	3	0
301	57	1	0	130	131	0	1	115	1	1.2	1	1	3	0
302	57	0	1	130	236	0	0	174	0	0.0	1	1	2	0

```python
In [5]:  df.target
```

Loading [MathJax]/extensions/Safe.js

```
Out[5]:   0       1
          1       1
          2       1
          3       1
          4       1
                 ..
          298     0
          299     0
          300     0
          301     0
          302     0
          Name: target, Length: 303, dtype: int64
```

In [6]: `df.shape`

Out[6]: `(303, 14)`

In [7]: `df.isnull().sum().sum()`

Out[7]: `0`

In [8]: `from sklearn.model_selection import train_test_split`

In [9]:
```python
x=df.drop(["target"],axis=1)
y=df["target"]
```

In [10]: `x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=0)`

In [11]: `x_train`

Out[11]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal
74	43	0	2	122	213	0	1	165	0	0.2	1	0	2
153	66	0	2	146	278	0	0	152	0	0.0	1	1	2
64	58	1	2	140	211	1	0	165	0	0.0	2	0	2
296	63	0	0	124	197	0	1	136	1	0.0	1	0	2
287	57	1	1	154	232	0	0	164	0	0.0	2	1	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...
251	43	1	0	132	247	1	0	143	1	0.1	1	4	3
192	54	1	0	120	188	0	1	113	0	1.4	1	1	3
117	56	1	3	120	193	0	0	162	0	1.9	1	0	3
47	47	1	2	138	257	0	0	156	0	0.0	2	0	2
172	58	1	1	120	284	0	0	160	0	1.8	1	0	2

242 rows × 13 columns

In [12]: `x_test`

Out[12]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal
225	70	1	0	145	174	0	1	125	1	2.6	0	0	3
152	64	1	3	170	227	0	0	155	0	0.6	1	0	3
228	59	1	3	170	288	0	0	159	0	0.2	1	0	3
201	60	1	0	125	258	0	0	141	1	2.8	1	1	3
52	62	1	2	130	231	0	1	146	0	1.8	1	3	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...
146	44	0	2	118	242	0	1	149	0	0.3	1	1	2
302	57	0	1	130	236	0	0	174	0	0.0	1	1	2
26	59	1	2	150	212	1	1	157	0	1.6	2	0	2
108	50	0	1	120	244	0	1	162	0	1.1	2	0	2
89	58	0	0	100	248	0	0	122	0	1.0	1	0	2

61 rows × 13 columns

In [13]:
```python
y_train
```

Out[13]:
```
74     1
153    1
64     1
296    0
287    0
      ..
251    0
192    0
117    1
47     1
172    0
Name: target, Length: 242, dtype: int64
```

In [14]:
```python
y_test
```

Out[14]:
```
225    0
152    1
228    0
201    0
52     1
      ..
146    1
302    0
26     1
108    1
89     1
Name: target, Length: 61, dtype: int64
```

In [15]:
```python
from sklearn.ensemble import RandomForestClassifier
```

In [16]:
```python
rfc1=RandomForestClassifier(max_depth=5,n_estimators=200)
rfc1
```

Out[16]:
```
RandomForestClassifier(max_depth=5, n_estimators=200)
```

In [17]:
```python
rfc1.fit(x_train,y_train)
```

Out[17]:
```
RandomForestClassifier(max_depth=5, n_estimators=200)
```

Loading [MathJax]/extensions/Safe.js

```python
In [18]: y_predict=rfc1.predict(x_test)
         y_predict
```

```
Out[18]: array([0, 1, 1, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 1, 0,
                0, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 0,
                0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1], dtype=int64)
```

```python
In [19]: from sklearn.metrics import confusion_matrix,accuracy_score
```

```python
In [20]: confusion_matrix(y_test,y_predict)
```

```
Out[20]: array([[21,  6],
                [ 3, 31]], dtype=int64)
```

```python
In [21]: accuracy_score(y_test,y_predict)
```

```
Out[21]: 0.8524590163934426
```

```python
In [22]: from sklearn import tree
```

```python
In [23]: from matplotlib import pyplot as plt
```

```python
In [24]: plt.figure(figsize=(25,5))
         tree.plot_tree(rfc1.estimators_[0])
         plt.show()
```



```python
In [ ]:
```