

```
In [1]: import pandas as pd
```

```
In [2]: data = pd.read_csv('heart.csv')
```

```
In [3]: data
```

Out[3]:

	Unnamed: 0	Age	Sex	ChestPain	RestBP	Chol	Fbs	RestECG	MaxHR	ExAng	Oldpeak
0	1	63	1	typical	145	233	1	2	150	0	2.1
1	2	67	1	asymptomatic	160	286	0	2	108	1	1.1
2	3	67	1	asymptomatic	120	229	0	2	129	1	2.1
3	4	37	1	nonanginal	130	250	0	0	187	0	3.1
4	5	41	0	nontypical	130	204	0	2	172	0	1.4
...	...	...	...	...	...	...	...	...	...	...	...
298	299	45	1	typical	110	264	0	0	132	0	1.1
299	300	68	1	asymptomatic	144	193	1	0	141	0	3.4
300	301	57	1	asymptomatic	130	131	0	0	115	1	1.1
301	302	57	0	nontypical	130	236	0	2	174	0	0.1
302	303	38	1	nonanginal	138	175	0	0	173	0	0.1

303 rows × 15 columns



```
In [4]: data.shape
```

Out[4]: (303, 15)

In [5]: `data.isnull()`

Out[5]:

	Unnamed: 0	Age	Sex	ChestPain	RestBP	Chol	Fbs	RestECG	MaxHR	ExAng	Oldpe
0	False	False	False	False	False	False	False	False	False	False	Fa
1	False	False	False	False	False	False	False	False	False	False	Fa
2	False	False	False	False	False	False	False	False	False	False	Fa
3	False	False	False	False	False	False	False	False	False	False	Fa
4	False	False	False	False	False	False	False	False	False	False	Fa
...	...	...	...	...	...	...	...	...	...	...	...
298	False	False	False	False	False	False	False	False	False	False	Fa
299	False	False	False	False	False	False	False	False	False	False	Fa
300	False	False	False	False	False	False	False	False	False	False	Fa
301	False	False	False	False	False	False	False	False	False	False	Fa
302	False	False	False	False	False	False	False	False	False	False	Fa

303 rows × 15 columns



In [6]: `data.isnull().sum()`

Out[6]:

Unnamed: 0	0
Age	0
Sex	0
ChestPain	0
RestBP	0
Chol	0
Fbs	0
RestECG	0
MaxHR	0
ExAng	0
Oldpeak	0
Slope	0
Ca	4
Thal	2
AHD	0
dtype: int64	

In [7]: `data.dtypes`

Out[7]:

Unnamed: 0	int64
Age	int64
Sex	int64
ChestPain	object
RestBP	int64
Chol	int64
Fbs	int64
RestECG	int64
MaxHR	int64
ExAng	int64
Oldpeak	float64
Slope	int64
Ca	float64
Thal	object
AHD	object
dtype:	object

In [8]: `data[data==0].count()`

Out[8]:

Unnamed: 0	0
Age	0
Sex	97
ChestPain	0
RestBP	0
Chol	0
Fbs	258
RestECG	151
MaxHR	0
ExAng	204
Oldpeak	99
Slope	0
Ca	176
Thal	0
AHD	0
dtype:	int64

In [9]: `data["Age"].mean()`

Out[9]: 54.43894389438944

In [11]: `ndata=data[["Age","Sex","ChestPain","RestBP","Chol"]]`

In [12]: `nndata`

Out[12]:

	Age	Sex	ChestPain	RestBP	Chol
0	63	1	typical	145	233
1	67	1	asymptomatic	160	286
2	67	1	asymptomatic	120	229
3	37	1	nonanginal	130	250
4	41	0	nontypical	130	204
...	...	...	...	...	...
298	45	1	typical	110	264
299	68	1	asymptomatic	144	193
300	57	1	asymptomatic	130	131
301	57	0	nontypical	130	236
302	38	1	nonanginal	138	175

303 rows × 5 columns

In [13]: `from sklearn.model_selection import train_test_spilt`

**ImportError**

Traceback (most recent call last)

`~\AppData\Local\Temp\ipykernel_14180/1366848395.py` in <module>

`----> 1 from sklearn.model_selection import train_test_spilt`

**ImportError**: cannot import name 'train\_test\_spilt' from 'sklearn.model\_selection' (C:\Users\admin\anaconda3\lib\site-packages\sklearn\model\_selection\\_\_init\_\_.py)

In [14]: `from sklearn.model_selection import train_test_split`

In [15]: `train , test = train_test_split(nndata, random_state=0, test_size=0.25)`

In [16]: train

Out[16]:

	Age	Sex	ChestPain	RestBP	Chol
173	62	0	asymptomatic	140	394
261	58	0	nontypical	136	319
37	57	1	asymptomatic	150	276
101	34	1	typical	118	182
166	52	1	nonanginal	138	223
...	...	...	...	...	...
251	58	1	asymptomatic	146	218
192	43	1	asymptomatic	132	247
117	35	0	asymptomatic	138	183
47	50	1	asymptomatic	150	243
172	59	0	asymptomatic	174	249

227 rows × 5 columns

In [17]: `import numpy as np`

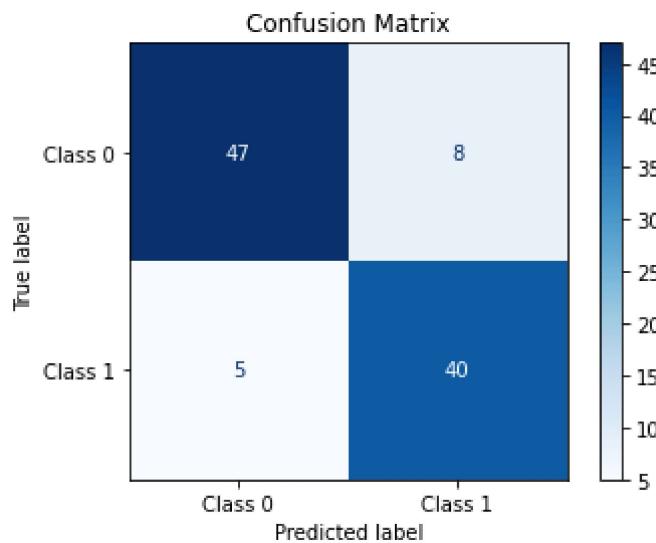
In [18]: `actual = list(np.ones(45)) + list(np.zeros(55))`

In [20]: `predicted = list(np.ones(40)) + list(np.zeros(52)) + list(np.ones(8))`

In [51]: `from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay  
import matplotlib.pyplot as plt`

```
In [52]: cm = confusion_matrix(actual, predicted)

disp = ConfusionMatrixDisplay(confusion_matrix=cm, display_labels=['Class 0',
disp.plot(cmap=plt.cm.Blues, values_format='d')
plt.title("Confusion Matrix")
plt.show()
```



```
In [31]: from sklearn.metrics import classification_report
```

```
In [33]: print(classification_report(actual,predicted))
```

	precision	recall	f1-score	support
0.0	0.90	0.85	0.88	55
1.0	0.83	0.89	0.86	45
accuracy			0.87	100
macro avg	0.87	0.87	0.87	100
weighted avg	0.87	0.87	0.87	100

```
In [ ]:
```