In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
## Data Collection and analysis

diabetes_dataset = pd.read_csv('diabetes.csv')
```

In [3]:

```
diabetes_dataset.head()
```

Out[3]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	6	148	72	35	0	33.6	0.627	50	1
1	1	85	66	29	0	26.6	0.351	31	0
2	8	183	64	0	0	23.3	0.672	32	1
3	1	89	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1

In [4]:

```
diabetes_dataset.isnull()
```

Out[4]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...
763	False	False	False	False	False	False	False	False	False
764	False	False	False	False	False	False	False	False	False
765	False	False	False	False	False	False	False	False	False
766	False	False	False	False	False	False	False	False	False
767	False	False	False	False	False	False	False	False	False

768 rows × 9 columns

In [5]:

```
diabetes_dataset.shape
```

Out[5]:

```
(768, 9)
```

In [6]:

```
diabetes_dataset.describe()
```

Out[6]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age
count	768.000000	768.000000	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	0.471876	33.240885
std	3.369578	31.972618	19.355807	15.952218	115.244002	7.884160	0.331329	11.760232
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.078000	21.000000
25%	1.000000	99.000000	62.000000	0.000000	0.000000	27.300000	0.243750	24.000000
50%	3.000000	117.000000	72.000000	23.000000	30.500000	32.000000	0.372500	29.000000
75%	6.000000	140.250000	80.000000	32.000000	127.250000	36.600000	0.626250	41.000000
max	17.000000	199.000000	122.000000	99.000000	846.000000	67.100000	2.420000	81.000000

In [7]:

```
diabetes_dataset['Outcome'].value_counts()
```

Out[7]:

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

0 --> Non-Diabetic

1 --> Diabetic

In [8]:

```
diabetes_dataset.groupby('Outcome').mean()
```

Out[8]:

Outcome	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Ag
0	3.298000	109.980000	68.184000	19.664000	68.792000	30.304200	0.429734	31.19000
1	4.865672	141.257463	70.824627	22.164179	100.335821	35.142537	0.550500	37.06716

In [9]:

```
# separating the data and labels
X = diabetes_dataset.drop('Outcome', axis=1)
y = diabetes_dataset['Outcome']
```

In [10]:

```
## Now Scale our Data

from sklearn.preprocessing import StandardScaler
```

In [11]:

```
scale = StandardScaler()
```

In [12]:

```
stand_scaler = scale.fit_transform(X)
```

In [13]:

```
stand_scaler
```

Out[13]:

```
array([[ 0.63994726,  0.84832379,  0.14964075, ...,  0.20401277,
         0.46849198,  1.4259954 ],
       [-0.84488505, -1.12339636, -0.16054575, ..., -0.68442195,
        -0.36506078, -0.19067191],
       [ 1.23388019,  1.94372388, -0.26394125, ..., -1.10325546,
         0.60439732, -0.10558415],
       ...,
       [ 0.3429808 ,  0.00330087,  0.14964075, ..., -0.73518964,
        -0.68519336, -0.27575966],
       [-0.84488505,  0.1597866 , -0.47073225, ..., -0.24020459,
        -0.37110101,  1.17073215],
       [-0.84488505, -0.8730192 ,  0.04624525, ..., -0.20212881,
        -0.47378505, -0.87137393]])
```

In [14]:

```
X = stand_scaler
y = diabetes_dataset['Outcome']
```

In [15]:

```
print(X,y)
```

```
[[ 0.63994726  0.84832379  0.14964075 ...  0.20401277  0.46849198
   1.4259954 ]
 [-0.84488505 -1.12339636 -0.16054575 ... -0.68442195 -0.36506078
  -0.19067191]
 [ 1.23388019  1.94372388 -0.26394125 ... -1.10325546  0.60439732
  -0.10558415]
 ...
 [ 0.3429808   0.00330087  0.14964075 ... -0.73518964 -0.68519336
  -0.27575966]
 [-0.84488505  0.1597866  -0.47073225 ... -0.24020459 -0.37110101
   1.17073215]
 [-0.84488505 -0.8730192   0.04624525 ... -0.20212881 -0.47378505
  -0.87137393]] 0      1
1      0
2      1
3      0
4      1
      ..
763    0
764    0
765    0
766    1
767    0
Name: Outcome, Length: 768, dtype: int64
```

In [16]:

```
## Now split into train test data

from sklearn.model_selection import train_test_split
```

In [17]:

```
X_train , X_test, y_train, y_test = train_test_split(X,y,test_size = 0.1, random_state = 42)
```

In [18]:

```
len(X_train)
```

Out[18]:

```
691
```

In [19]:

```
X_train
```

Out[19]:

```
array([[-0.25095213, -0.77912776, -0.67752325, ..., -0.92556851,
         1.4258696 ,  0.49003012],
       [-1.14185152, -0.12188771, -0.16054575, ..., -0.15136112,
         0.06379607, -0.95646168],
       [ 0.04601433, -0.34096773,  1.18359575, ...,  0.71168975,
        -0.84827977, -0.27575966],
       ...,
       [ 1.82781311, -0.62264204,  0.87340925, ...,  1.72704372,
         2.00573238,  0.40494237],
       [-1.14185152,  0.62924378, -3.57259724, ...,  1.32090213,
        -0.8059981 , -0.36084741],
       [-1.14185152,  0.12848945,  1.39038675, ..., -1.20479085,
        -0.63385134, -1.04154944]])
```

Now train our data by SVM Classifier

In [20]:

```
from sklearn.svm import SVC
```

In [21]:

```
classifier = SVC(kernel= 'linear', C = 1000)
```

In [22]:

```
classifier.fit(X_train,y_train)
```

Out[22]:

```
SVC(C=1000, kernel='linear')
```

Now Model Evalution

In [23]:

```
pred = classifier.predict(X_test)
```

In [24]:

```
from sklearn.metrics import classification_report, plot_confusion_matrix
```

In [25]:

```
print(classification_report(y_test,pred))
```

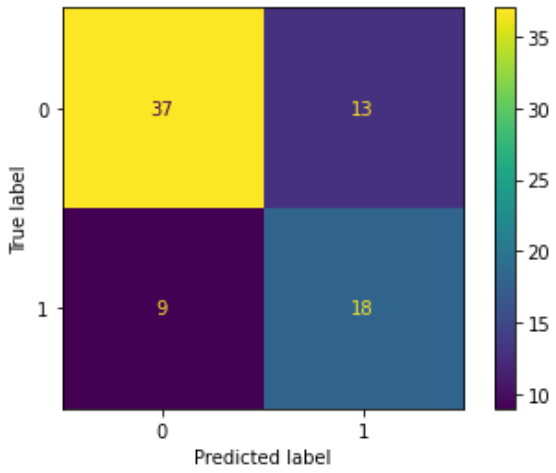
```
              precision    recall  f1-score   support

           0       0.80      0.74      0.77        50
           1       0.58      0.67      0.62        27

    accuracy                           0.71        77
   macro avg       0.69      0.70      0.70        77
weighted avg       0.73      0.71      0.72        77
```

In [26]:

```
plot_confusion_matrix(classifier,X_test,y_test)
```

Out[26]:

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7ff28ba20e80>
```



Making a Predictive System

In [27]:

```
input_data = (7,100,0,0,0,30,0.484,32)

## Change input into numpy array

input_data_as_numpy_array = np.asarray(input_data)


## Reshape data

input_data_reshape = input_data_as_numpy_array.reshape(1,-1)

## Standardize the input data

std_data = scale.transform(input_data_reshape)
print(std_data)

prediction = classifier.predict(std_data)
print(prediction)
```

```
[[ 0.93691372 -0.65393918 -3.57259724 -1.28821221 -0.69289057 -0.25289651
   0.03661501 -0.10558415]]
[0]
```

In [28]:

```
if (prediction[0] == 0):
    print('The Person is not Diabitic')
else:
    print('The Person is Diabitic')
```

```
The Person is not Diabitic
```

In [31]:

```
input_data = (5,166,72,19,175,25.8,0.587,51)

## Change input into numpy array

input_data_as_numpy_array = np.asarray(input_data)


## Reshape data

input_data_reshape = input_data_as_numpy_array.reshape(1,-1)

## Standardize the input data

std_data = scale.transform(input_data_reshape)
```

```
print(std_data)

prediction = classifier.predict(std_data)
print(prediction)
```

```
[[ 0.3429808   1.41167241  0.14964075 -0.09637905  0.82661621 -0.78595734
   0.34768723  1.51108316]]
[1]
```

In [32]:

```
if (prediction[0] == 0):
    print('The Person is not Diabitic')
else:
    print('The Person is Diabitic')
```

```
The Person is Diabitic
```

In [ ]:

```

```