In [ ]:
```
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Batch: A3
```

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

In [3]:
```
df = pd.read_csv("diabetes.csv")
df
```

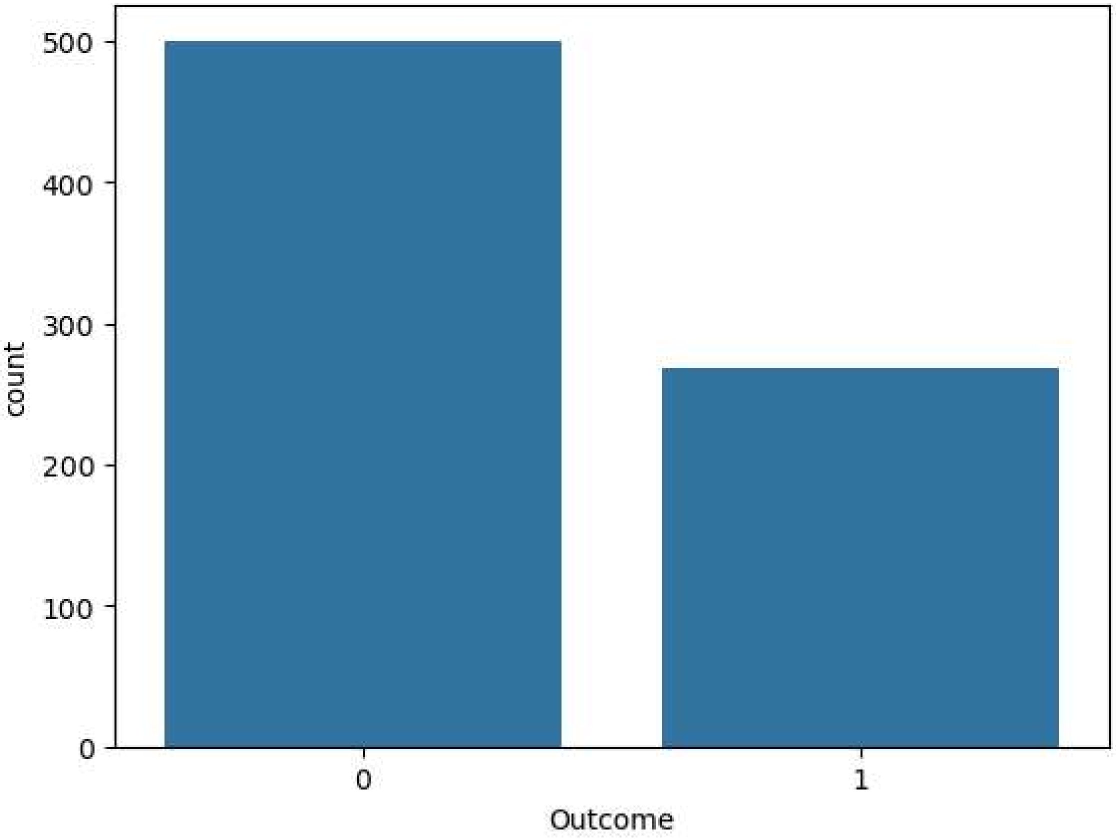
Out[3]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	Pedigree	Age	Ou
0	6	148	72	35	0	33.6	0.627	50	
1	1	85	66	29	0	26.6	0.351	31	
2	8	183	64	0	0	23.3	0.672	32	
3	1	89	66	23	94	28.1	0.167	21	
4	0	137	40	35	168	43.1	2.288	33	
...	...	...	...	...	...	...	...	...	
763	10	101	76	48	180	32.9	0.171	63	
764	2	122	70	27	0	36.8	0.340	27	
765	5	121	72	23	112	26.2	0.245	30	
766	1	126	60	0	0	30.1	0.349	47	
767	1	93	70	31	0	30.4	0.315	23	

768 rows × 9 columns

In [4]:
```
x = df.drop('Outcome', axis = 1)
y = df['Outcome']
```

In [5]:
```
sns.countplot(x=y);
```



In [6]:
```
from sklearn.preprocessing import MinMaxScaler
scaler = MinMaxScaler()
x_scaled = scaler.fit_transform(x)
```

In [8]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(x_scaled, y, random_state=0, test_
```

In [9]:
```
x.shape
```

Out[9]:
```
(768, 8)
```

In [10]:
```
x_train.shape
```

Out[10]:
```
(614, 8)
```

In [11]:
```
x_test.shape
```

Out[11]:
```
(154, 8)
```

In [12]:
```
from sklearn.neighbors import KNeighborsClassifier
```

In [13]:
```
knn =  KNeighborsClassifier(n_neighbors = 5)
```

In [14]:
```
knn.fit(x_train, y_train)
```

Out[14]:

```
▾ KNeighborsClassifier
KNeighborsClassifier()
```

In [15]:

```python
from sklearn.metrics import accuracy_score , ConfusionMatrixDisplay
from sklearn.metrics import classification_report
```

In [16]:

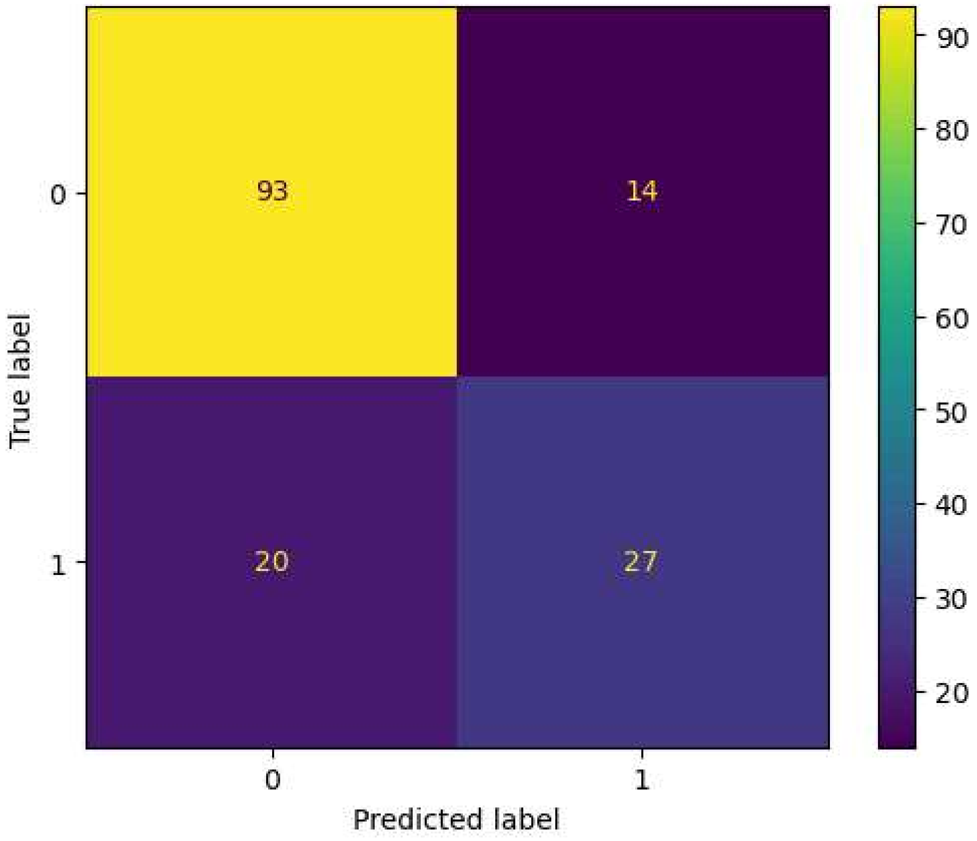
```python
y_pred = knn.predict(x_test)
```

In [17]:

```python
ConfusionMatrixDisplay.from_predictions(y_test,y_pred)
```

Out[17]:

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x1ffd1271a90>
```



In [18]:

```python
print(classification_report(y_test,y_pred))
```

```
              precision    recall  f1-score   support

           0       0.82      0.87      0.85       107
           1       0.66      0.57      0.61        47

    accuracy                           0.78       154
   macro avg       0.74      0.72      0.73       154
weighted avg       0.77      0.78      0.77       154
```

In [19]:

```python
import matplotlib.pyplot as plt
import numpy as np
```

In [20]:

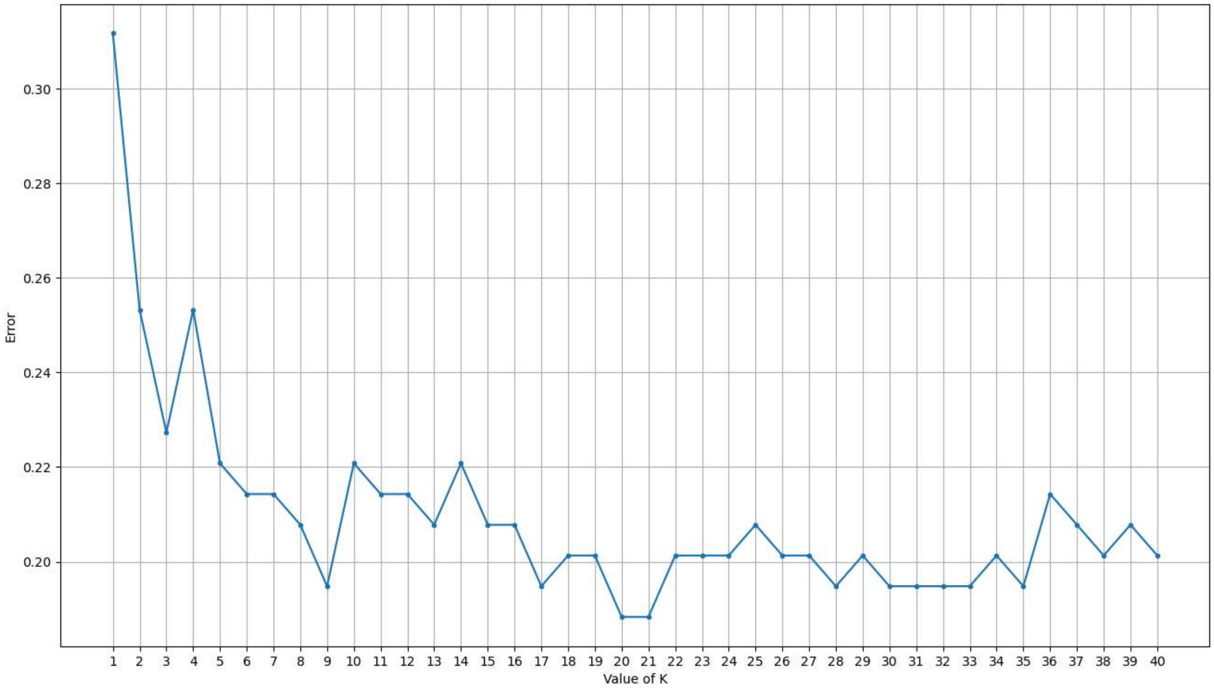
```
error = []
for k in range (1,41):
    knn = KNeighborsClassifier(n_neighbors = k)
    knn.fit(x_train, y_train)
    pred=knn.predict(x_test)
    error.append(np.mean(pred!=y_test))
```

In [21]:

```
plt.figure(figsize=(16,9))
plt.xlabel('Value of K')
plt.ylabel('Error')
plt.grid()
plt.xticks(range(1,41))
plt.plot(range(1,41),error,marker='.')
```

Out[21]:

```
[<matplotlib.lines.Line2D at 0x1ffd2454910>]
```



In [22]:

```
knn = KNeighborsClassifier(n_neighbors = 33)
```

In [23]:

```
knn.fit(x_train, y_train)
```

Out[23]:

```
▾ KNeighborsClassifier
KNeighborsClassifier(n_neighbors=33)
```

In [24]:

```
y_pred=knn.predict(x_test)
```

In [25]:

```
print(classification_report(y_test,y_pred))
```

```
              precision    recall  f1-score   support

           0       0.82      0.93      0.87       107
           1       0.76      0.53      0.62        47

    accuracy                           0.81       154
   macro avg       0.79      0.73      0.75       154
weighted avg       0.80      0.81      0.79       154
```

```
In [ ]:
```