```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LinearRegression
from sklearn.metrics import confusion_matrix, accuracy_score, precision_score, recall_score, f1_score
df = pd.read_csv('diabetes.csv')
df.head()
```

	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

Next steps: Generate code with df | New interactive sheet

```
# 1. Replace zero values in key features with column median
key_features = ['Glucose','BloodPressure','SkinThickness','Insulin','BMI']

for col in key_features:
    median = df.loc[df[col] != 0, col].median()
    df.loc[df[col] == 0, col] = median

# 2. Replace the first row’s glucose value with the maximum glucose
df.loc[0, 'Glucose'] = df['Glucose'].max()

# 3. For records with the lowest age, replace glucose values with the minimum
min_age = df['Age'].min()
df.loc[df['Age'] == min_age, 'Glucose'] = df['Glucose'].min()

df.head()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	6	199	72	35	125	33.6	0.627	50	1
1	1	85	66	29	125	26.6	0.351	31	0
2	8	183	64	29	125	23.3	0.672	32	1
3	1	44	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1

Next steps: Generate code with df | New interactive sheet

```
print(df.info())
print(df.describe())
```

```
<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
None
       Pregnancies     Glucose  BloodPressure  SkinThickness     Insulin  \
count   768.000000  768.000000     768.000000     768.000000  768.000000
```

```
mean      3.845052  116.294271      72.386719      29.108073  140.671875
std       3.369578   36.797403      12.096642       8.791221   86.383060
min       0.000000   44.000000      24.000000       7.000000   14.000000
25%       1.000000   95.000000      64.000000      25.000000  121.500000
50%       3.000000  115.000000      72.000000      29.000000  125.000000
75%       6.000000  140.000000      80.000000      32.000000  127.250000
max      17.000000  199.000000     122.000000      99.000000  846.000000

              BMI  DiabetesPedigreeFunction         Age     Outcome
count  768.000000                768.000000  768.000000  768.000000
mean    32.455208                  0.471876   33.240885    0.348958
std      6.875177                  0.331329   11.760232    0.476951
min     18.200000                  0.078000   21.000000    0.000000
25%     27.500000                  0.243750   24.000000    0.000000
50%     32.300000                  0.372500   29.000000    0.000000
75%     36.600000                  0.626250   41.000000    1.000000
max     67.100000                  2.420000   81.000000    1.000000
```

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

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

X_train, X_test, y_train, y_test = train_test_split(
    X_scaled, y, test_size=0.2, random_state=42
)
```

```
model = LinearRegression()
model.fit(X_train, y_train)
```

```
▾ LinearRegression
LinearRegression()
```

```
y_pred_cont = model.predict(X_test)
y_pred = np.rint(y_pred_cont).astype(int)
y_pred = np.clip(y_pred, 0, 1)
```

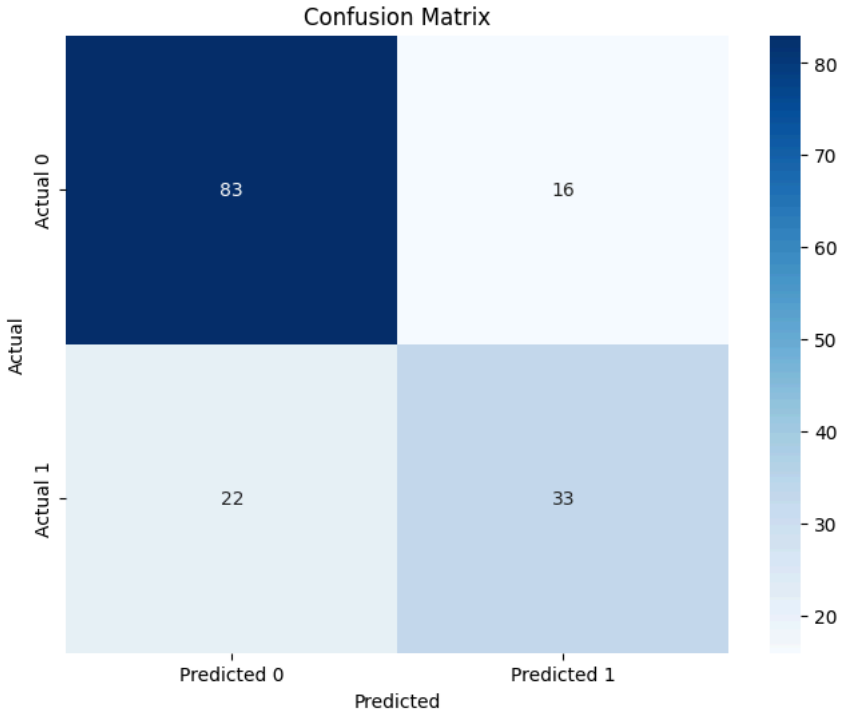
```
acc = accuracy_score(y_test, y_pred)
prec = precision_score(y_test, y_pred, zero_division=0)
rec = recall_score(y_test, y_pred, zero_division=0)
f1 = f1_score(y_test, y_pred, zero_division=0)
cm = confusion_matrix(y_test, y_pred)

print("Accuracy:", acc)
print("Precision:", prec)
print("Recall:", rec)
print("F1-score:", f1)
print("Confusion Matrix:\n", cm)
```

```
Accuracy: 0.7597402597402597
Precision: 0.68
Recall: 0.6181818181818182
F1-score: 0.6476190476190476
Confusion Matrix:
 [[83 16]
 [21 34]]
```

```
# 1. Calculate and print the accuracy score
accuracy = accuracy_score(y_test, y_pred_binary)
print(f"Accuracy: {accuracy:.4f}")

# 2. Calculate the confusion matrix
conf_matrix = confusion_matrix(y_test, y_pred_binary)

# 3. Create a heatmap of the confusion matrix
plt.figure(figsize=(8, 6))
sns.heatmap(conf_matrix, annot=True, fmt='d', cmap='Blues',
            xticklabels=['Predicted 0', 'Predicted 1'],
            yticklabels=['Actual 0', 'Actual 1'])
plt.xlabel('Predicted')
```

```
plt.ylabel('Actual')
plt.title('Confusion Matrix')
plt.show()

# 4. Print a classification report
class_report = classification_report(y_test, y_pred_binary)
print("\nClassification Report:")
print(class_report)
```

```
Accuracy: 0.7532
```




```
Classification Report:
              precision    recall  f1-score   support

           0       0.79      0.84      0.81        99
           1       0.67      0.60      0.63        55

    accuracy                           0.75       154
   macro avg       0.73      0.72      0.72       154
weighted avg       0.75      0.75      0.75       154
```