Assignment No. : 5

Implement K-Nearest Neighbors algorithm on diabetes.csv dataset. Compute confusion matrix, accuracy, error rate, precision and recall on the given dataset. Dataset link : https://www.kaggle.com/datasets/abdallamahgoub/diabetes

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import confusion_matrix, accuracy_score, precision_score, recal
```

```
data = pd.read_csv('/content/diabetes.csv')
data.head(2)
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	Pedigree	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

```
data.isnull().sum()
```

	0
Pregnancies	0
Glucose	0
BloodPressure	0
SkinThickness	0
Insulin	0
BMI	0
Pedigree	0
Age	0
Outcome	0

KNN Model

```
X = data.drop(columns=['Outcome'])
y = data['Outcome']

# Normalize the features
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

# Step 3: Split the Data into Training and Testing Sets
X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.2, rand
```

```
# Step 4: Train the KNN Model
knn = KNeighborsClassifier(n_neighbors=5)  # You can tune n_neighbors
knn.fit(X_train, y_train)
```

```
KNeighborsClassifier
KNeighborsClassifier()
```

```
# Step 5: Make Predictions
y_pred = knn.predict(X_test)


# Step 6: Calculate Metrics
# Confusion Matrix
cm = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:")
print(cm)
```

```
Confusion Matrix:
[[79 20]
 [28 27]]
```

```
# Accuracy
accuracy = accuracy_score(y_test, y_pred)

# Error Rate
error_rate = 1 - accuracy

# Precision
precision = precision_score(y_test, y_pred)

# Recall
recall = recall_score(y_test, y_pred)

# Output the results
print(f"Accuracy: {accuracy}")
print(f"Error Rate: {error_rate}")
print(f"Precision: {precision}")
print(f"Recall: {recall}")
```

```
Accuracy: 0.6883116883116883
Error Rate: 0.3116883116883117
Precision: 0.574468085106383
Recall: 0.4909090909090909
```