Importing the Dependencies

```
import pandas as pd
#for data handling
import numpy as np
#for number operations
import matplotlib.pyplot as plt
import seaborn as sns
#for plotting graphs
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score,confusion_matrix,classification_report
```

Load the Dataset

```
url =  'https://docs.google.com/spreadsheets/d/1p_WuY33JZo00wRFvtI7kEAITRHrwG0OM/export?format=csv'
df = pd.read_csv(url)
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

Code to Analyze the Dataset:

```
print("Dataset info:")
df.info()
```

```
Dataset info:
<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
```

```
print("\nsummary Statistics:")
df.describe()
```

summary Statistics:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
count	768.000000	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	0.348958
std	3.369578	31.972618	19.355807	15.952218	115.244002	7.884160	0.331329	11.760232	0.476951
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.078000	21.000000	0.000000
25%	1.000000	99.000000	62.000000	0.000000	0.000000	27.300000	0.243750	24.000000	0.000000
50%	3.000000	117.000000	72.000000	23.000000	30.500000	32.000000	0.372500	29.000000	0.000000
75%	6.000000	140.250000	80.000000	32.000000	127.250000	36.600000	0.626250	41.000000	1.000000
max	17.000000	199.000000	122.000000	99.000000	846.000000	67.100000	2.420000	81.000000	1.000000

```
print("\nMissing Values in Each Column:")
print(df.isnull().sum())
```

```
Missing Values in Each Column:
Pregnancies                 0
Glucose                     0
BloodPressure               0
SkinThickness               0
Insulin                     0
BMI                         0
DiabetesPedigreeFunction    0
Age                         0
Outcome                     0
dtype: int64
```

Visualize the Dataset

A) Check Diabetes Outcome Count(0 or 1)

Start coding or generate with AI.

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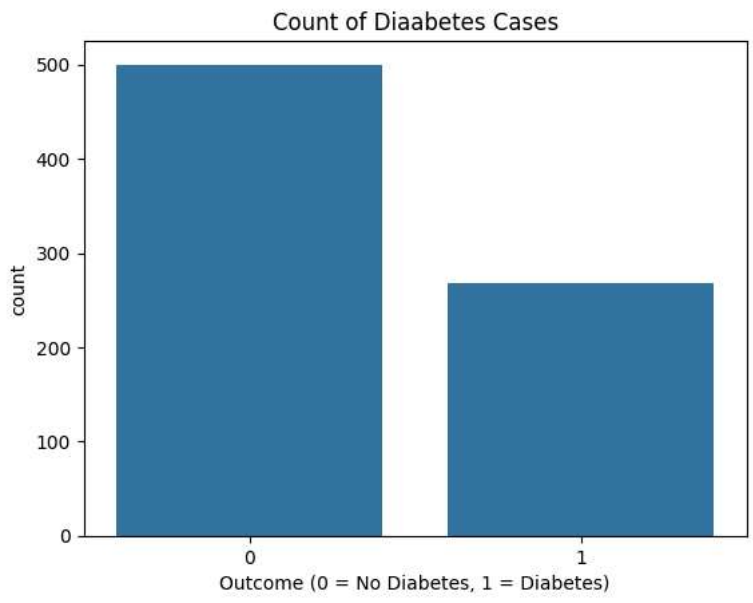
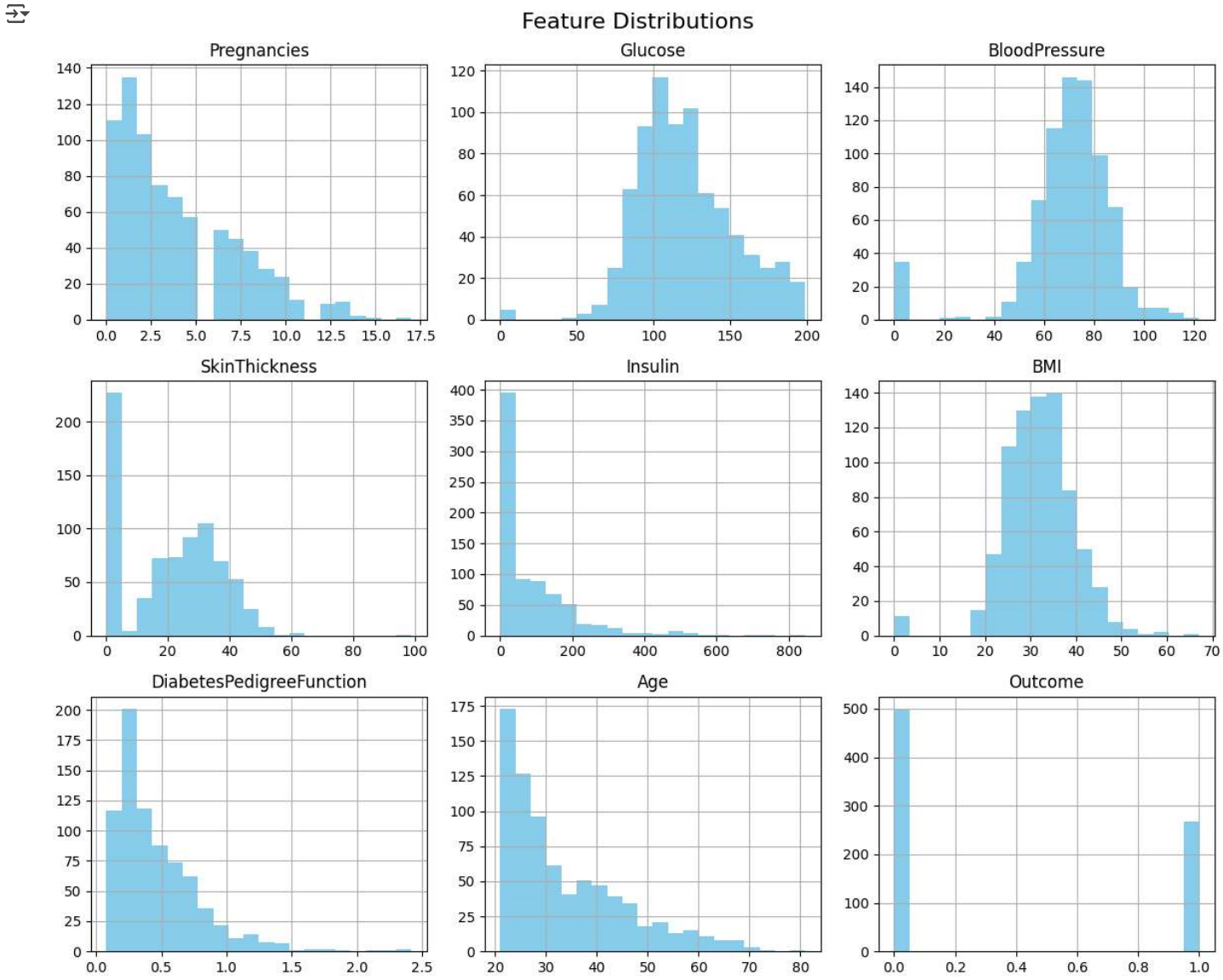
```
sns.countplot(x='Outcome',data=df)
plt.title("Count of Diaabetes Cases")
plt.xlabel("Outcome (0 = No Diabetes, 1 = Diabetes)")
plt.ylabel("count")
plt.show()
```



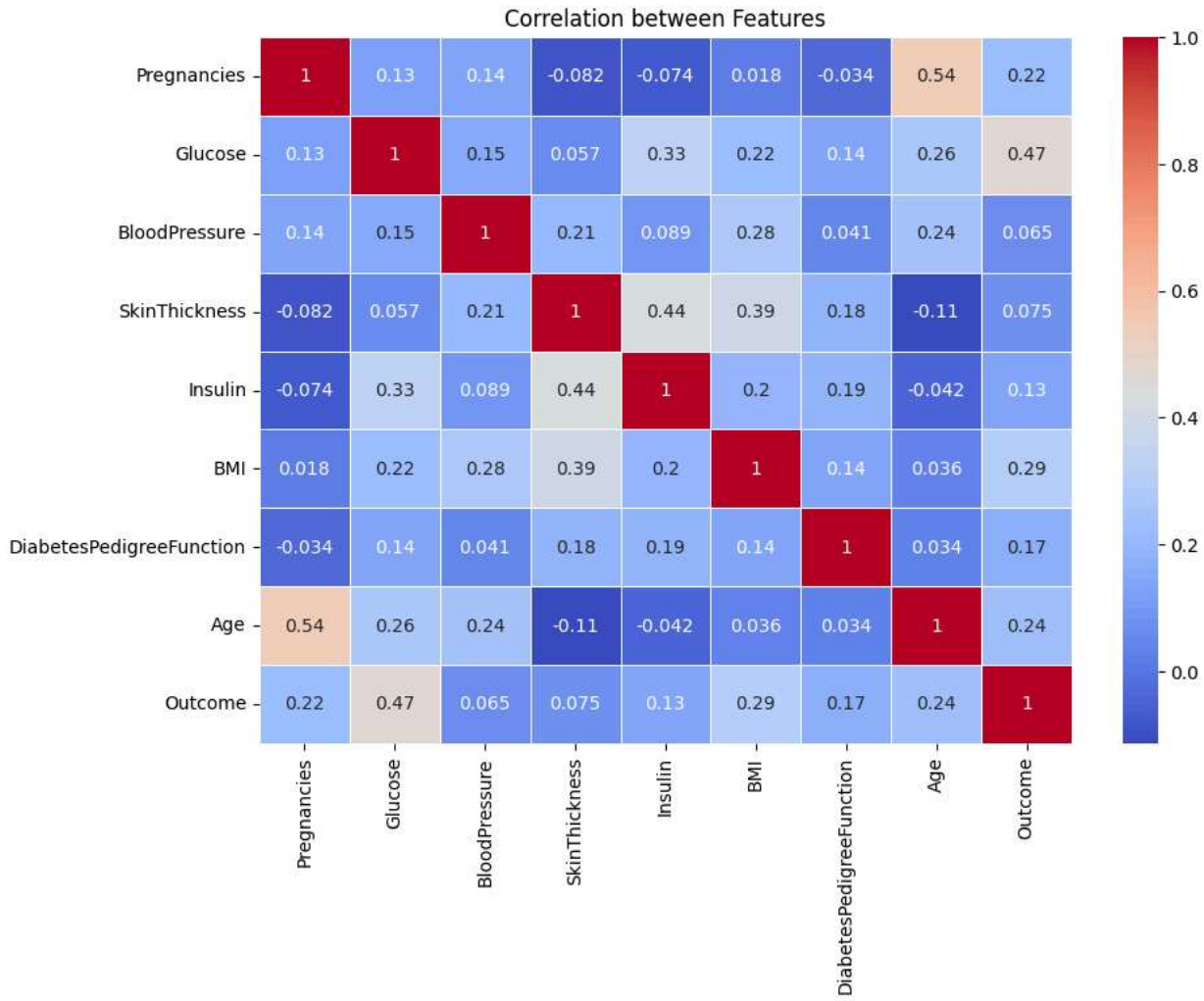
B) Show Histograms for All Features

```
df.hist(bins=20, figsize=(12,10),color='skyblue')
plt.suptitle("Feature Distributions",fontsize=16)
plt.tight_layout()
plt.show()
```



C) Correlation Heatmap

```
plt.figure(figsize=(10,7))
sns.heatmap(df.corr(),annot=True,cmap='coolwarm',linewidths=0.5)
plt.title("Correlation between Features")
plt.show()
```



Prepare the Data for Machine Learning

A) Split into X and Y

```
# X = input features (all columns except 'Outcome')
X = df.drop('Outcome', axis=1)

# y = target/output label
y = df['Outcome']

# Check shapes
print("Shape of X:", X.shape)
print("Shape of y:", y.shape)
```

```
Shape of X: (768, 8)
Shape of y: (768,)
```

B) Split into Training and Testing Sets

```
from sklearn.model_selection import train_test_split

# random_state ensures the same split every time (reproducibility)
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42)

print("Training Set Size:", X_train.shape)
print("Testing Set Size:", X_test.shape)
```

```
Training Set Size: (614, 8)
Testing Set Size: (154, 8)
```

Code to Sacle Features

```
from sklearn.preprocessing import StandardScaler

# Create the scaler
scaler = StandardScaler()

# Fit on training data and transform both training and test sets
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

# Check result
print("First 5 scaled training rows:\n", X_train[:5])
```

```
First 5 scaled training rows:
 [[-0.52639686 -1.15139792 -3.75268255 -1.32277365 -0.70120553 -4.13525578
  -0.49073479 -1.03594038]
 [ 1.58804586 -0.27664283  0.68034485  0.23350519 -0.70120553 -0.48916881
   2.41502991  1.48710085]
 [-0.82846011  0.56687102 -1.2658623  -0.09071957  0.01344832 -0.42452187
   0.54916055 -0.94893896]
 [-1.13052335  1.2541786  -1.04961706 -1.32277365 -0.70120553 -1.30372015
  -0.63929127  2.79212217]
 [ 0.68185612  0.41066475  0.57222224  1.07648956  2.48460077  1.83812075
  -0.68682934  1.13909516]]
```

Code Train the Model

```
from sklearn.linear_model import LogisticRegression

# Create the model
model = LogisticRegression()

# Train the model using the training data
model.fit(X_train, y_train)

print("✅ Model Training Complete")
```

```
✅ Model Training Complete
```

Code to Predict and Evaluate

```
from sklearn.metrics import accuracy_score, confusion_matrix, classification_report

# Make predictions on the test set
y_pred = model.predict(X_test)

# 1. Accuracy Score
print("✅ Accuracy Score:", accuracy_score(y_test, y_pred))

# 2. Confusion Matrix
print("\n📊 Confusion Matrix:")
print(confusion_matrix(y_test, y_pred))

# 3. Classification Report
print("\n📄 Classification Report:")
print(classification_report(y_test, y_pred))
```

```
✅ Accuracy Score: 0.7532467532467533

📊 Confusion Matrix:
[[79 20]
 [18 37]]

📄 Classification Report:
              precision    recall  f1-score   support

           0       0.81      0.80      0.81        99
           1       0.65      0.67      0.66        55

    accuracy                           0.75       154
```

```
           macro avg       0.73      0.74      0.73       154
        weighted avg       0.76      0.75      0.75       154
```

Predict Diabetes for a New Person

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

# Step 1: Convert input to NumPy array
input_array = np.asarray(input_data).reshape(1, -1)

# Step 2: Scale the input
scaled_input = scaler.transform(input_array)

# Step 3: Predict
prediction = model.predict(scaled_input)

# Step 4: Display result
if prediction[0] == 0:
    print('🟢 The person is NOT diabetic')
else:
    print('🔴 The person HAS diabetes')
```

```
🔴 The person HAS diabetes
/usr/local/lib/python3.11/dist-packages/sklearn/utils/validation.py:2739: UserWarning: X does not have valid feature names, but Standarc
  warnings.warn(
```