In [25]:
```
# Libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [26]:
```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
```

In [27]:
```
# Loading the dataset
data=pd.read_csv("C:/Users/HP/Desktop/project-DiabetesPrediction/1.diabetes_Data.cs
data
```

Out[27]:

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

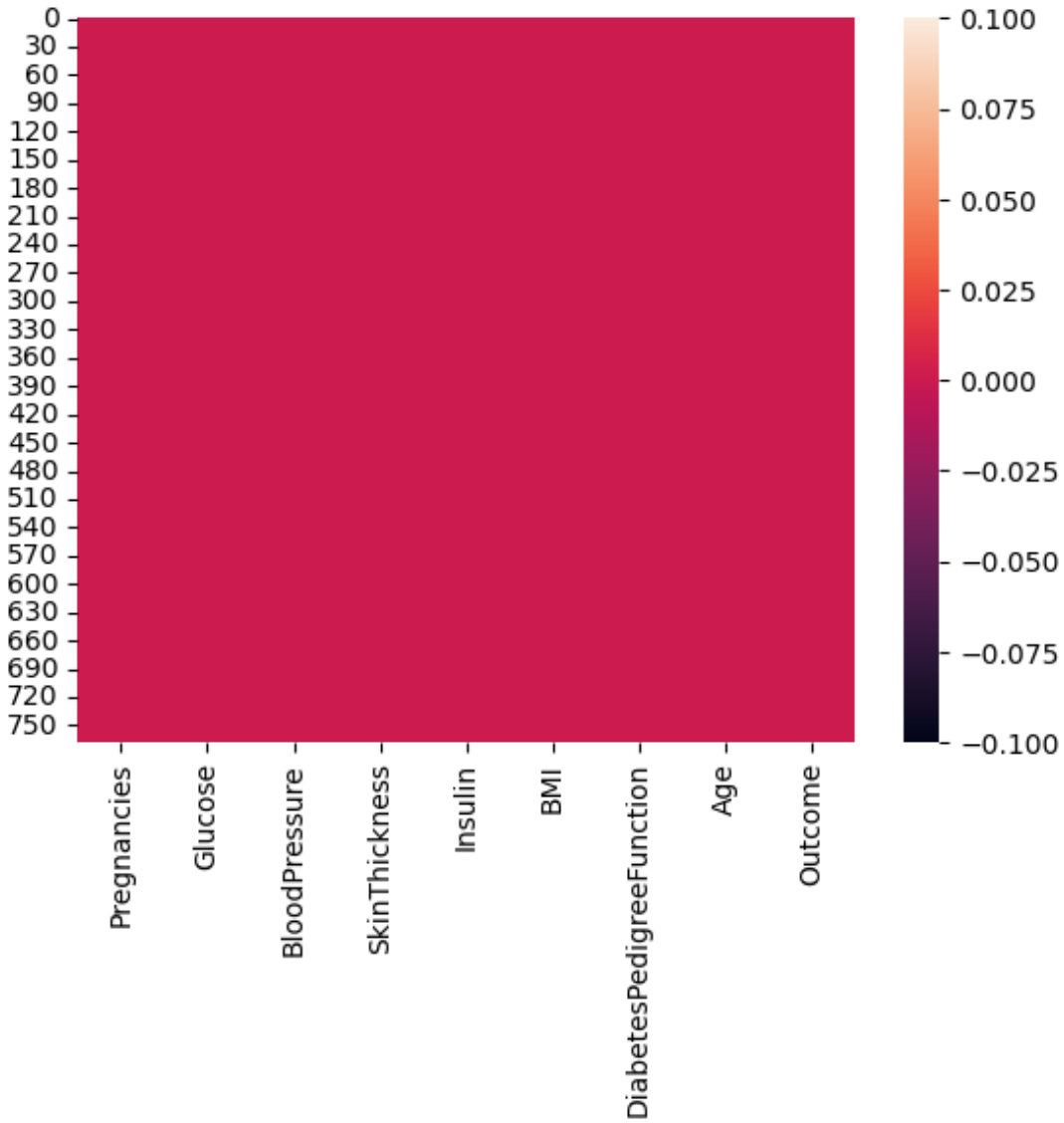
768 rows × 9 columns

In [28]:
```
# Checking for missing values
data.isnull().sum()
```

Out[28]:
```
Pregnancies                 0
Glucose                     0
BloodPressure               0
SkinThickness               0
Insulin                     0
BMI                         0
DiabetesPedigreeFunction    0
Age                         0
Outcome                     0
dtype: int64
```

In [29]:
```
#Checking for missing values
sns.heatmap(data.isnull())
```

Out[29]: <Axes: >



In [12]:
```
# Co relation matrix
correlation=data.corr()
print(correlation)
```

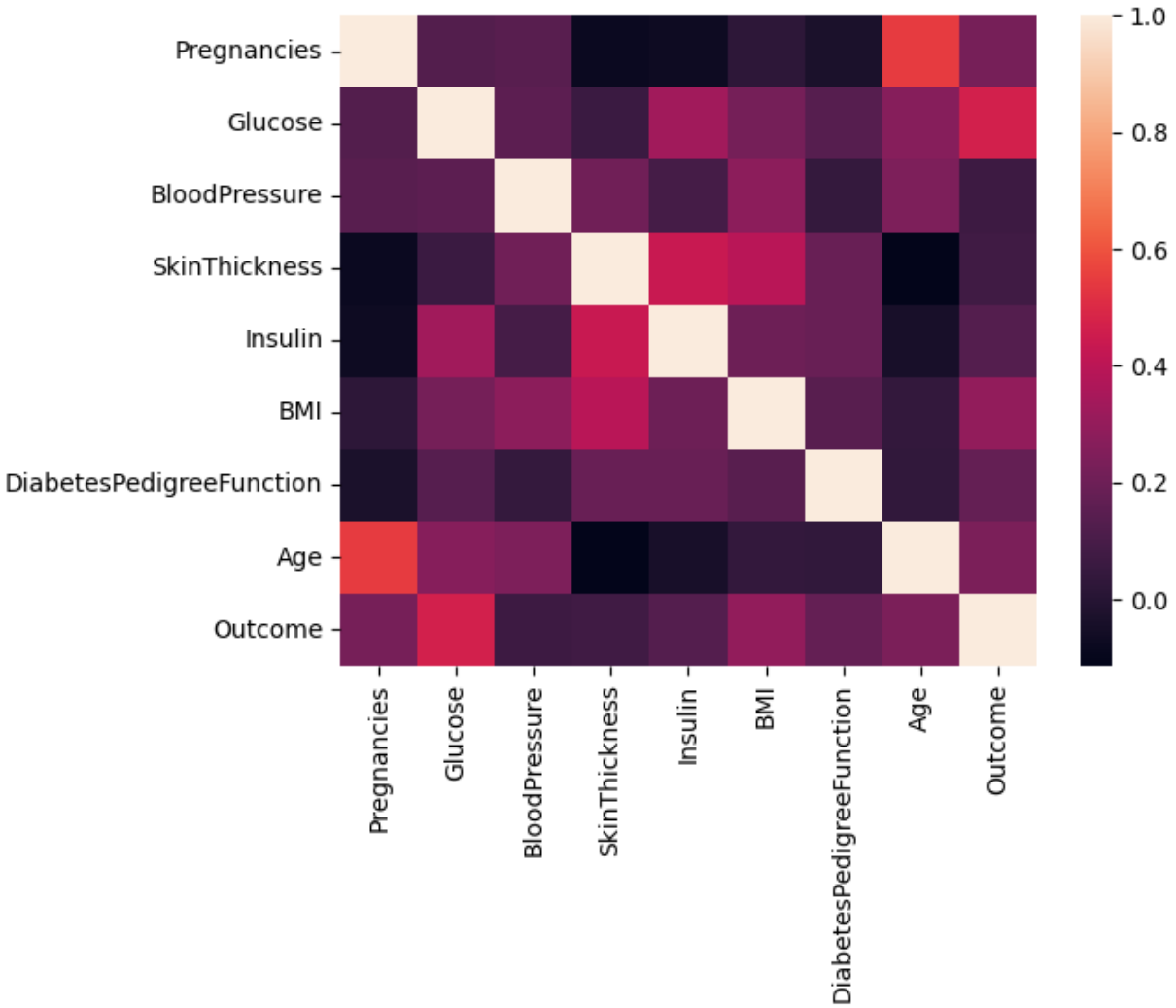
```
                          Pregnancies   Glucose  BloodPressure  SkinThickness  \
Pregnancies                  1.000000  0.129459       0.141282      -0.081672
Glucose                      0.129459  1.000000       0.152590       0.057328
BloodPressure                0.141282  0.152590       1.000000       0.207371
SkinThickness               -0.081672  0.057328       0.207371       1.000000
Insulin                     -0.073535  0.331357       0.088933       0.436783
BMI                          0.017683  0.221071       0.281805       0.392573
DiabetesPedigreeFunction    -0.033523  0.137337       0.041265       0.183928
Age                          0.544341  0.263514       0.239528      -0.113970
Outcome                      0.221898  0.466581       0.065068       0.074752

                            Insulin       BMI  DiabetesPedigreeFunction  \
Pregnancies               -0.073535  0.017683                 -0.033523
Glucose                    0.331357  0.221071                  0.137337
BloodPressure              0.088933  0.281805                  0.041265
SkinThickness              0.436783  0.392573                  0.183928
Insulin                    1.000000  0.197859                  0.185071
BMI                        0.197859  1.000000                  0.140647
DiabetesPedigreeFunction   0.185071  0.140647                  1.000000
Age                       -0.042163  0.036242                  0.033561
Outcome                    0.130548  0.292695                  0.173844

                               Age   Outcome
Pregnancies               0.544341  0.221898
Glucose                   0.263514  0.466581
BloodPressure             0.239528  0.065068
SkinThickness            -0.113970  0.074752
Insulin                  -0.042163  0.130548
BMI                       0.036242  0.292695
DiabetesPedigreeFunction  0.033561  0.173844
Age                       1.000000  0.238356
Outcome                   0.238356  1.000000
```

In [30]:
```
# Visualising the Co relation
sns.heatmap(data.corr())
```

Out[30]: <Axes: >



In [31]:
```
# Train test split
x=data.drop("Outcome",axis=1)
y=data["Outcome"]
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.3,random_state=21
```

In [32]:
```
# Training the model
model=LogisticRegression()
model.fit(x_train,y_train)
```

```
D:\Users\HP\anaconda3\Lib\site-packages\sklearn\linear_model\_logistic.py:460: Co
nvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html (https://scikit-le
arn.org/stable/modules/preprocessing.html)
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
(https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression)
  n_iter_i = _check_optimize_result(
```

Out[32]:
```
LogisticRegression
LogisticRegression()
```

In [33]:
```
# Making Prediction
prediction = model.predict(x_test)
prediction
```

Out[33]:
```
array([0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 0,
       1, 1, 1, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       1, 0, 0, 0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0,
       0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1,
       0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0,
       0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0,
       0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, 0, 1,
       1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 1, 0, 0, 0,
       0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1,
       1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], dtype=int64)
```

In [34]:
```
# Accuracy_score of the model
accuracy = accuracy_score(prediction,y_test)
accuracy
```

Out[34]:
```
0.7272727272727273
```

In [35]:
```
from sklearn.metrics import confusion_matrix,classification_report
```

In [36]:
```
#Confusion matrix
cm = confusion_matrix(y_test,prediction)
cm
```

Out[36]:
```
array([[129,  15],
       [ 48,  39]], dtype=int64)
```

In [37]:
```
# Classification Report
print(classification_report(prediction,y_test))
```

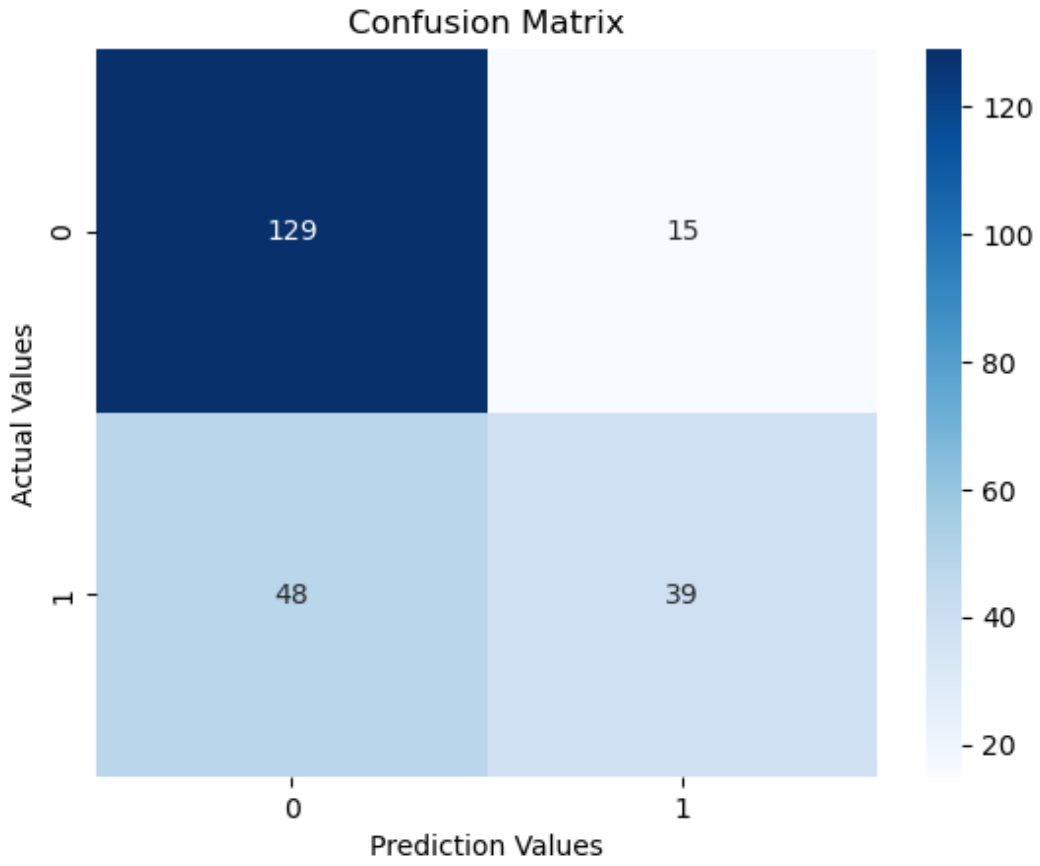
```
              precision    recall  f1-score   support

           0       0.90      0.73      0.80       177
           1       0.45      0.72      0.55        54

    accuracy                           0.73       231
   macro avg       0.67      0.73      0.68       231
weighted avg       0.79      0.73      0.75       231
```

In [40]:
```
# Grafhical Presentation of Confusion Matrix
plt.title("Confusion Matrix")
sns.heatmap(cm,annot = True,fmt='d',cmap = 'Blues')
plt.ylabel("Actual Values")
plt.xlabel("Prediction Values")
```

Out[40]: Text(0.5, 23.52222222222222, 'Prediction Values')



In [ ]: