Ex.No-3 **DATA VISUALIZATION**

AIM:

To compute their sigmoid and tanh (hyperbolic tangent) values using NumPy and plot the values

INTEGRATED DEVELOPMENT ENVIRONMENT (IDE) REQUIRED:

JUPYTER NOTEBOOK

REQUIRED LIBRARIES FOR PYTHON:

- Numpy
- MatplotLib

PROCEDURE:

Step 1: Import required libraries

Step 2: Write code to define the sigmoid function Define the tanh function Step 3:

Write code to define the tanh function

Step 4: Generate a random array of values using numpy

Step 5: Calculate the sigmoid and tanh (hyperbolic tangent) of these random values Step 5:Plot

the values

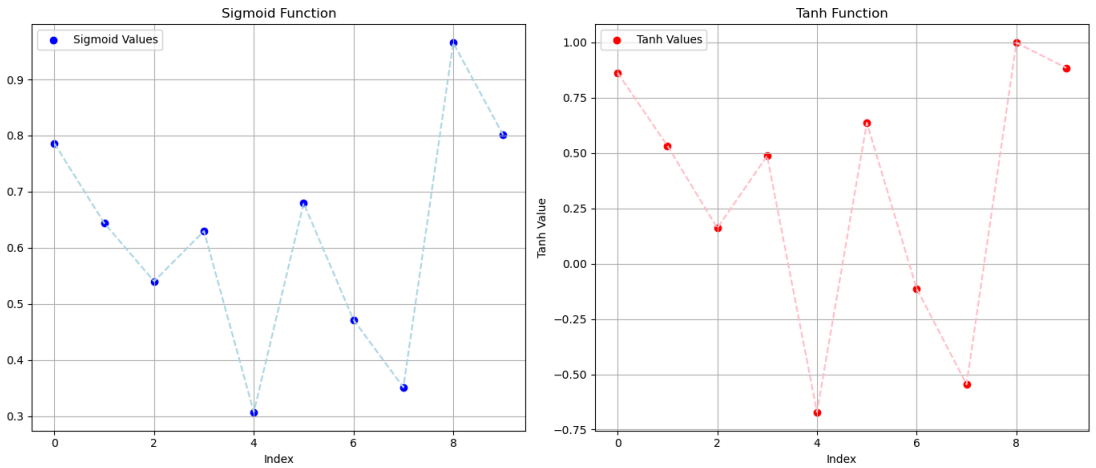
PROGRAM:

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

# Define the sigmoid function
def sigmoid(x):
    return 1 / (1 + np.exp(-x))

# Define the tanh function
def tanh(x):
    return np.tanh(x)

# Generate a random array of values using numpy
random_values = np.random.randn(10)  # Generate 10 random values from a standard normal distribution

# Calculate the sigmoid and tanh (hyperbolic tangent) of these random values
sigmoid_values = sigmoid(random_values)
tanh_values = tanh(random_values)
```

```
# Generate indices for x-axis
indices = np.arange(len(random_values))

# Plotting
plt.figure(figsize=(14, 6))

# Plot for Sigmoid values
plt.subplot(1, 2, 1)
plt.scatter(indices, sigmoid_values, color='blue', label='Sigmoid Values')
plt.plot(indices, sigmoid_values, color='lightblue', linestyle='--')
plt.title('Sigmoid Function')
plt.xlabel('Index')
plt.ylabel('Sigmoid Value')
plt.grid(True)
plt.legend()

# Plot for Tanh values
plt.subplot(1, 2, 2)
plt.scatter(indices, tanh_values, color='red', label='Tanh Values')
plt.plot(indices, tanh_values, color='pink', linestyle='--')
plt.title('Tanh Function')
plt.xlabel('Index')
plt.ylabel('Tanh Value')
plt.grid(True)
plt.legend()

plt.tight_layout()
plt.show()
```

OUTPUT:

Output graph is plotted as below



Result:

The programs were run successfully