ASSIGNMENT

1. How can you create a histogram in Matplotlib?

   To create a histogram in Matplotlib, you use the `plt.hist()` function. A histogram represents the distribution of numerical data and is created by dividing the data into intervals (bins).

   Here's an example:

```
import matplotlib.pyplot as plt

# Example data
data = [7, 8, 5, 6, 9, 8, 10, 7, 6, 7, 8, 6, 9, 5]

# Creating the histogram
plt.hist(data, bins=5, color='blue', edgecolor='black')

# Adding labels and title
plt.xlabel('Value')
plt.ylabel('Frequency')
plt.title('Histogram Example')

# Display the histogram
plt.show()
```

2. What is the purpose of the plt.subplots() function in Matplotlib?

   The `plt.subplots()` function in Matplotlib is used to create a figure and one or more axes (subplots). It simplifies creating multiple subplots within the same figure and provides better control over their arrangement.

   Basic Example:

```
import matplotlib.pyplot as plt

# Create a figure with two subplots (1 row, 2 columns)
fig, axes = plt.subplots(1, 2, figsize=(10, 5))

# First subplot
axes[0].plot([1, 2, 3], [4, 5, 6])
axes[0].set_title('First Plot')

# Second subplot
axes[1].plot([1, 2, 3], [6, 5, 4])
axes[1].set_title('Second Plot')

# Show the plots
plt.tight_layout()
plt.show()
```

3. How can you create a 3D plot in Matplotlib?

   To create a 3D plot in Matplotlib, you need to use the mpl_toolkits.mplot3d module. First, set up a 3D axes using projection='3d'.

Example of a 3D Plot:

```
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
import numpy as np

# Create data for the 3D plot
x = np.linspace(-5, 5, 100)
y = np.linspace(-5, 5, 100)
X, Y = np.meshgrid(x, y)
Z = np.sin(np.sqrt(X**2 + Y**2))

# Create a figure and a 3D axes
fig = plt.figure()
ax = fig.add_subplot(111, projection='3d')

# Plot a 3D surface
ax.plot_surface(X, Y, Z, cmap='viridis')

# Adding labels
ax.set_xlabel('X-axis')
ax.set_ylabel('Y-axis')
ax.set_zlabel('Z-axis')

# Show the 3D plot
plt.show()
```

This produces a 3D surface plot. You can also create 3D scatter plots, line plots, and bar plots similarly.