

# OPEN SOURCE SOFTWARE LAB (15B17CI575)

## Lab Assignment 5

### Topic Coverage: Python- Matplotlib

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Refer to Help File Lab Assignment 5.pdf

#### **Matplotlib Practice Questions**

1. Creating simple plots of  $\sin(x)$  and  $\cos(x)$

```
import numpy as np

X = np.linspace(-np.pi, np.pi, 256, endpoint=True)
C, S = np.cos(X), np.sin(X)
import matplotlib.pyplot as plt
plt.plot(X, C)
plt.plot(X, S)
plt.show()
```

Here, X is numpy array with 256 values ranging from  $-\pi$  to  $+\pi$ . C is cosine (256 values) and S is sine (256 values).

2. Exploring all the figure settings that influence the appearance of the plot.

```
# Create a figure of size 8x6 inches, 80 dots per inch
plt.figure(figsize=(8, 6), dpi=80)

# Create a new subplot from a grid of 1x1
plt.subplot(1, 1, 1)

# Plot cosine with a blue continuous line of width 1 (pixels)
plt.plot(X, C, color="blue", linewidth=1.0, linestyle="-")

# Plot sine with a green continuous line of width 1 (pixels)
plt.plot(X, S, color="green", linewidth=1.0, linestyle="-")

# Set x limits
plt.xlim(-4.0, 4.0)

# Set x ticks
plt.xticks(np.linspace(-4, 4, 9, endpoint=True))
```

```
# Set y limits
plt.ylim(-1.0, 1.0)

# Set y ticks
plt.yticks(np.linspace(-1, 1, 5, endpoint=True))

# Save figure using 72 dots per inch
plt.savefig("exercise_2.png", dpi=72)
```

### 3. Adding legends

```
plt.plot(X, C, color="blue", linewidth=2.5, linestyle="-", label="cosine")
plt.plot(X, S, color="red", linewidth=2.5, linestyle="-", label="sine")
plt.legend(loc='upper left')
```

### 4. RegularPlots

```
n = 256
X = np.linspace(-np.pi, np.pi, n, endpoint=True)
Y = np.sin(2 * X)
plt.plot(X, Y + 1, color='blue', alpha=1.00)
plt.plot(X, Y - 1, color='blue', alpha=1.00)
```

### 5. Scatter Plot

```
n = 1024
X = np.random.normal(0,1,n)
Y = np.random.normal(0,1,n)
plt.scatter(X,Y)
```

### 6. Bar Chart

```
n = 12
X = np.arange(n)
Y1 = (1 - X / float(n)) * np.random.uniform(0.5, 1.0, n)
plt.bar(X, +Y1, facecolor='#9999ff', edgecolor='white')
plt.show()
Y2 = (1 - X / float(n)) * np.random.uniform(0.5, 1.0, n)
plt.bar(X, -Y2, facecolor='#ff9999', edgecolor='white')
plt.show()
```

### 7. Plot $\tan(x)$ , $\cot(x)$ , $\sec(x)$ and $\operatorname{cosec}(x)$ for the values of $x = [-\pi, -\pi/4, -\pi/2, 0, \pi/4, \pi/2, \pi]$

8. Represent the following table using barchart

Method	Result1	Result2
A	2	3
B	5	2
C	8	5
D	5	7