# Experiment - 4

Objective:
Matplotlib plotting for Data visualization: Tweaking Colors, Symbols, Formulations. Plotting Categorical data, 3D Axes, Parametric Curves, Trigonometry functions, Histogram, Bar, Pie chart. Graph plotting using Pandas

Program 1: Plot a simple Trigonometry function

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

fig, ax = plt.subplots()
# x data
x = np.linspace(0, 10, 300)
# y data
y = np.sin(x) + x
# creates the plot
ax.plot(x, y)
# this will show your plot in case your environment is not
interactive
fig.show()
```

Output:
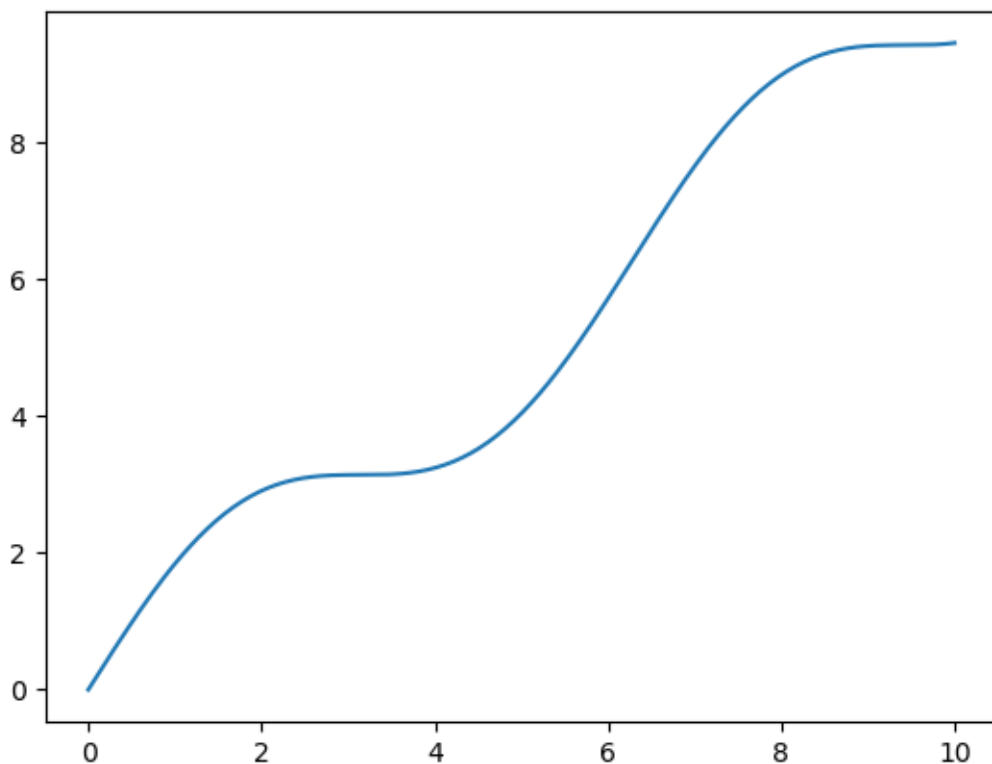
Multiple Subplots

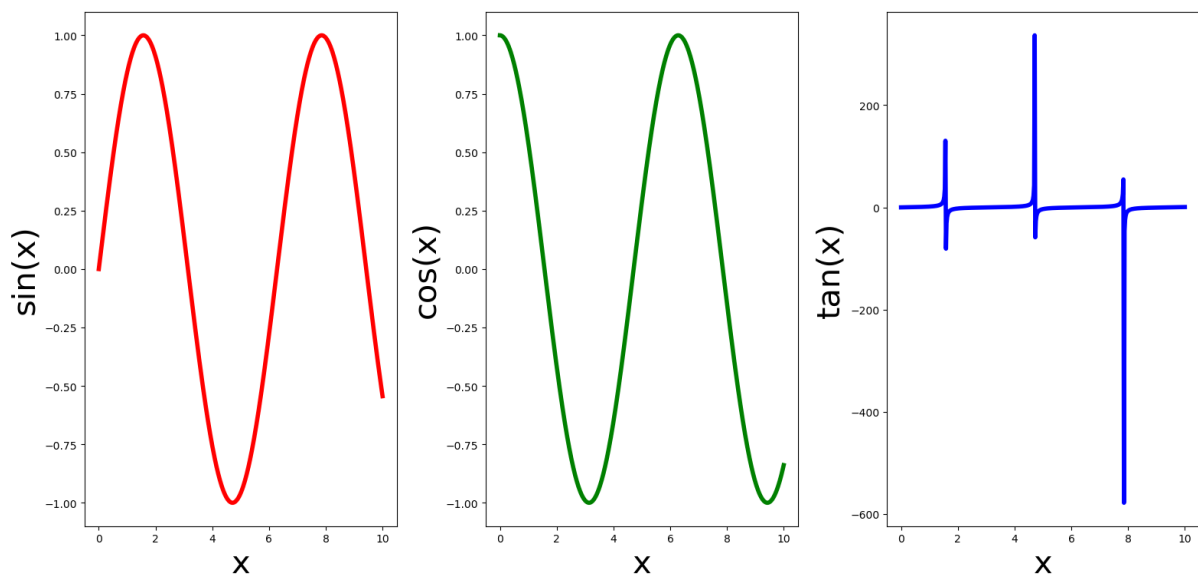### Program 2: Plot simple Trigonometry function plot in three parts

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

fig, axes = plt.subplots(1, 3, figsize=(16,8))
ax1, ax2, ax3 = axes
x = np.linspace(0,10,500)
y1 = np.sin(x)
y2 = np.cos(x)
y3 = np.tan(x)

ax1.set_ylabel('sin(x)', fontsize=30)
ax1.set_xlabel('x', fontsize=30)
ax2.set_ylabel('cos(x)', fontsize=30)
ax2.set_xlabel('x', fontsize=30)
ax3.set_ylabel('tan(x)', fontsize=30)
ax3.set_xlabel('x', fontsize=30)
fig.tight_layout(pad=2)

ax1.plot(x, y1, c='r', linewidth=4)
ax2.plot(x, y2, c='g', linewidth=4)
ax3.plot(x, y3, c='b', linewidth=4)
plt.show()
```

Output:

The Bar Chart

Program 3: Create a simple bar graph. Suppose you want to compare the box office of the movies released in 2020 in the India

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

films = ['Tanhaji', 'Baaghi 3', 'Love Aaj Kal', 'Jawaani
Jaaneman', 'Street Dancer 3D']
box_office = [367.65, 137.05, 44.77, 52.63, 97]
plt.bar(films, box_office)
plt.show()
```
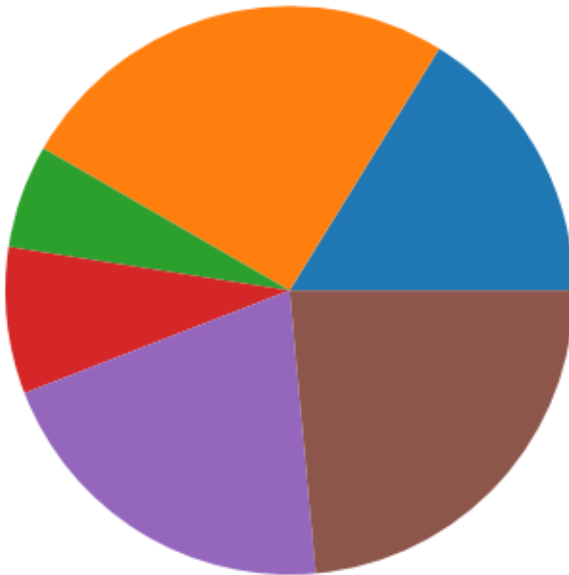
Output:
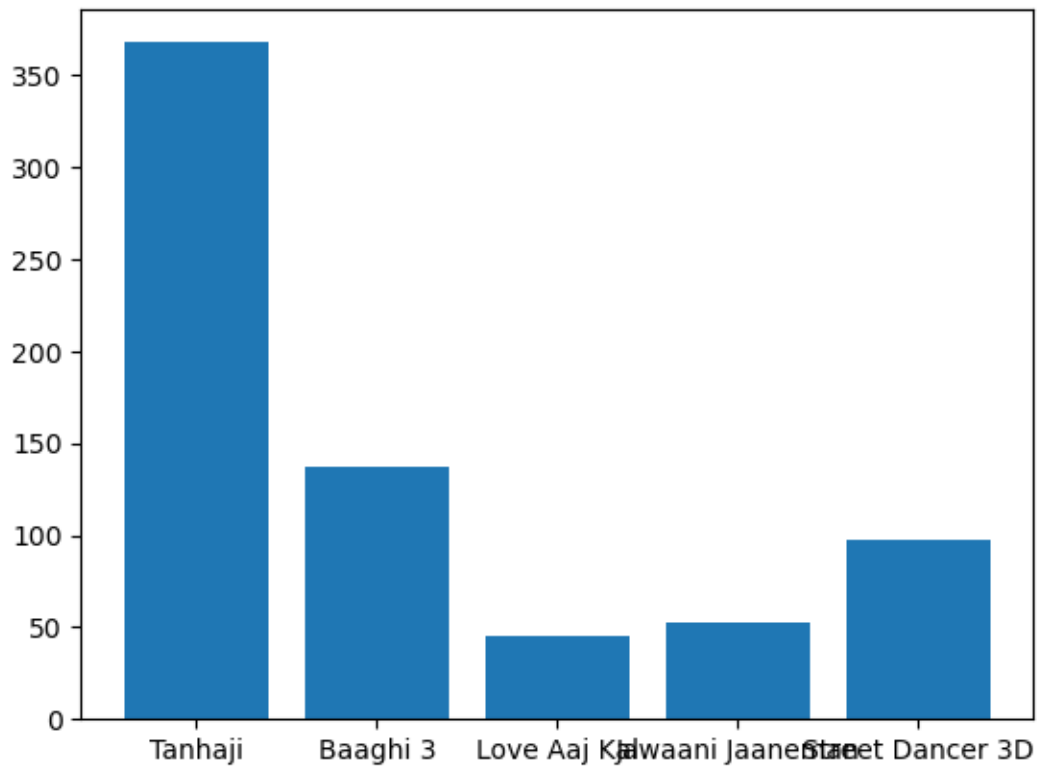
The Pie Chart

Program 4: Create simple pie chart. Assume our data represents the result of a survey on a favourite programming language

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

data=[33,52,12,17,42,48]
plt.pie(data)
plt.show()
```

Output:

The Histogram

Program 5: Let's say you've decided to plot the height of your classmate. Now, create a very simple histogram with only 10 values

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

plt.hist(data, color="purple", edgecolor="white")
plt.title("My classmate' height")
plt.ylabel("Number of people")
plt.xlabel("Height in cm")
plt.show()
```

Output:
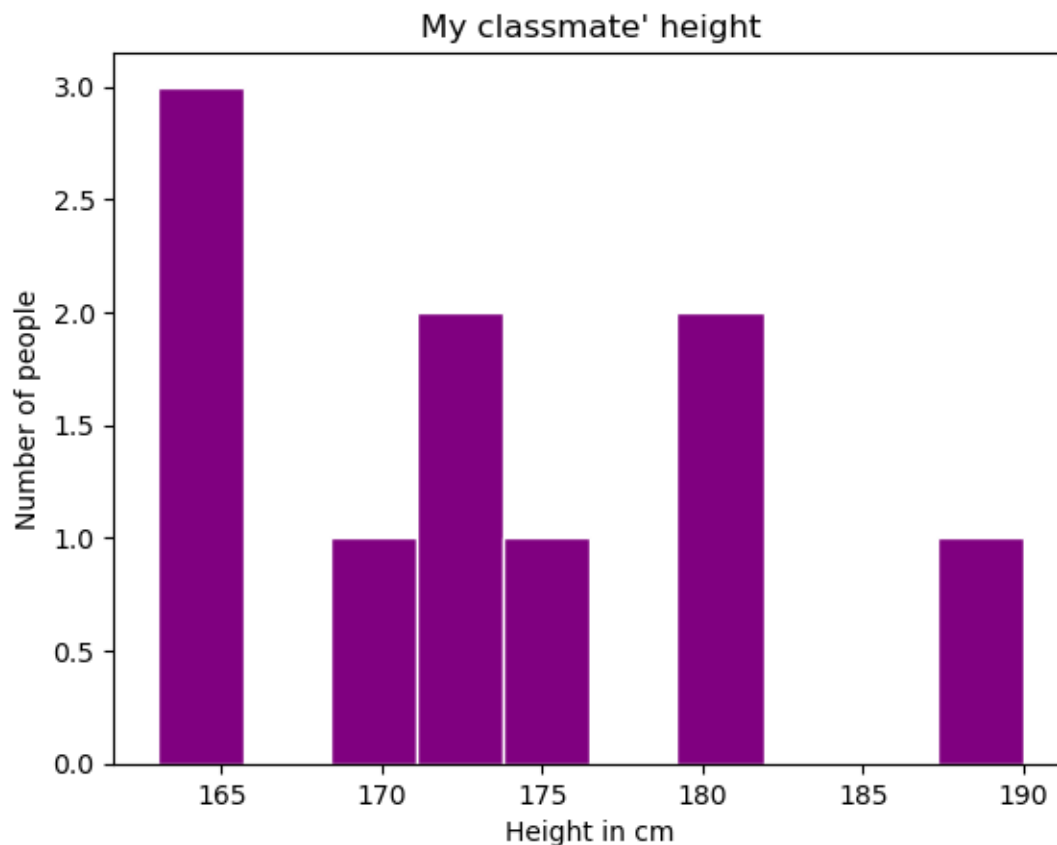
3D graphs

Program 6: Create a simple 3D graph

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

from mpl_toolkits.mplot3d import axes3d
import matplotlib.pyplot as plt
from matplotlib import style

style.use('fivethirtyeight')

fig = plt.figure()
ax1 = fig.add_subplot(111, projection='3d')

x = [1,2,3,4,5,6,7,8,9,10]
y = [5,6,7,8,2,5,6,3,7,2]
z = [1,2,6,3,2,7,3,3,7,2]

ax1.plot(x,y,z)

ax1.set_xlabel('x axis')
ax1.set_ylabel('y axis')
ax1.set_zlabel('z axis')

plt.show()
```

Output: