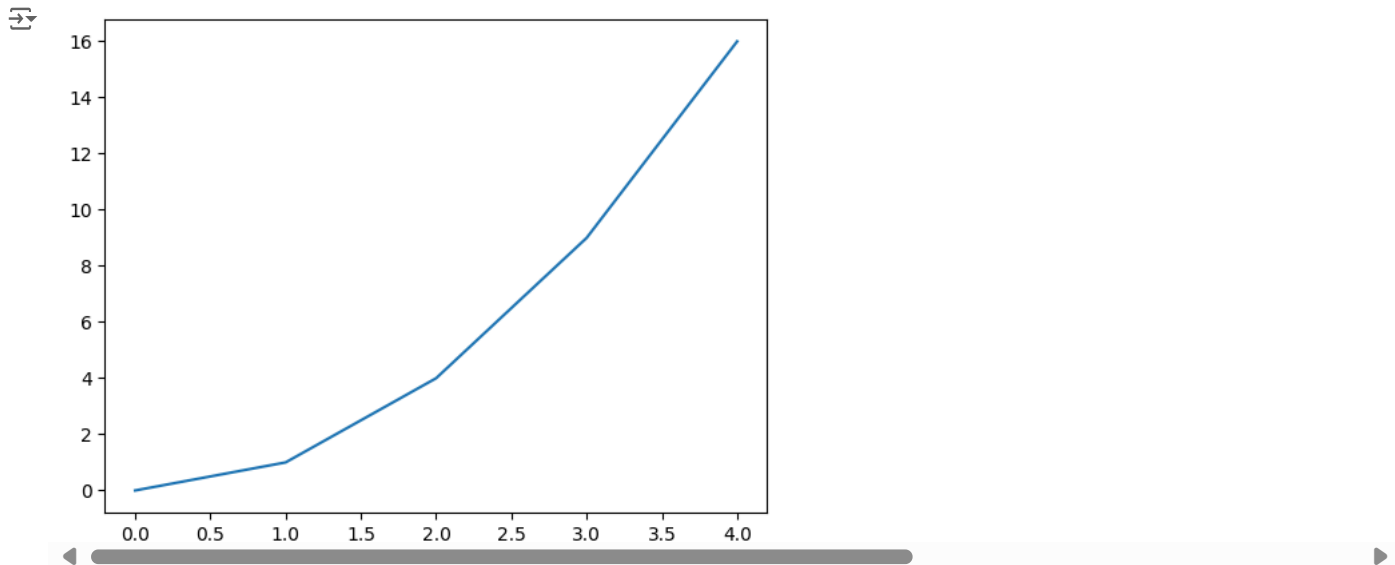## Muhammad Tahir

K214503

Data Science Visualization Lab

Part 01

```python
from matplotlib import pyplot as plt

x_values = [0, 1, 2, 3, 4]
y_values = [0, 1, 4, 9, 16]
plt.plot(x_values, y_values)
plt.show()
```
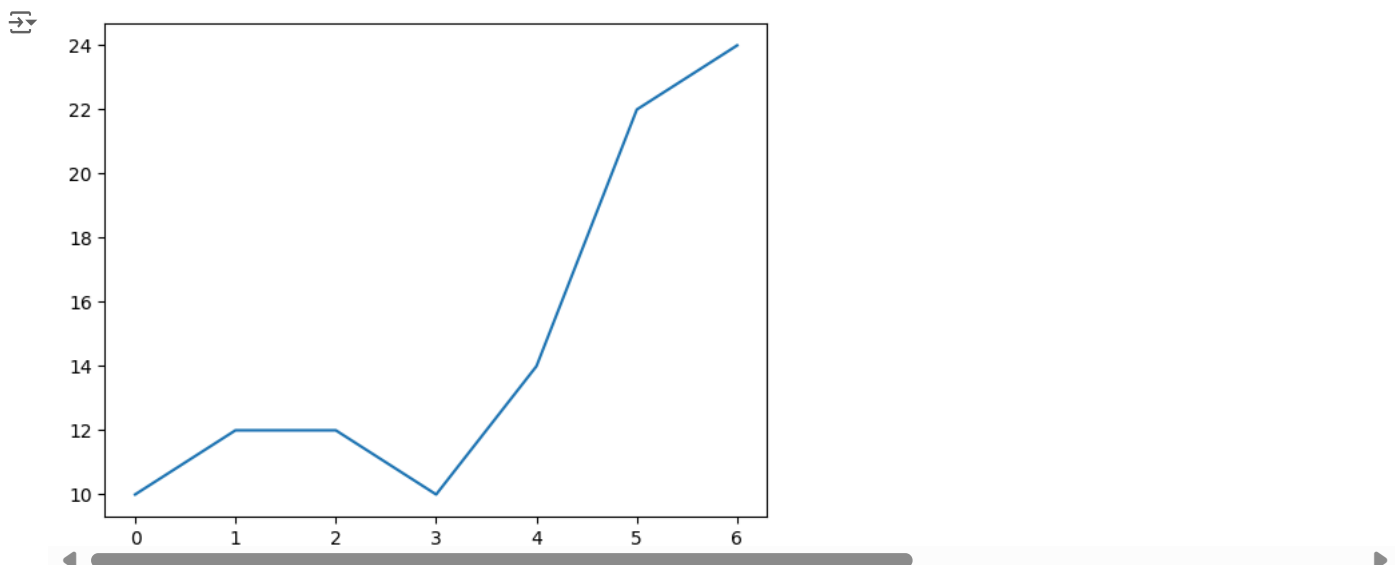


```python
from matplotlib import pyplot as plt

days = range(7) # days = [0, 1, 2, 3, 4,5, 6]

money_spent = [10, 12, 12, 10, 14, 22, 24]

plt.plot(days, money_spent)

plt.show()
```
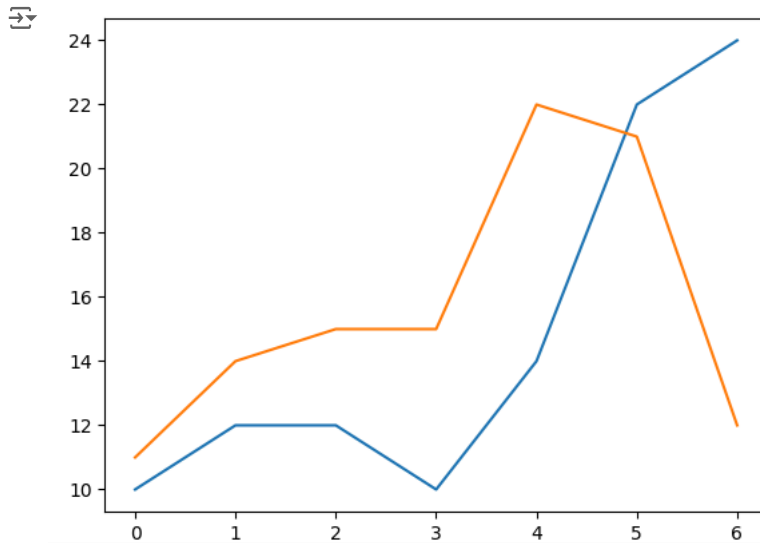


```python
# Days of the week:
days = [0, 1, 2, 3, 4, 5, 6]
# Your Money:
money_spent = [10, 12, 12, 10, 14, 22, 24]
```

```
# Your Friend's Money:
money_spent_2 = [11, 14, 15, 15, 22, 21, 12]
# Plot your money:
plt.plot(days, money_spent)
# Plot your friend's money:
plt.plot(days, money_spent_2)
# Display the result:
plt.show()
```


Lab Task 1: We have defined lists called time, revenue, and costs. time = [0, 1, 2, 3, 4] revenue = [200, 400, 650, 800, 850] costs = [150, 500, 550, 550, 560] (a) Plot revenue vs time. (b) Plot costs vs time on the same plot as the last line.
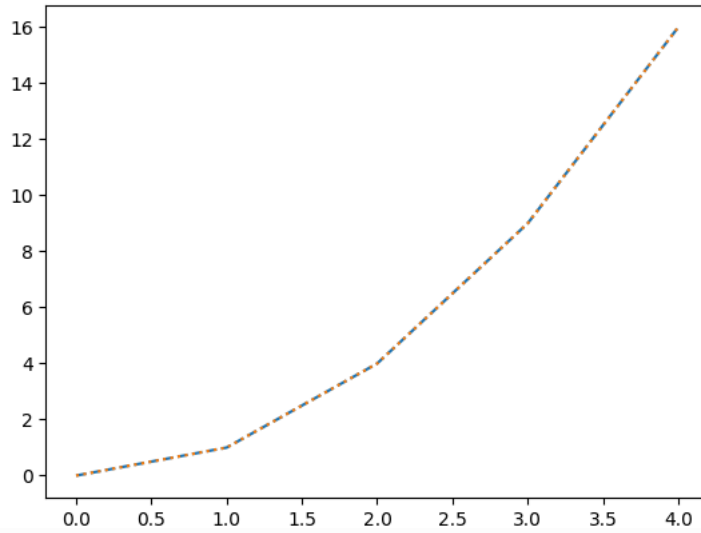
```
time = [0, 1, 2, 3, 4]
revenue = [200, 400, 650, 800, 850]
costs = [150, 500, 550, 550, 560]

plt.plot(time, revenue, color='green')
plt.plot(time, costs, color='red')
plt.show()
```
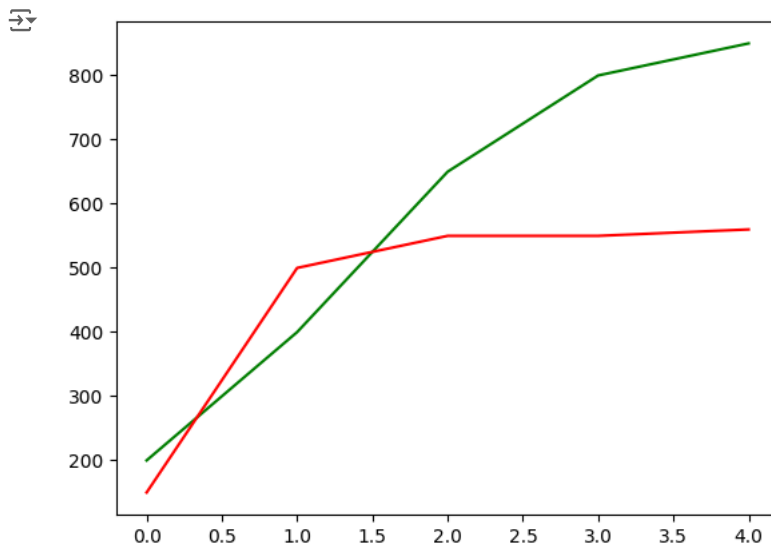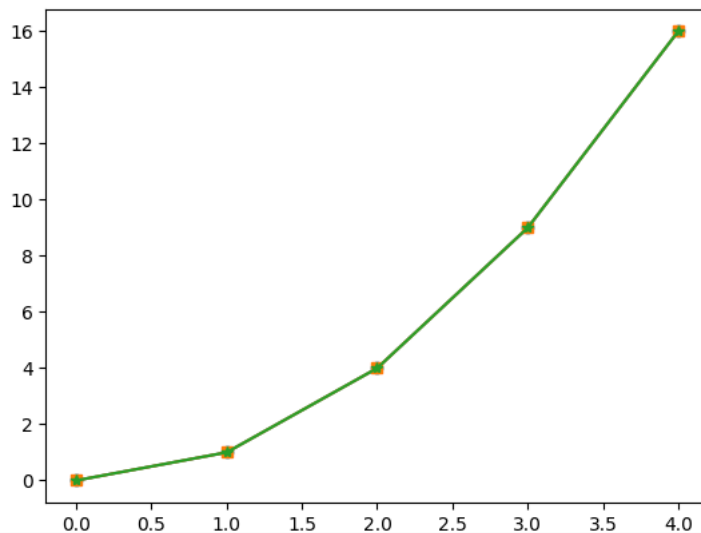


```
# Dashed:
plt.plot(x_values, y_values, linestyle='--')
# Dotted:
plt.plot(x_values, y_values, linestyle=':')
# No line:
plt.plot(x_values, y_values, linestyle='')
```
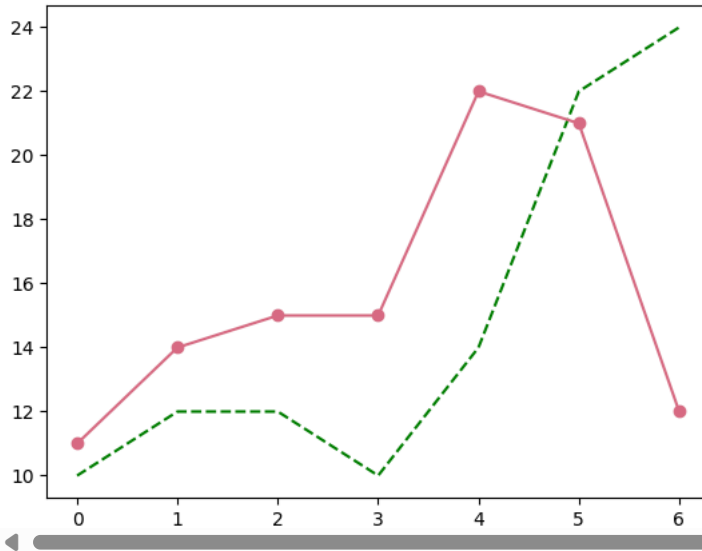
```
# A circle:
plt.plot(x_values, y_values, marker='o')
# A square:
plt.plot(x_values, y_values, marker='s')
# A star:
plt.plot(x_values, y_values, marker='*')
```

```
days = [0, 1, 2, 3, 4, 5, 6]
money_spent = [10, 12, 12, 10, 14, 22, 24]
money_spent_2 = [11, 14, 15, 15, 22, 21, 12]
plt.plot(days, money_spent, color='green', linestyle='--')
plt.plot(days, money_spent_2, color='#D76C82', marker='o')
```
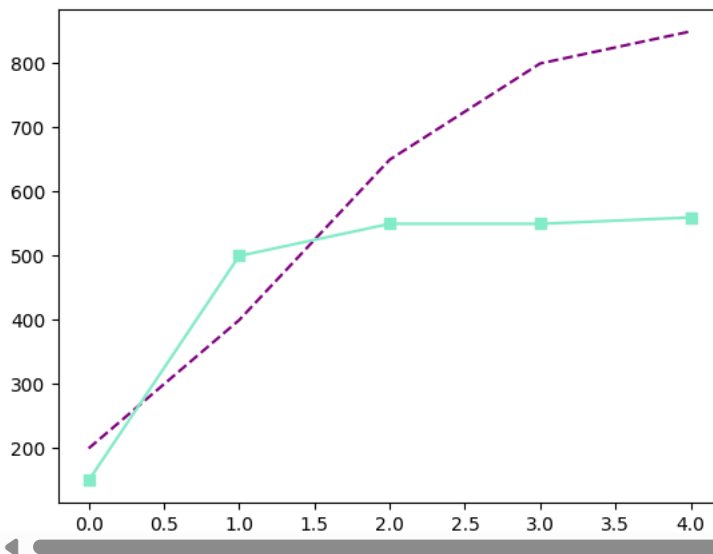
Lab Task 2:
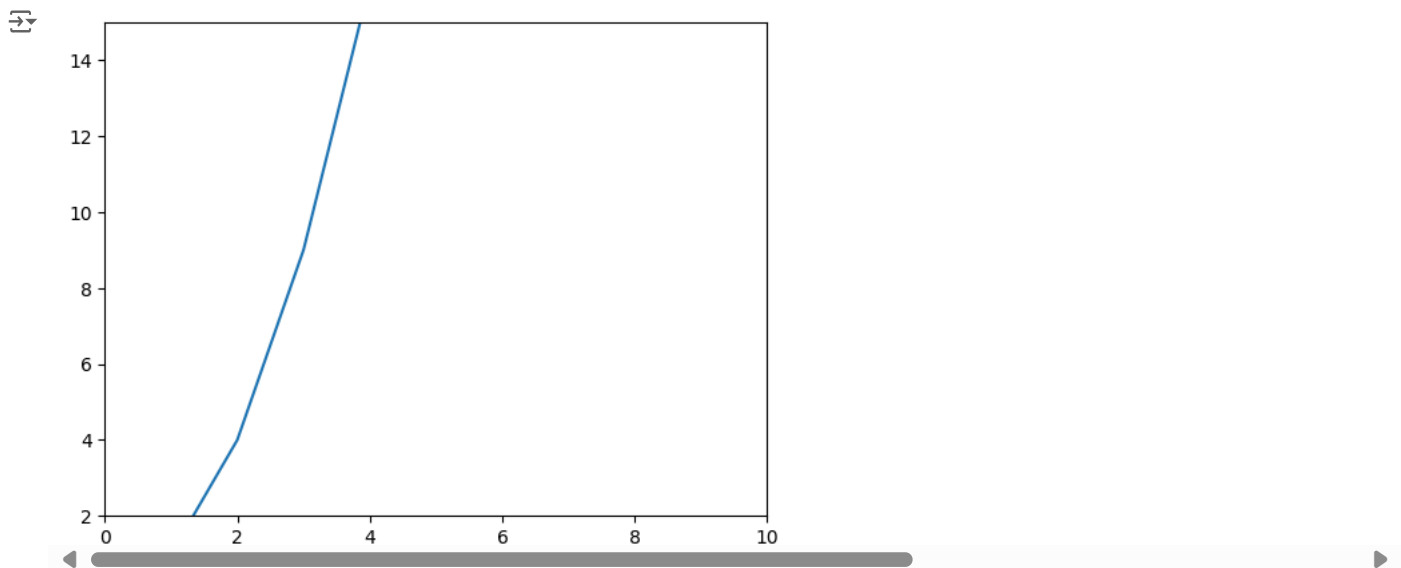
a) Plot revenue vs. time as a purple ('purple'), dashed ('--') line.

b) Plot costs vs. time as a line with the HEX color #82edc9 and square ('s') markers.

```
plt.plot(time, revenue, color='purple', linestyle='--')
plt.plot(time, costs, color='#82edc9', marker='s')
plt.show()
```



```
x = [0, 1, 2, 3, 4]
y = [0, 1, 4, 9, 16]
plt.plot(x, y)
plt.axis([0,10, 2, 15])
plt.show()
```

Lab Task 3: We have plotted a line representing someone's spending on coffee over the past 12 years.

Let's modify the axes to zoom in a bit more on our line chart. Use plt.axis() to modify the axes so that the x-axis goes from 0 to 12, and the y-axis goes from 2900 to 3100.

```
from matplotlib import pyplot as plt
x = range(12)
y = [3000, 3005, 3010, 2900, 2950, 3050, 3000, 3100, 2980,
2980, 2920, 3010]
plt.axis([0, 12, 2900, 3100])
plt.plot(x, y)
plt.show()
```
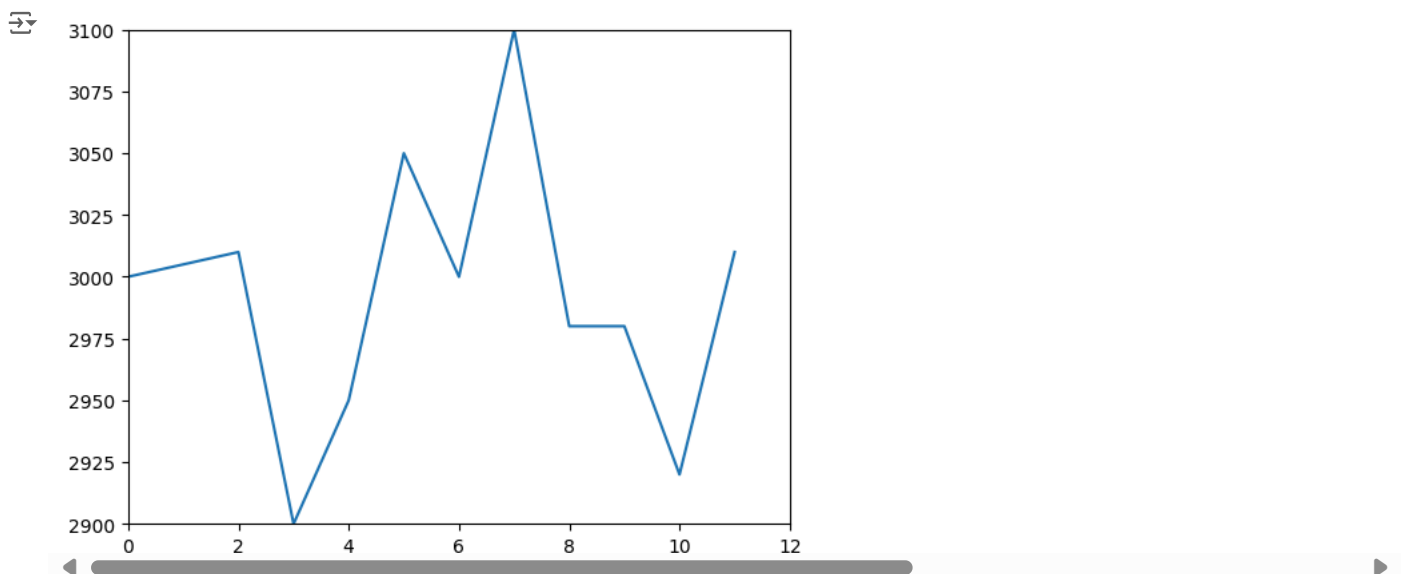


```
hours = [9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
happiness = [9.8, 9.9, 9.2, 8.6, 8.3, 9.0, 8.7, 9.1, 7.0, 6.4, 6.9, 7.5]
plt.plot(hours, happiness)
plt.xlabel('Time of day')
plt.ylabel('Happiness Rating (out of 10)')
plt.title('My Self-Reported Happiness While Awake')
plt.show()
```

My Self-Reported Happiness While Awake
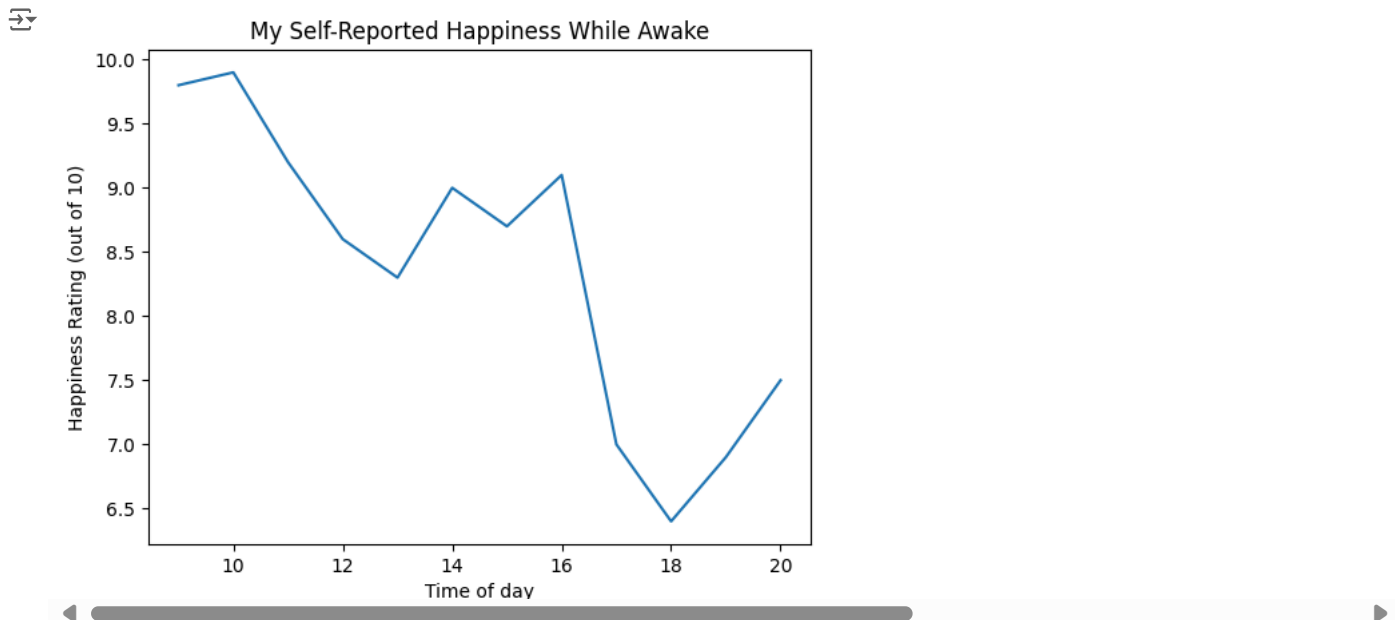
Lab Task 4: Consider the following code:

from matplotlib import pyplot as plt

x = range(12) y = [3000, 3005, 3010, 2900, 2950, 3050, 3000, 3100, 2980, 2980, 2920, 3010]

a) Label the x-axis 'Time'.

b) Label the y-axis 'Dollars spent on coffee'.

c) Add the title 'My Last Twelve Years of Coffee Drinking'.

```
x = range(12)
y = [3000, 3005, 3010, 2900, 2950, 3050, 3000, 3100, 2980, 2980, 2920, 3010]
plt.xlabel("Time")
plt.ylabel("Dollars spent on coffee")
plt.title("My Last Twelve Years of Coffee Drinking")
plt.plot(x, y)
plt.show()
```
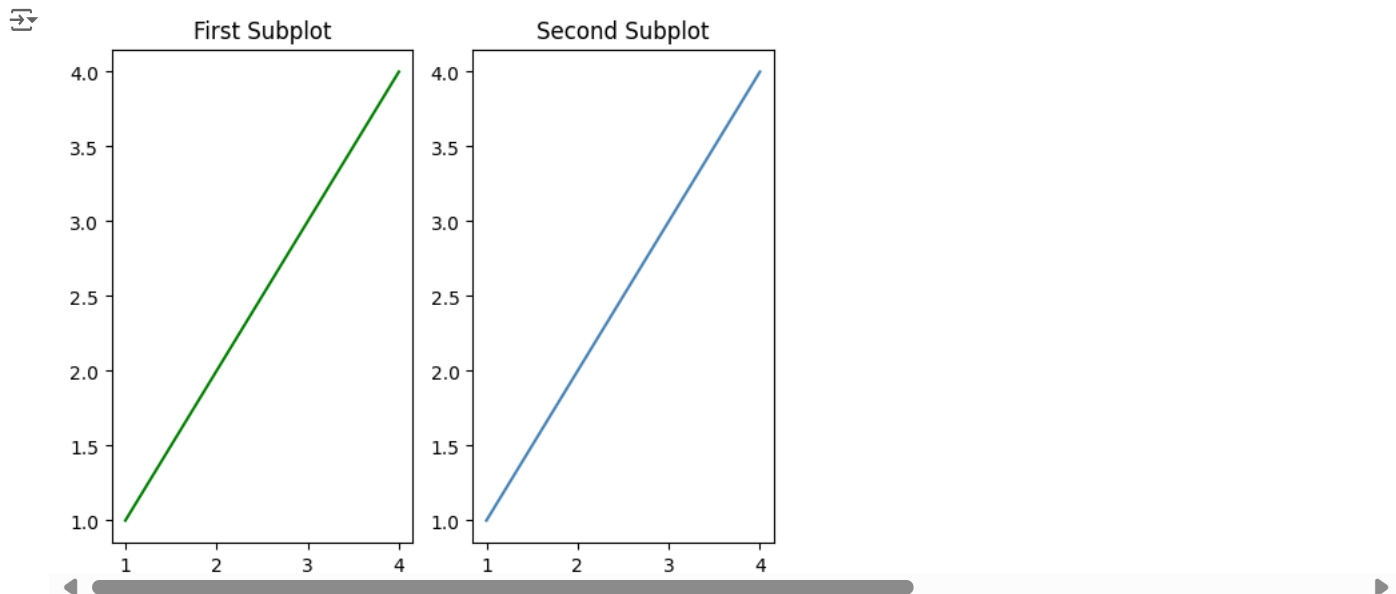

My Last Twelve Years of Coffee Drinking
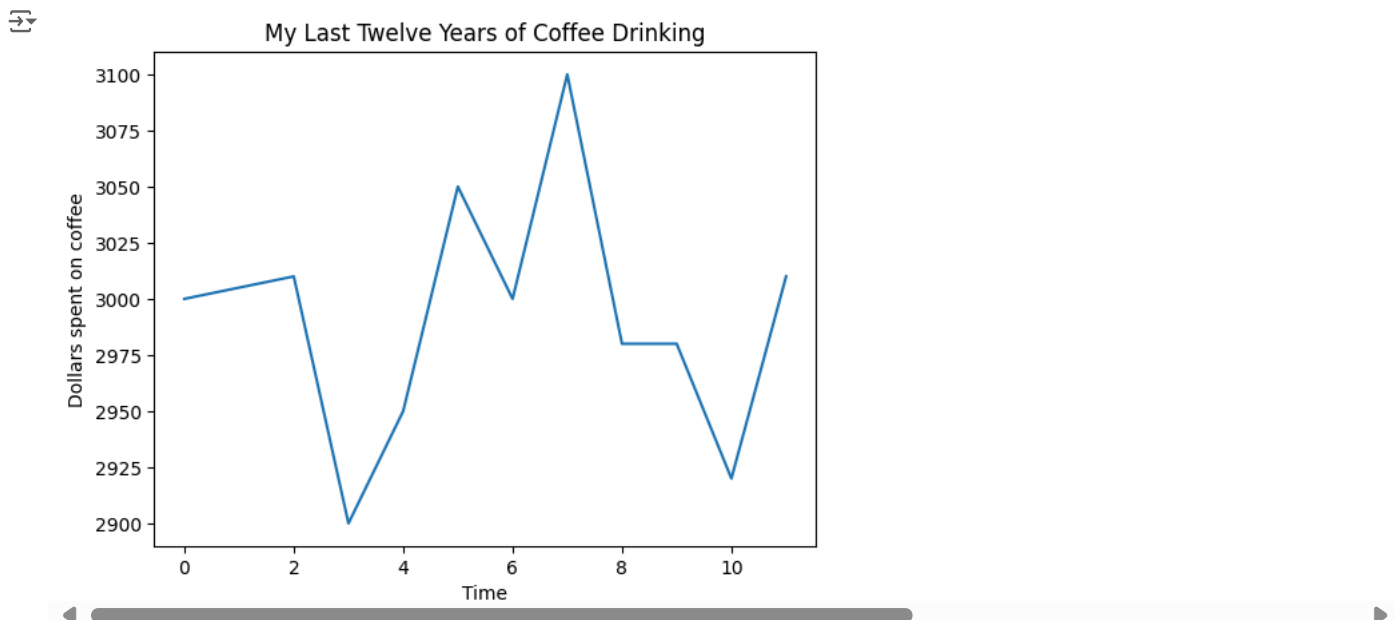
```
# Data sets
x = [1, 2, 3, 4]
y = [1, 2, 3, 4]

# First Subplot
plt.subplot(1, 2, 1)
plt.plot(x, y, color='green')
plt.title('First Subplot')

# Second Subplot
plt.subplot(1, 2, 2)
```

```
plt.plot(x, y, color='steelblue')
plt.title('Second Subplot')

# Display both subplots
plt.show()
```


Lab Task 5: We have defined the lists months, temperature, and flights_to_hawaii for you. a) Using the plt.subplot command, plot temperature vs months in the left box of a figure that has 1 row with 2 columns.

from matplotlib import pyplot as plt

months = range(12) temperature = [36, 36, 39, 52, 61, 72, 77, 75, 68, 57, 48, 48] flights_to_hawaii = [1200, 1300, 1100, 1450, 850, 750, 400, 450, 400, 860, 990, 1000]

b) Plot flights_to_hawaii vs temperature in the same figure, to the right of your first plot. Add the parameter "o" to the end of your call to plt.plot to make the plot into a scatterplot, if you want!
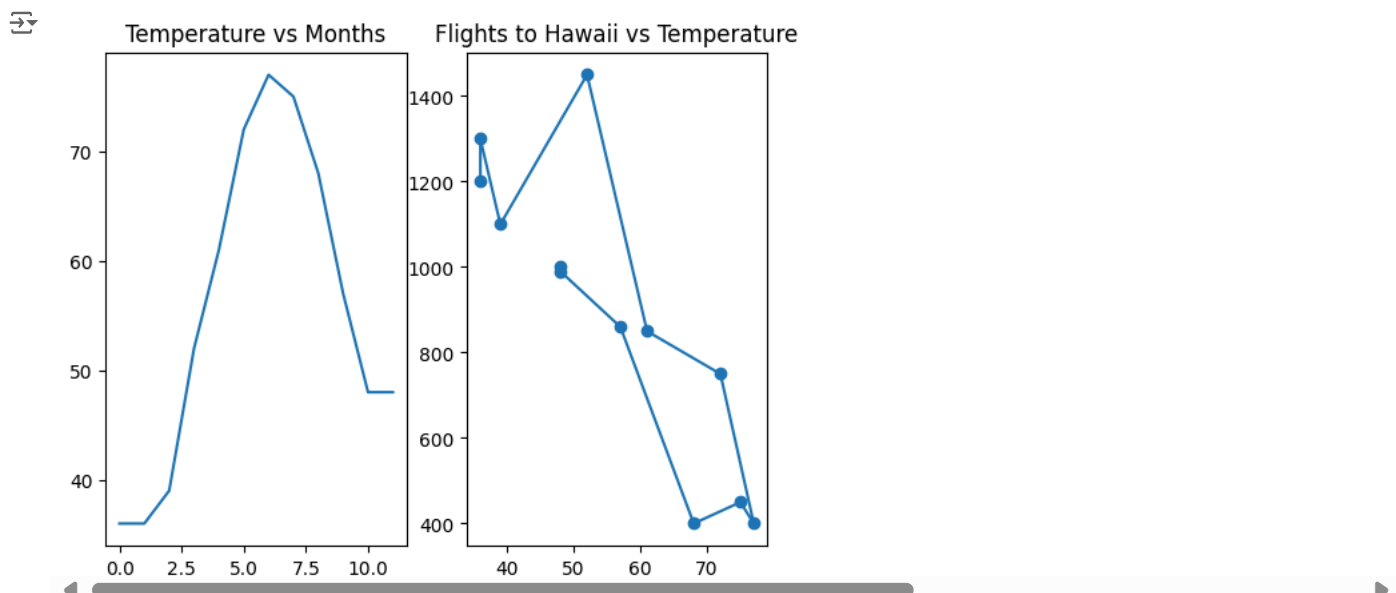
```
from matplotlib import pyplot as plt

months = range(12)
temperature = [36, 36, 39, 52, 61, 72, 77, 75, 68, 57, 48, 48]
flights_to_hawaii = [1200, 1300, 1100, 1450, 850, 750, 400, 450, 400, 860, 990, 1000]

plt.subplot(1, 2, 1)
plt.plot(months, temperature)
plt.title('Temperature vs Months')

plt.subplot(1, 2, 2)
plt.plot(temperature, flights_to_hawaii, marker='o')
plt.title('Flights to Hawaii vs Temperature')

plt.show()
```
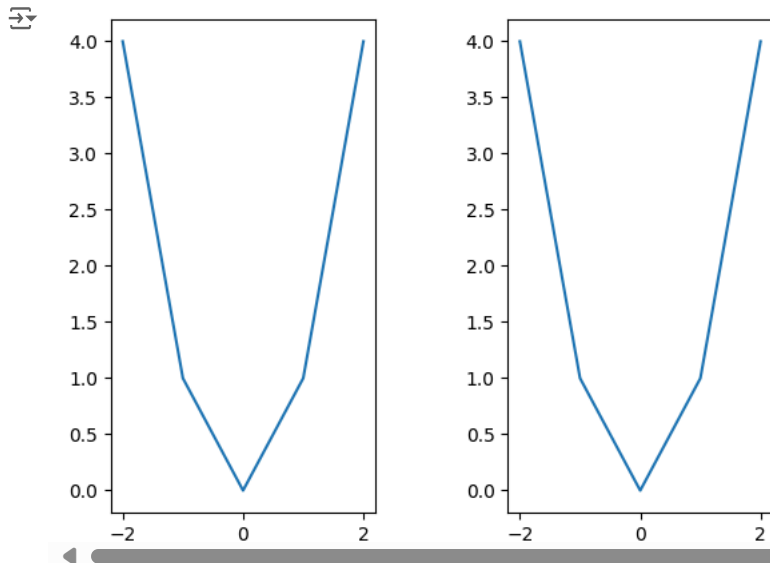
```
# Left Plot
plt.subplot(1, 2, 1)
plt.plot([-2, -1, 0, 1, 2], [4, 1, 0, 1, 4])
# Right Plot
plt.subplot(1, 2, 2)
plt.plot([-2, -1, 0, 1, 2], [4, 1, 0, 1, 4])
# Subplot Adjust
plt.subplots_adjust(wspace=0.5)
plt.show()
```



```
# Lab Task 6:
# (a) Create a figure that has two rows of subplots. It should
# have:
# • one subplot in the top row
# • two subplots in the bottom row

# (b) Plot straight_line vs x in this subplot you've selected.
# Now, use the plt.subplot() command to select the box in the
# first column of the second row (the one with a square in it). Plot
# parabola vs x in this box.

# (c) Now, use the plt.subplot() command to select the box in the
# second column of the second row (the one with a triangle in it).
# Plot cubic vs x in this box.

# (d) Increase the spacing between horizontal subplots to 0.35
# and the bottom margin to 0.2.

from matplotlib import pyplot as plt

x = [-2, -1, 0, 1, 2]
straight_line = [-2, -1, 0, 1, 2]
parabola = [4, 1, 0, 1, 4]
cubic = [-8, -1, 0, 1, 8]

# (a) Create the figure and subplots
plt.figure()

# Top row, single subplot
plt.subplot(2, 1, 1)
plt.plot(x, straight_line)
plt.title('Straight Line')

# Bottom row, two subplots
plt.subplot(2, 2, 3)
plt.plot(x, parabola)
plt.title('Parabola')

plt.subplot(2, 2, 4)
plt.plot(x, cubic)
plt.title('Cubic')

# (d) Adjust spacing
plt.subplots_adjust(hspace=0.35, bottom=0.2)

# Display the plot
plt.show()
```
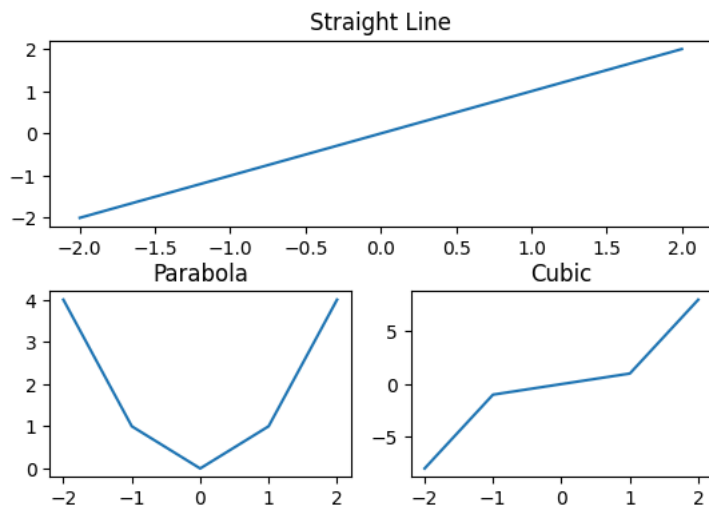
Straight Line

Parabola

Cubic

```
for i in range(44):
  print(i)
```

⮦ 0
1
2
3