Day-24 Lab

(PN: Assign minimum 2 labs.

ChatGPT lab is mandatory)

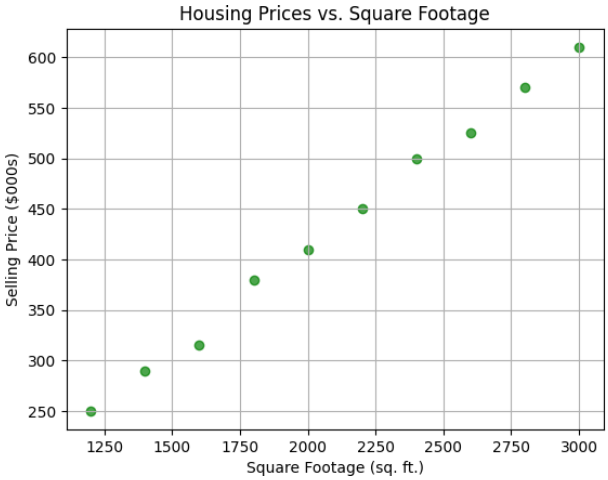
Lab1: Analyze the relationship between the size of houses (measured in square footage) and their selling prices in a particular neighborhood. You have collected data on various houses in that neighborhood.Create a scatter plot using the below data and share your conclusion/analysis.

Input:

square_footage = np.array([1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800, 3000])

selling_prices = np.array([250, 290, 315, 380, 410, 450, 500, 525, 570, 610])

Output:



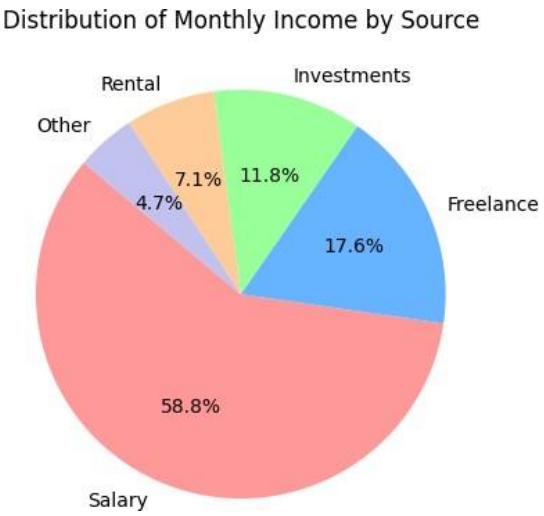
Lab2: Create a pie chart to visualize the distribution of your monthly income by source. You have collected data on the various sources of your income, such as salary, freelance work, investments, and rental income. Share your conclusion/analysis.

Input:

income_sources = ['Salary', 'Freelance', 'Investments', 'Rental', 'Other']

monthly_income = [5000, 1500, 1000, 600, 400]

Output:

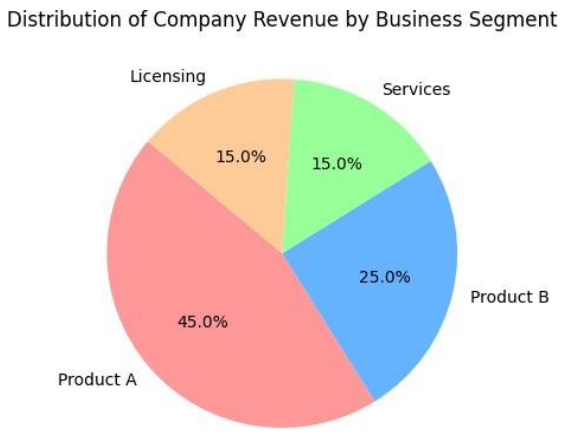


Lab3: Create a pie chart to illustrate the distribution of a company's revenue across its various business segments. You have collected data on the revenue generated by each segment, such as Product A, Product B, Services, and Licensing. Share your conclusion/analysis.

Input:

segments = ['Product A', 'Product B', 'Services', 'Licensing']
revenue_percentages = [45, 25, 15, 15]

Output:



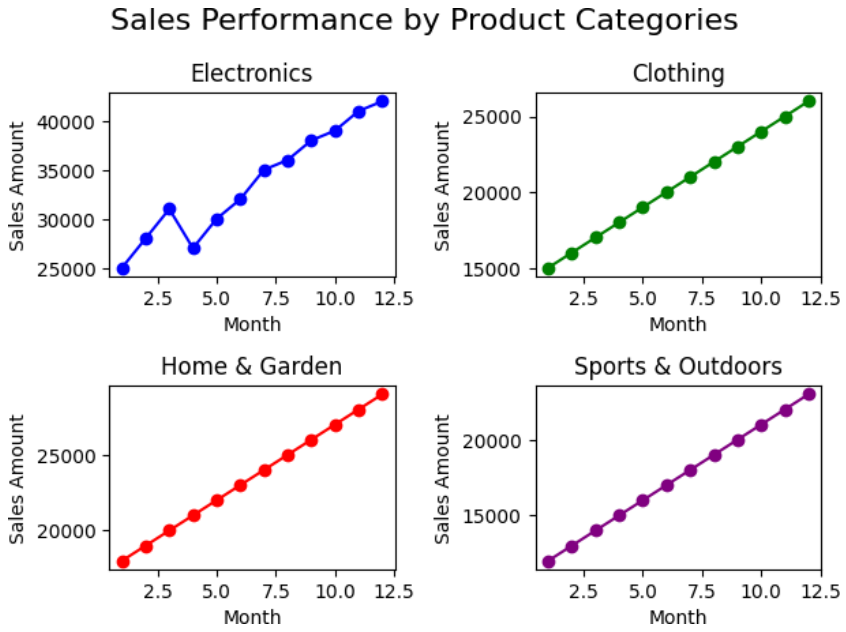
Lab3: Suppose you're a sales manager for an e-commerce company, and you want to create a figure with subplots to compare the sales performance of different product categories over time. You have sales data for four product

categories: Electronics, Clothing, Home & Garden, and Sports & Outdoors. Share your conclusion/analysis.

Input:

```
months = np.arange(1, 13)
electronics_sales = np.array([25000, 28000, 31000, 27000, 30000, 32000, 35000, 36000, 38000, 39000, 41000, 42000])
clothing_sales = np.array([15000, 16000, 17000, 18000, 19000, 20000, 21000, 22000, 23000, 24000, 25000, 26000])
home_garden_sales = np.array([18000, 19000, 20000, 21000, 22000, 23000, 24000, 25000, 26000, 27000, 28000, 29000])
sports_outdoors_sales = np.array([12000, 13000, 14000, 15000, 16000, 17000, 18000, 19000, 20000, 21000, 22000, 23000])
```

Output:



ChatGPT Exercise

Using ChatGPT generate the python code to solve the same problem

Scenario:Analyzing Sales Data

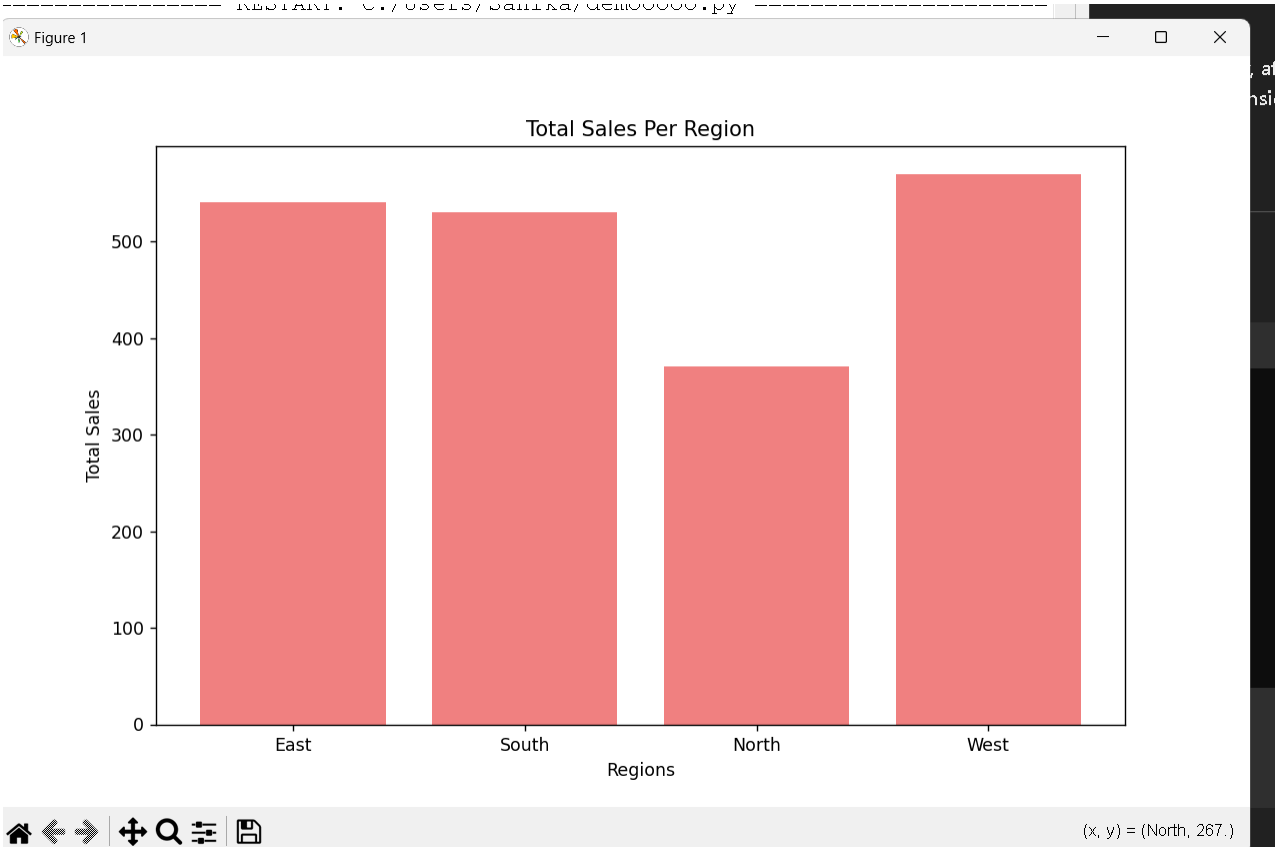
Suppose you work for a retail company, and you have dummy data containing sales data for the past year. The data includes information such as SalesDate,product

names,regions, sales quantities, prices, and dates. You have to generate a bar chart ,pie plot on region and prices and line chart on SalesDate and prices columns.

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

# Dummy sales data
sales_data = [
    ['2023-01-01', 'Product A', 'North', 100, 20],
    ['2023-02-01', 'Product B', 'South', 150, 30],
    ['2023-03-01', 'Product C', 'East', 200, 25],
    ['2023-04-01', 'Product A', 'West', 180, 20],
    ['2023-05-01', 'Product B', 'North', 130, 30],
    ['2023-06-01', 'Product C', 'South', 170, 25],
    ['2023-07-01', 'Product A', 'East', 160, 20],
    ['2023-08-01', 'Product B', 'West', 190, 30],
    ['2023-09-01', 'Product C', 'North', 140, 25],
    ['2023-10-01', 'Product A', 'South', 210, 20],
    ['2023-11-01', 'Product B', 'East', 180, 30],
    ['2023-12-01', 'Product C', 'West', 200, 25],
]

# Extract data
sales_dates = [row[0] for row in sales_data]
regions = [row[2] for row in sales_data]
sales_quantities = [row[3] for row in sales_data]
prices = [row[4] for row in sales_data]

# Calculate total sales per region
regions_unique = list(set(regions))
total_sales_per_region = [sum(sales_quantities[i] for i in range(len(regions)) if
regions[i] == region) for region in regions_unique]

# Create bar chart for total sales per region
plt.figure(figsize=(10, 6))
plt.bar(regions_unique, total_sales_per_region, color='lightcoral')
plt.xlabel('Regions')
plt.ylabel('Total Sales')
plt.title('Total Sales Per Region')
plt.show()

# Create pie chart for sales distribution by region
sales_by_region = [sum(sales_quantities[i] for i in range(len(regions)) if regions[i]
== region) for region in regions_unique]
```

```
plt.figure(figsize=(8, 8))
plt.pie(sales_by_region, labels=regions_unique, autopct='%1.1f%%',
startangle=140, colors=['lightblue', 'lightgreen', 'lightyellow', 'lightpink'])
plt.title('Sales Distribution by Region')
plt.show()

# Create line chart for sales trend by SalesDate and Price
# Convert SalesDate to datetime
sales_dates = [datetime.strptime(date, '%Y-%m-%d') for date in sales_dates]

plt.figure(figsize=(10, 6))
plt.plot(sales_dates, prices, marker='o', linestyle='-', color='skyblue')
plt.xlabel('Sales Date')
plt.ylabel('Price')
plt.title('Sales Trend (SalesDate vs Price)')
plt.xticks(rotation=45)
plt.show()
```

Furth



Create a ChatGPT prompt to generate the code for this scenario. Based on the code generated, ask ChatGPT to give the conclusion/inference.

Explanation and Inference Request (for ChatGPT)

"Now that the code has generated the bar chart, pie chart, and line chart based on the sales data, could you provide an inference or conclusion based on the insights from these visualizations?"

Conclusion / Inference (Based on the Charts)

After running the above code, you will generate the following charts:

1. **Bar Chart (Total Sales Per Region):**
    - This bar chart displays the total sales for each region. From the chart, you can conclude which region has the highest and lowest sales, helping the business identify strong and weak markets.
2. **Pie Chart (Sales Distribution by Region):**
    - This pie chart shows the percentage share of total sales by each region. It provides insight into which regions are contributing the most to overall sales and which have a smaller share. This can help in deciding where to allocate marketing resources or expand product availability.
3. **Line Chart (Sales Date vs Price Trend):**
    - The line chart shows how the price of products changed over time (SalesDate). From this chart, you can analyze whether price fluctuations have a visible impact on sales trends or if there are patterns

in pricing strategies.

Note. You can provide the data to ChatGPT or ask it to use sample data.