

# Introduction to Matplotlib

**Course Code:** CPE 031

**Program:** Computer Engineering

**Course Title:** Visualization and Data Analysis

**Date Performed:** 10 / 22 /24

Section: CPE21S4

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**Name:** Leoj Jeam B. Tandayu

**Instructor:** Engr. Ma. Rizette Sayo

**Intended Learning Outcomes (ILO):**

By the end of this laboratory session, learners will be able to:

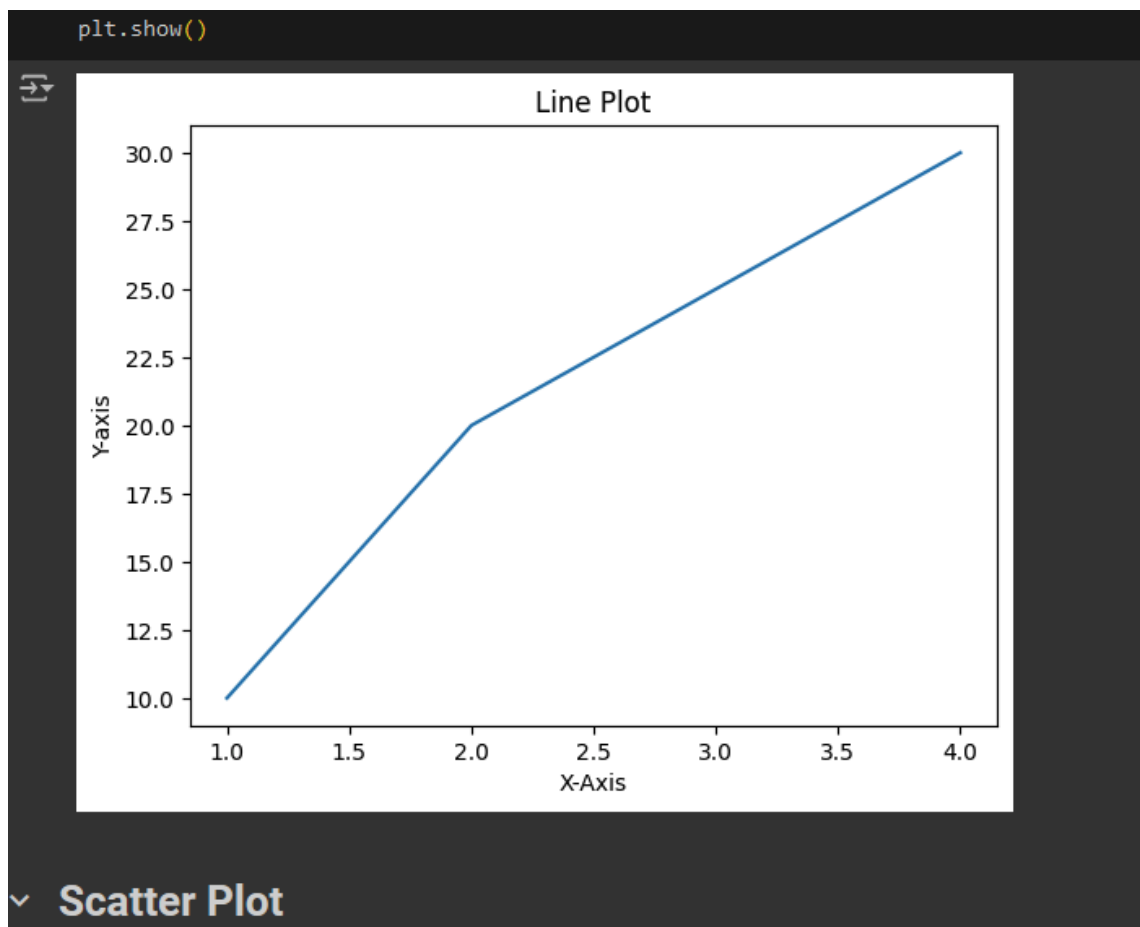
1. Utilize Matplotlib's pyplot interface to create a variety of visualizations, including line plots, scatter plots, histograms, and box plots, demonstrating an understanding of the library's syntax and functionality.
2. Customize visual elements such as titles, labels, and legends to enhance the clarity and aesthetics of their plots, applying best practices in data visualization.
3. Analyze and interpret visual data representations to extract meaningful insights, effectively communicating findings through well-structured graphical presentations.

**Part 1:** Perform the following codes, and understand the difference between line plot, scatter plot, histogram, bar chart, box plot, and pie chart using matplotlib's pyplot sub-module. (Provide a screenshot of your output.)

- ## 1. Line Plot

```
import matplotlib.pyplot as plt

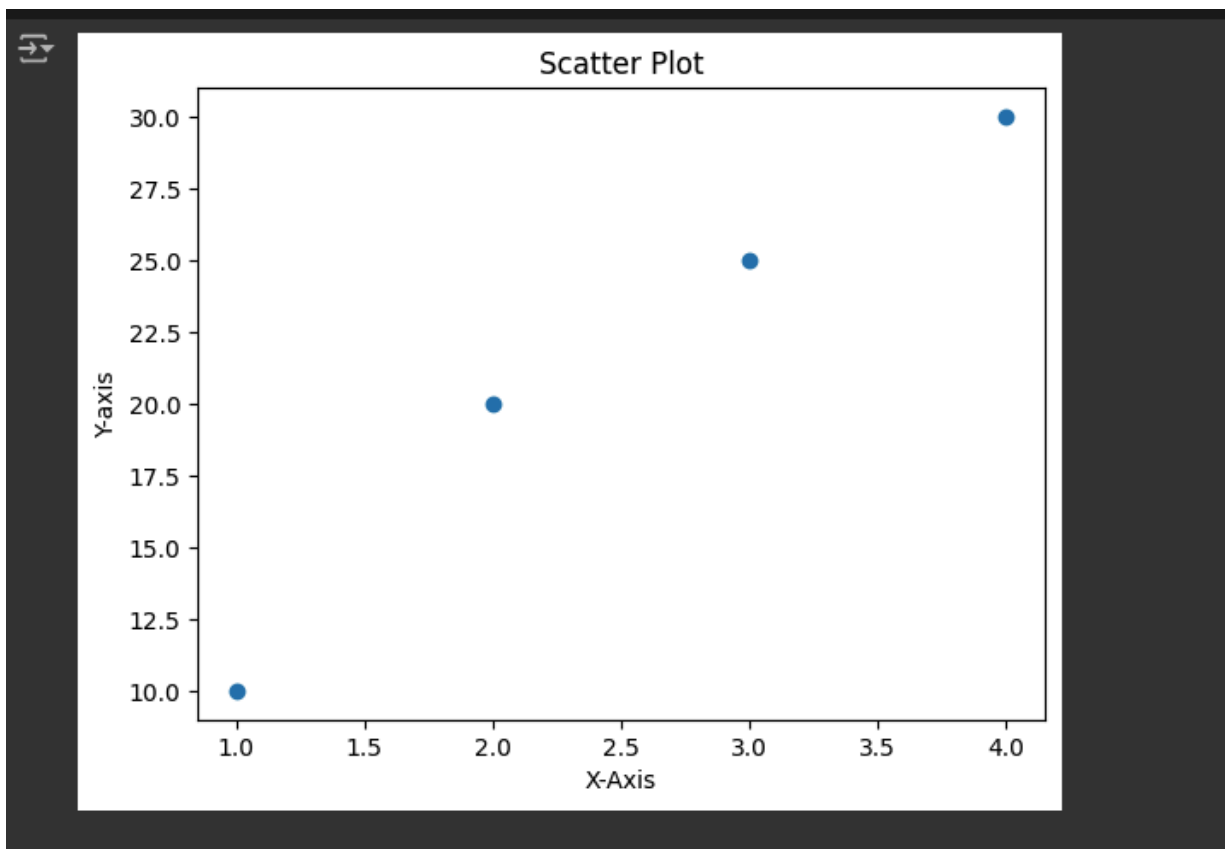
x = [1, 2, 3, 4]
y = [10, 20, 25, 30]
plt.plot(x, y)
plt.title("Line Plot Example")
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



## 2. Scatter Plot

```
import matplotlib.pyplot as plt

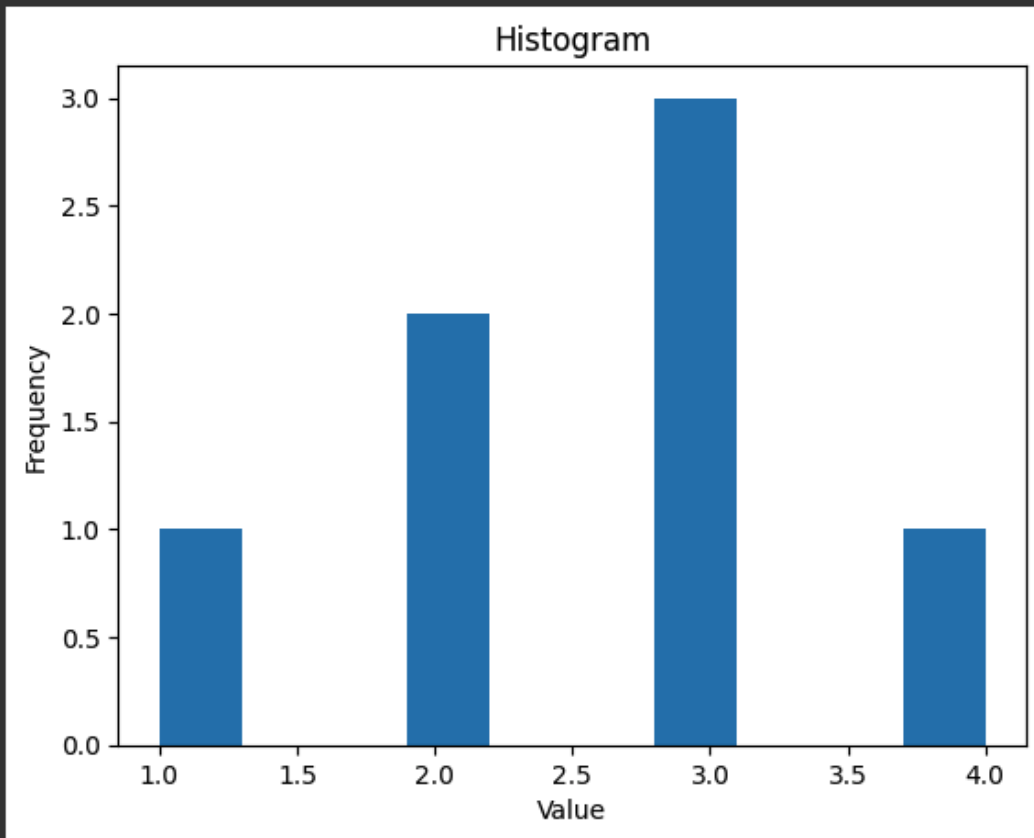
x = [1, 2, 3, 4]
y = [10, 20, 25, 30]
plt.scatter(x, y)
plt.title("Scatter Plot Example")
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



### 3. Histogram

```
import matplotlib.pyplot as plt

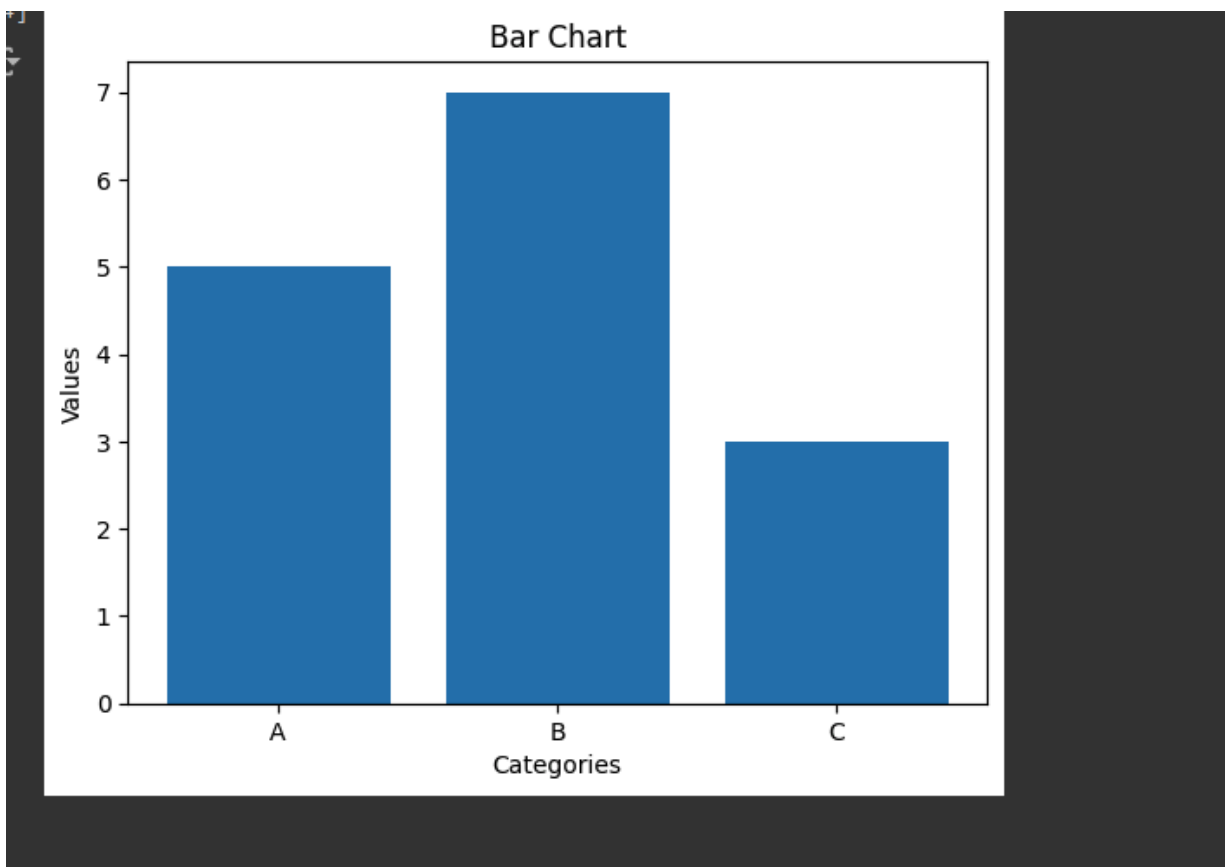
data = [1, 2, 2, 3, 3, 3, 4]
plt.hist(data)
plt.title("Histogram Example")
plt.xlabel("Value")
plt.ylabel("Frequency")
plt.show()
```



#### 4. Bar Chart

```
import matplotlib.pyplot as plt

categories = ['A', 'B', 'C']
values = [5, 7, 3]
plt.bar(categories, values)
plt.title("Bar Chart Example")
plt.xlabel("Categories")
plt.ylabel("Values")
plt.show()
```



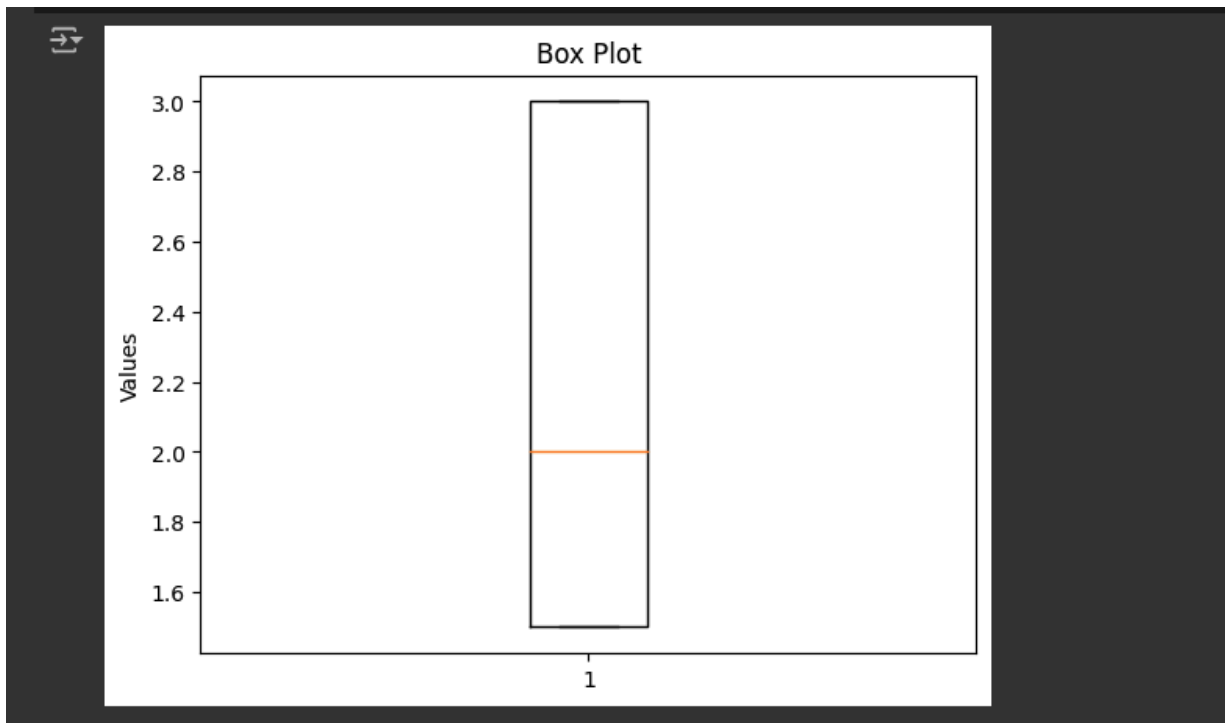
#### 5. Box plot

```
import matplotlib.pyplot as plt

data = [[1.5]*10 + [2]*10 + [3]*10]

plt.boxplot(data)

plt.title("Box Plot Example")
plt.ylabel("Values")
plt.show()
```

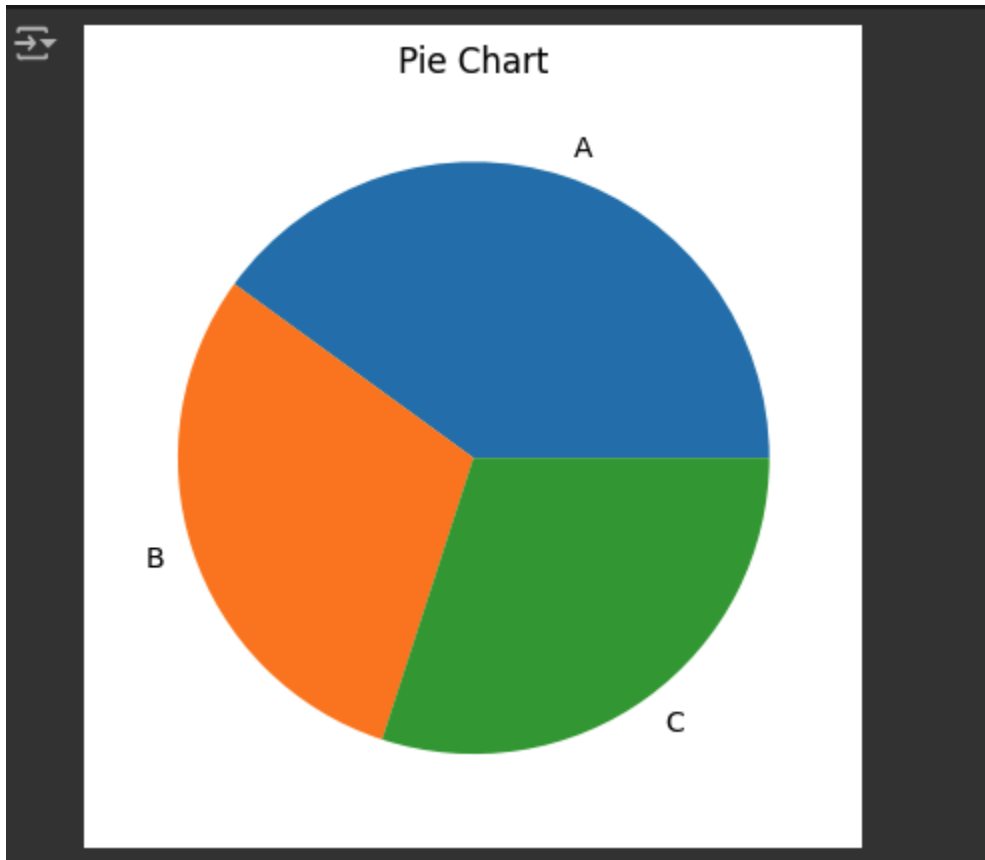


## 6. Pie chart

```
import matplotlib.pyplot as plt

labels = ['A', 'B', 'C']
sizes = [40, 30, 30]

plt.pie(sizes, labels=labels)
plt.title("Pie Chart Example")
plt.show()
```



**Part 2: Refer to the instructions below.**

1. **Find a dataset for this activity:** Please visit Kaggle and look for a new dataset that

would allow you to perform visualization and analysis using matplotlib.

**2. Creating a dataframe from your CSV file:** Once you have successfully loaded your dataset, you need to create a dataframe from your uploaded CSV file

**3. Import the matplotlib.pyplot**

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```
import matplotlib.pyplot as plt

regions = df['region'].value_counts()

plt.pie(regions, labels=regions.index)
plt.title('Distribution of Characters by Region' , color = 'b')
plt.axis('equal')
plt.show()
```

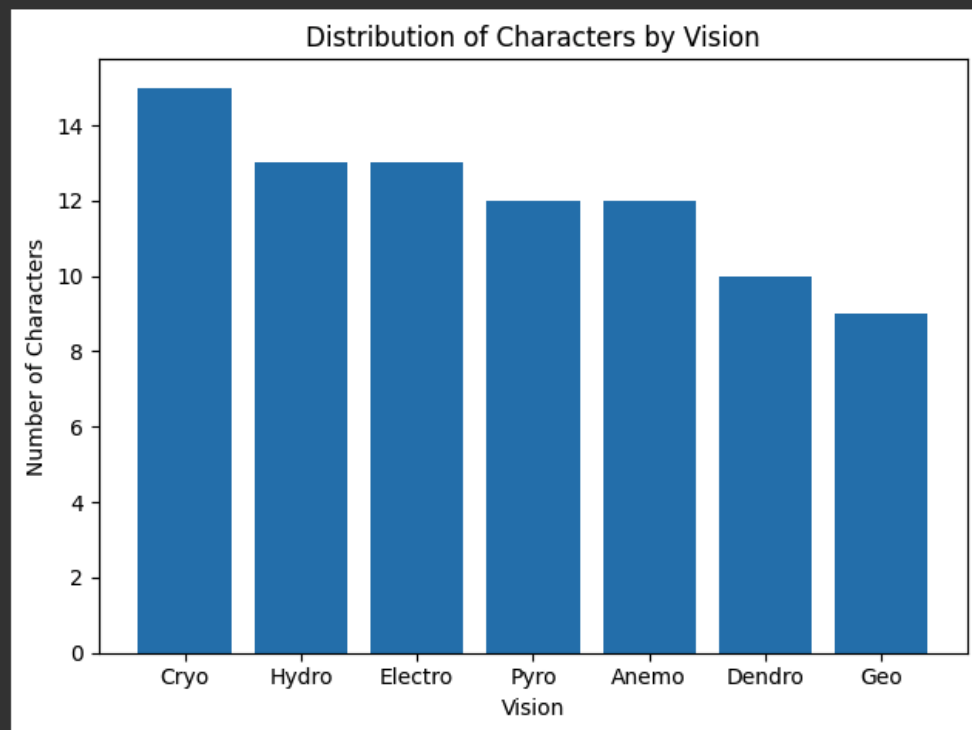
**4. Based on your chosen dataset, you will develop three questions that you will answer using pyplot visualizations. This means that you will need to produce at least three pyplot visualizations. You are also required to make certain customizations on your data vizes.**



```
import matplotlib.pyplot as plt
import pandas as pd

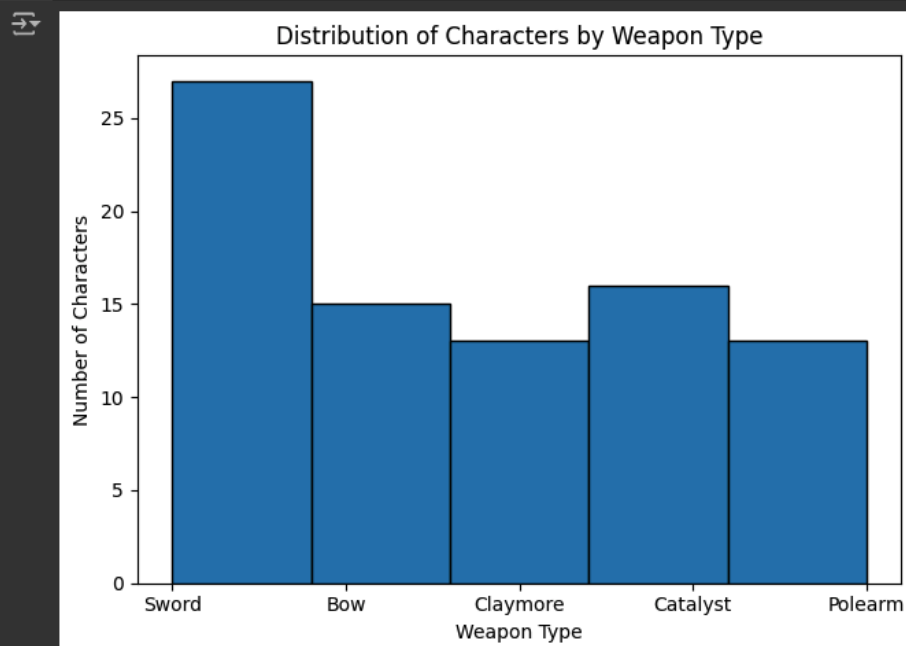
vision_counts = df['vision'].value_counts()

plt.bar(vision_counts.index, vision_counts.values)
plt.title('Distribution of Characters by Vision')
plt.xlabel('Vision')
plt.ylabel('Number of Characters')
plt.tight_layout()
plt.show()
```



```
weapon_counts = df['weapon_type'].value_counts()

plt.hist(df['weapon_type'], bins=weapon_counts.shape[0], edgecolor='black')
plt.title('Distribution of Characters by Weapon Type')
plt.xlabel('Weapon Type')
plt.ylabel('Number of Characters')
plt.tight_layout()
plt.show()
```

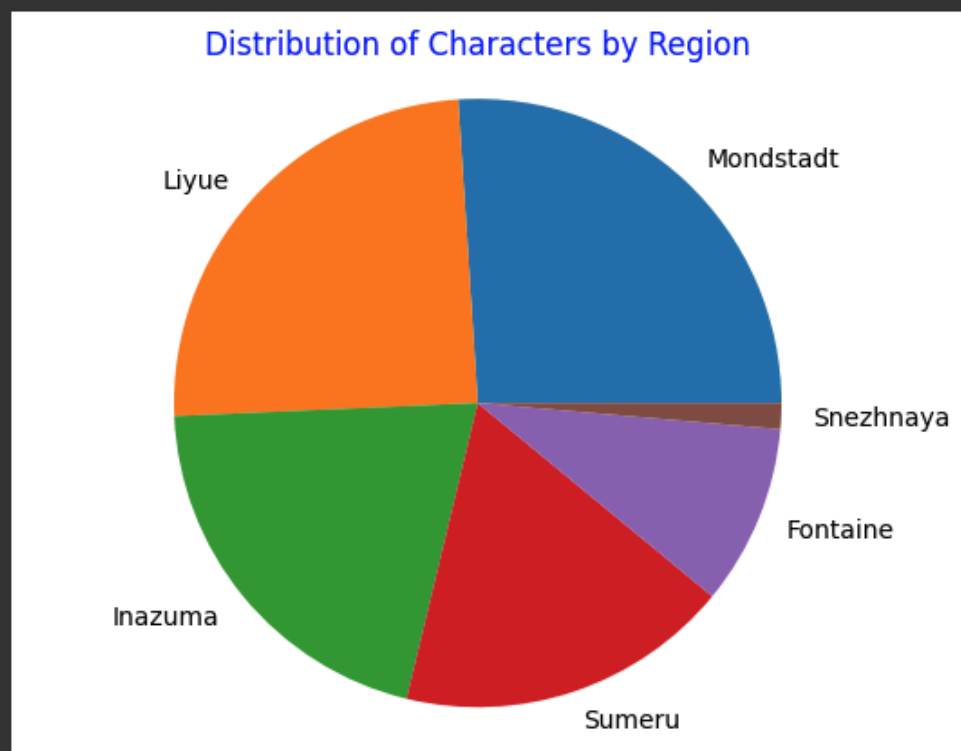




```
import matplotlib.pyplot as plt

regions = df['region'].value_counts()

plt.pie(regions, labels=regions.index)
plt.title('Distribution of Characters by Region' , color = 'b')
plt.axis('equal')
plt.show()
```



5. Provide observations for each of your data viz, then **produce one insight not longer than five sentences given your three observations**. Your output shall follow this outline:

Introduction (Describe your dataset)

Questions

Visualization and Observation

Insight

- The datasets that I used in this laboratory are the same as the previous labs which show the stats of each character in Genshin Impact. The data that are used in the data sets are the regions, elements, and weapon type of the characters. The visualizations that I used are pie chart, bar graph, and histogram. These visualizations show me the distribution of the characters in

the said questions.

6. Your grade will depend on the quality of the question, difficulty/complexity of the visualization, and value-add of the insight that you will generate.