

# Chapter 7

## Data Visualization with Matplotlib



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# About Authors



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- Introduction
- Install
- Pandas vs SQL
- Pandas Features
- Pandas Getting Started With
- Pandas Data Structure
- Working on DataFrames

## → Data Visualization:

- is the process of presenting data in the form of graphs or charts.
- is also used in high-level data analysis for Machine Learning and Exploratory Data Analysis (EDA)

## → Matplotlib

- is a low-level library of Python which is used for data visualization.
- is easy to use and emulates MATLAB like graphs and visualization.

→ **Step 1 – Make sure Python and pip is preinstalled on your system:**

- Check Python : `python --version` ;
- Check pip : `pip -V`

→ **Step 2 – Install Matplotlib**

- Command : `pip install matplotlib`

→ **Step 3 - Check if it is installed successfully**

- Command : `import matplotlib`  
`Matplotlib.__version__`

# Types of plot in matplotlib

→ Line Plot

→ Example:

```
# importing matplotlib module
from matplotlib import pyplot as plt

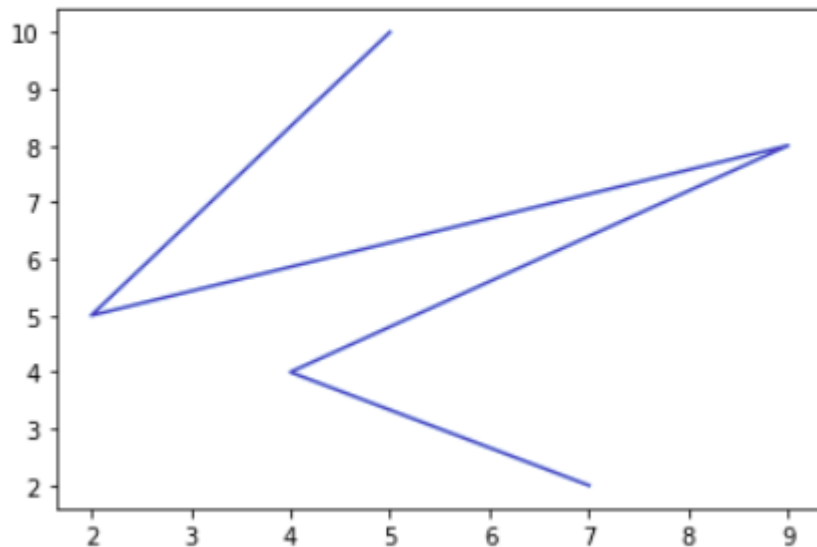
# x-axis values
x = [5, 2, 9, 4, 7]

# Y-axis values
y = [10, 5, 8, 4, 2]

# Function to plot
plt.plot(x, y)

# function to show the plot
plt.show()
```

Output:



# Types of plot in matplotlib

→ Bar Plot

→ Example:

```
# importing matplotlib module
from matplotlib import pyplot as plt

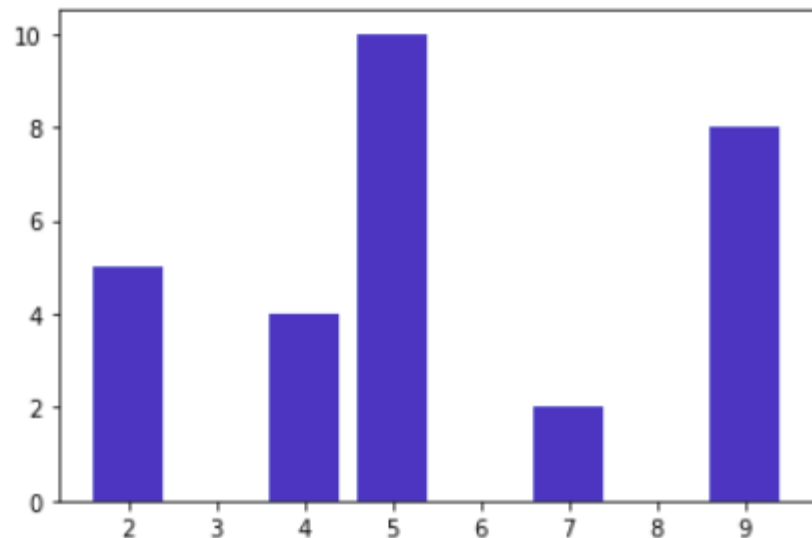
# x-axis values
x = [5, 2, 9, 4, 7]

# Y-axis values
y = [10, 5, 8, 4, 2]

# Function to plot
plt.bar(x, y)

# function to show the plot
plt.show()
```

Output:



# Types of plot in matplotlib

→ Histogram

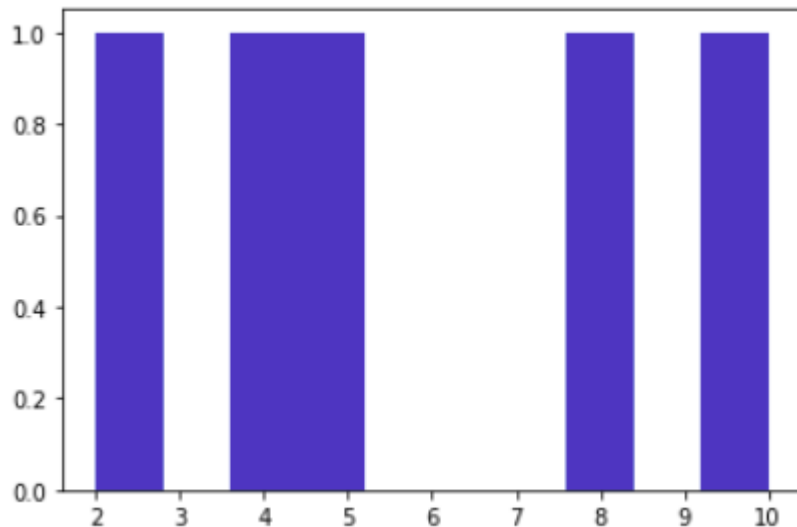
→ Example:

```
# importing matplotlib module
from matplotlib import pyplot as plt

# Y-axis values
y = [10, 5, 8, 4, 2]

# Function to plot histogram
plt.hist(y)

# Function to show the plot
plt.show()
```





# Types of plot in matplotlib

→ Scatter Plot

→ Example:

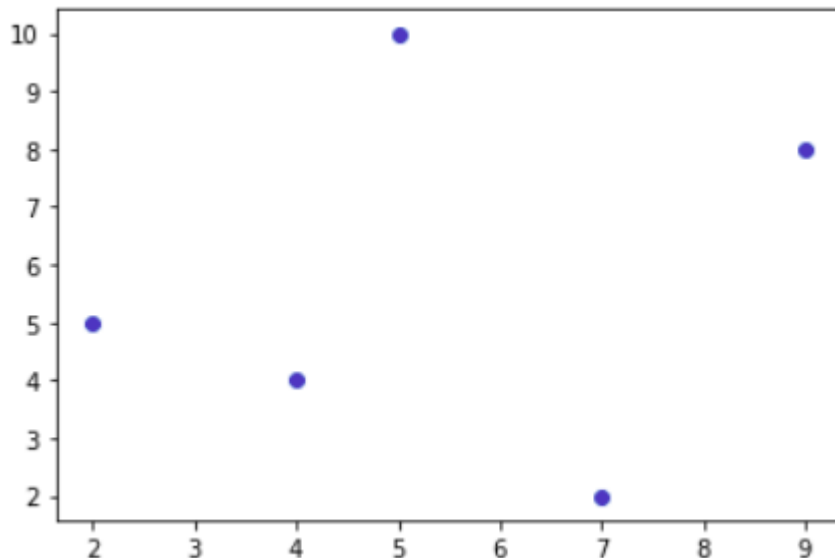
```
# importing matplotlib module
from matplotlib import pyplot as plt

# x-axis values
x = [5, 2, 9, 4, 7]

# Y-axis values
y = [10, 5, 8, 4, 2]

# Function to plot scatter
plt.scatter(x, y)

# function to show the plot
plt.show()
```



# Types of plot in matplotlib

→ **Adding title and Labeling the Axes in the graph**

→ Add Title:

```
“matplotlib.pyplot.title("My title")”
```

→ Label the x-axis and y-axis :

```
“matplotlib.pyplot.xlabel("Time (Hr)")
```

```
matplotlib.pyplot.ylabel("Position (Km)")”
```

# Types of plot in matplotlib

→ Adding title and Labeling the Axes in the graph

→ Example:

```
# x-axis values
x = [5, 2, 9, 4, 7]

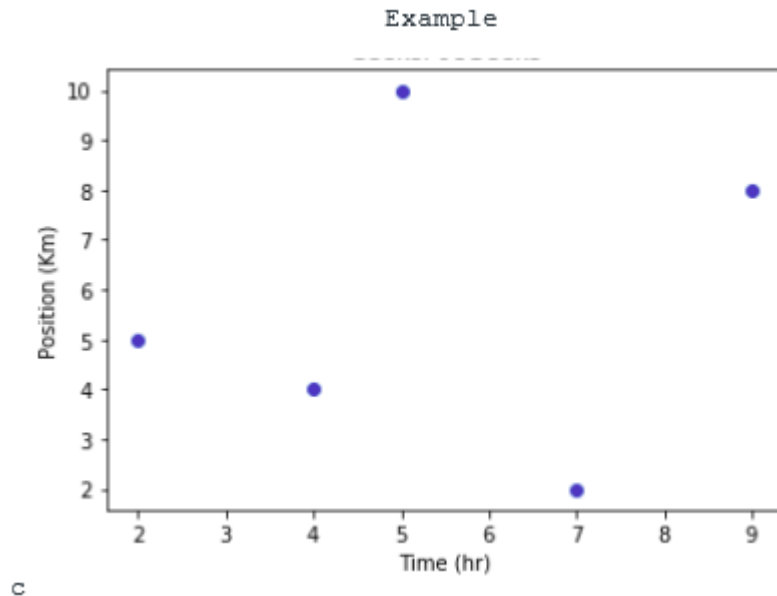
# Y-axis values
y = [10, 5, 8, 4, 2]

# Function to plot
plt.scatter(x, y)

# Adding Title
plt.title("Example")

# Labeling the axes
plt.xlabel("Time (hr)")
plt.ylabel("Position (Km)")

# function to show the plot
plt.show()
```



# Types of plot in matplotlib

- **Multiple Graphs:** by repeating the **show()** function or use a function called **subplot()** in order to print them horizontally as well.
- **Example:**

```
from matplotlib import pyplot as plt
```

```
x = [1, 2, 3, 4, 5]
y = [1, 4, 9, 16, 25]
plt.scatter(x, y)
```

```
# function to show the plot
plt.show()
```

```
plt.plot(x, y)
```

```
# function to show the plot
plt.show()
```

