Practical – 1

Aim: Basic Python programs. [NumPy, Panda, Matplotlib]

1. **Creating blank array with predefined data**

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

   standings = np.array([575, 285, 234, 206, 206, 205, 200, 175, 97, 62])
   ```

2. **Slicing and Updating elements.**
   ```
   # ! Slicing
   arr = standings[:4]
   print("Data slicing: ", arr)
   # ! Updating
   standings[0] = 576
   # ! Printing updated data
   print("Updating data in standings: ", standings)
   ```

   ```
   Data slicing:  [575 285 234 206]
   Updating data in standings:  [576 285 234 206 206 205 200 175  97  62]
   ```

3. **Slicing and Updating elements.**

   ```
   # ! Reshaping
   newarr = standings.reshape(5, 2)
   print(newarr)
   ```

   ```
   [[576 285]
    [234 206]
    [206 205]
    [200 175]
    [ 97  62]]
   ```

4. **Looping in numpy**
   ```
   for i in newarr:
     print(i)
   ```

   ```
   [576 285]
   [234 206]
   [206 205]
   [200 175]
   [97 62]
   ```

5. **Read csv file in numpy**
   ```
   from google.colab import drive
   drive.mount('/content/drive')

   data_set = pd.read_csv("/content/drive/MyDrive/temp/prac_1.csv")
   ```

   ```
   Mounted at /content/drive
   ```

6. **Create a dataframe**
   df = pd.DataFrame(data_set)
   print(df)

```
          Drivers  Standing
0      Carlos Sainz       200
1    George Russell       175
2    Max Verstappen       575
3      Pierre Gasly        62
4      Sergio Perez       285
5     Oscar Piastri        97
6   Fernando Alonso       206
7    Lewis Hamilton       234
8      Lando Norris       205
9   Charles Leclerc       206
```

7. **Slicing in created dataframe**
   print(df.iloc[:4])

```
          Drivers  Standing
0     Carlos Sainz       200
1   George Russell       175
2   Max Verstappen       575
3     Pierre Gasly        62
```
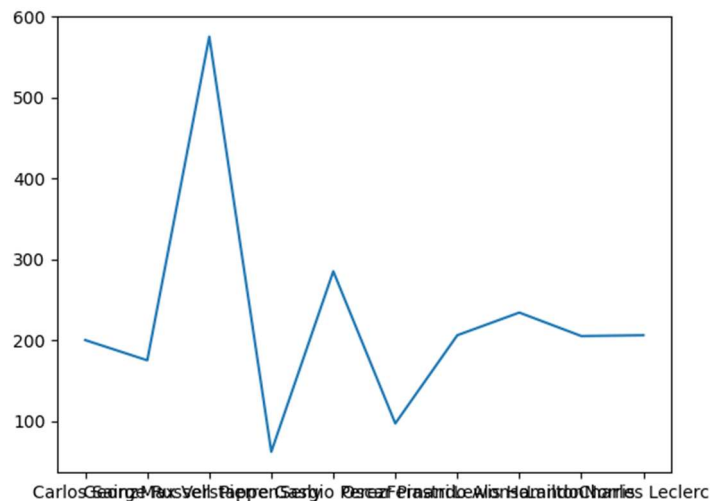
8. **Column and Row manipulation**
   np.transpose(data_set)

|	0	1	2	3	4	5	6	7	8	9
Drivers	Carlos Sainz	George Russell	Max Verstappen	Pierre Gasly	Sergio Perez	Oscar Piastri	Fernando Alonso	Lewis Hamilton	Lando Norris	Charles Leclerc
Standing	200	175	575	62	285	97	206	234	205	206

9. **Importing matplotlib and make simple line chart**
   plt.plot(df["Drivers"], df["Standing"])
   plt.show()

10. **Make histogram**
    # ! Creating a histogram for standings
    plt.hist(df["Standing"], bins=10, color='blue', edgecolor='black')
    plt.title("Driver's Standings")
    plt.xlabel("Standings")
    plt.ylabel("Frequency")
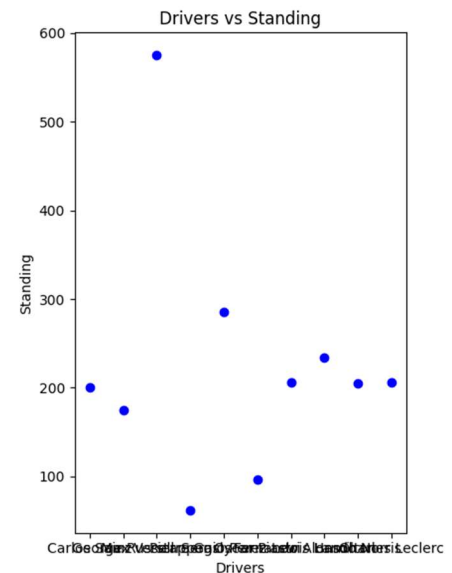   plt.show()
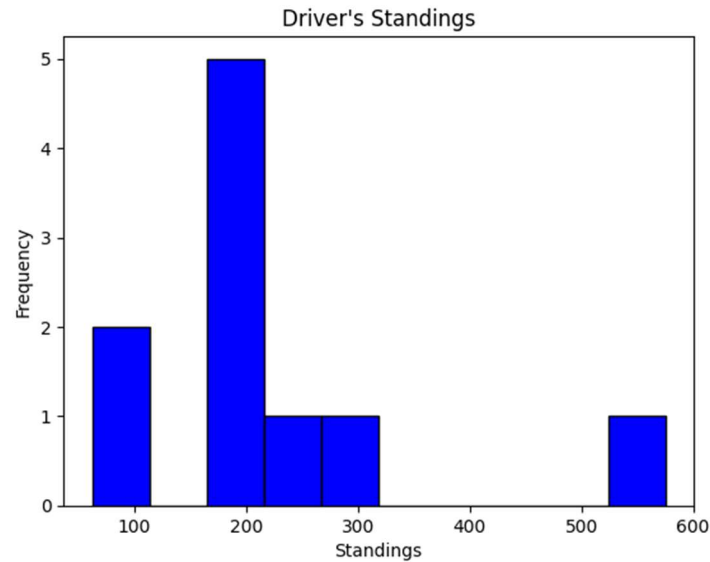
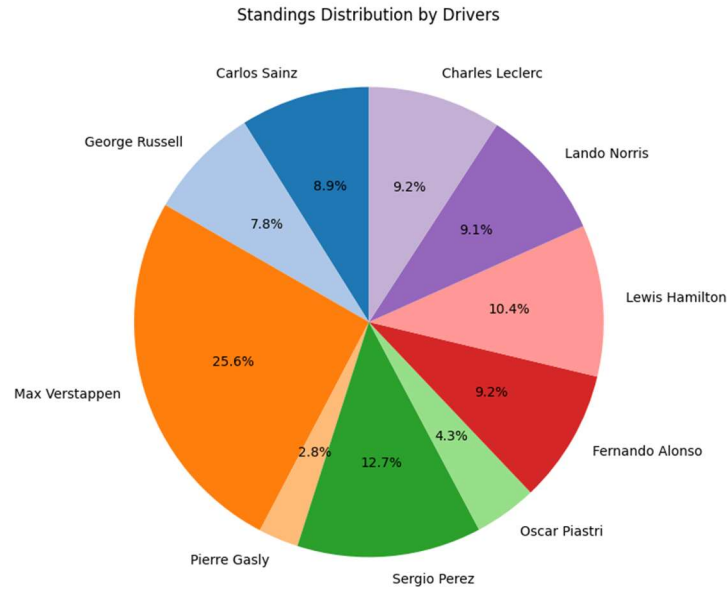## 11. Plotting multivariate data

```
plt.figure(figsize=(12, 6))

# ! Plot 1: Drivers vs Standing
plt.subplot(1, 3, 1)
plt.scatter(df["Drivers"], df["Standing"], color='blue')
plt.title("Drivers vs Standing")
plt.xlabel("Drivers")
plt.ylabel("Standing")


plt.tight_layout()
plt.show()
```


12. Plotting pie chart

```
plt.figure(figsize=(8, 8))
plt.pie(df["Standing"], labels=df["Drivers"], autopct='%1.1f%%', startangle=90,
colors=plt.cm.tab20.colors)
plt.title("Standings Distribution by Drivers")
plt.show()
```

Standings Distribution by Drivers