Experiment No. 2

Data Visualization

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Branch: BE-CSE   **Section/Group: 607/A**

Semester: 5th   **Subject: Machine Learning Lab**

1. **Aim:** In this experiment we are doing data visualization using python library matplotlib. It offers data visualization packages different features for creating informative, customized and appealing plot to present data in the most simple and effective way.

2. **Software/Hardware Requirements:** Windows 7 & above version

3. **Tools to be used:**

   - Anaconda Navigator
   - Jupiter Notebook

4. **Implementation:**

```
In [8]: df=pd.read_csv("F:\\SEM-5\\ML\\Iris.csv")
        print(df)

             Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
        0     1            5.1           3.5            1.4           0.2
        1     2            4.9           3.0            1.4           0.2
        2     3            4.7           3.2            1.3           0.2
        3     4            4.6           3.1            1.5           0.2
        4     5            5.0           3.6            1.4           0.2
        ..   ...          ...           ...            ...           ...
        145  146           6.7           3.0            5.2           2.3
        146  147           6.3           2.5            5.0           1.9
        147  148           6.5           3.0            5.2           2.0
        148  149           6.2           3.4            5.4           2.3
        149  150           5.9           3.0            5.1           1.8

                     Species
        0        Iris-setosa
        1        Iris-setosa
        2        Iris-setosa
        3        Iris-setosa
        4        Iris-setosa
        ..               ...
        145   Iris-virginica
        146   Iris-virginica
        147   Iris-virginica
        148   Iris-virginica
        149   Iris-virginica

        [150 rows x 6 columns]
```

Graph of Id vs Sepal length using matplotlib library:
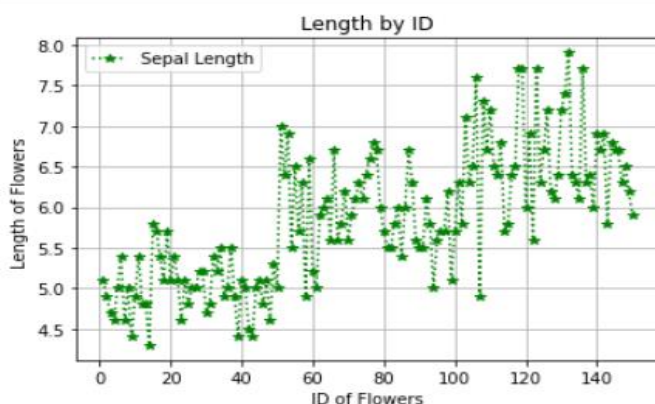
```
In [20]: import matplotlib.pyplot as plt
         Id=df["Id"]
         SepalLengthCm=df["SepalLengthCm"]

         plt.plot(Id,SepalLengthCm,'g:*',label='Sepal Length')


         plt.xlabel('ID of Flowers')
         plt.ylabel('Length of Flowers ')

         plt.title('Length by ID')
         plt.legend()

         plt.grid(True)
```
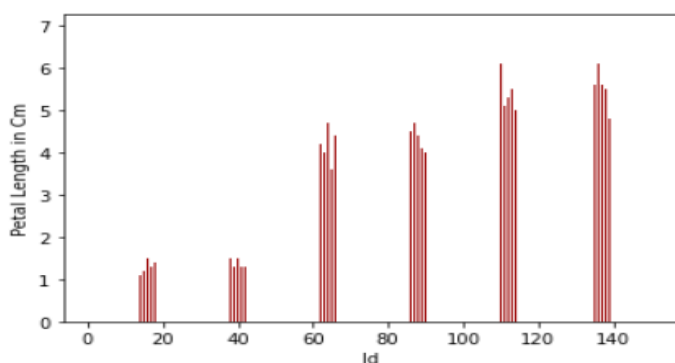
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Bar graph of Id vs petal length using matplotlib library:

```
In [24]: Id=df["Id"]
         PetalLengthCm=df["PetalLengthCm"]
         plt.xlabel('Id')
         plt.ylabel('Petal Length in Cm')
         plt.bar(Id, PetalLengthCm,width=.1,color='#990000')
         plt.show()
```
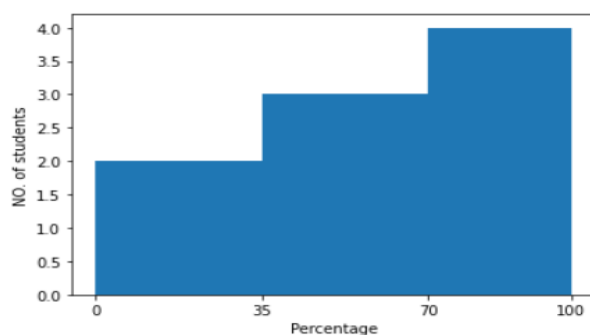


```
In [ ]:
```

Histogram of marks vs grade using matplotlib library:

```
In [42]: marks=[90,50,40,60,70,80,10,30,84]
         grade=[0,35,70,100]

         plt.hist(marks,grade)

         plt.xlabel('Percentage')
         plt.ylabel('NO. of students')
         plt.xticks([0,35,70,100])
```

```
Out[42]: ([<matplotlib.axis.XTick at 0x1b77f27d820>,
           <matplotlib.axis.XTick at 0x1b77f27d5e0>,
           <matplotlib.axis.XTick at 0x1b77f277f10>,
           <matplotlib.axis.XTick at 0x1b77f2ad880>],
          [Text(0, 0, ''), Text(0, 0, ''), Text(0, 0, ''), Text(0, 0, '')])
```
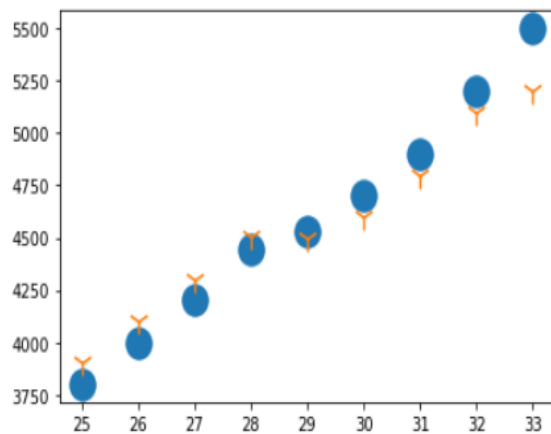
Scatter plot of age vs salary using matplotlib library:

```
In [45]: age_x=[25,26,27,28,29,30,31,32,33]
         sal_y=[3800,4000,4200,4443,4532,4700,4900,5200,5500]
         sal_y2=[3900,4100,4300,4503,4500,4600,4800,5100,5200]
         plt.scatter(age_x,sal_y,label="all developers",s=300)
         plt.scatter(age_x,sal_y2,label="python", marker="1",s=200)

Out[45]: <matplotlib.collections.PathCollection at 0x1b77f406250>
```
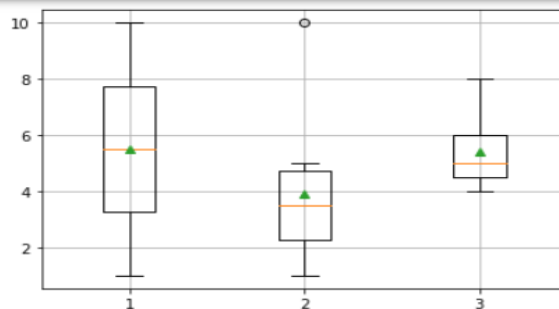
Boxplot of data using matplotlib library:

```
In [50]: one=[1,2,3,4,5,6,7,8,9,10]
         two=[1,2,2,3,3,4,4,5,5,10] #circle is an outlier, orange lines are median
         three=[4,5,6,4,5,6,8]

         data=[one,two,three]
         plt.boxplot(data, showmeans=True)
         plt.grid()
         plt.show()
         print(help(plt.boxplot))
```

```
Help on function boxplot in module matplotlib.pyplot:

boxplot(x, notch=None, sym=None, vert=None, whis=None, positions=None, widths
=None, patch_artist=None, bootstrap=None, usermedians=None, conf_intervals=No
```

Violinplot of data using matplotlib library:

```
In [53]: one=[1,2,3,4,5,6,7,8,9,10]
         two=[1,2,2,3,3,4,4,5,5,10]
         three=[4,5,6,4,5,6,8]

         data=[one,two,three]
         plt.violinplot(data,showmeans=True,showmedians=True)
         plt.grid()
         plt.show()
```
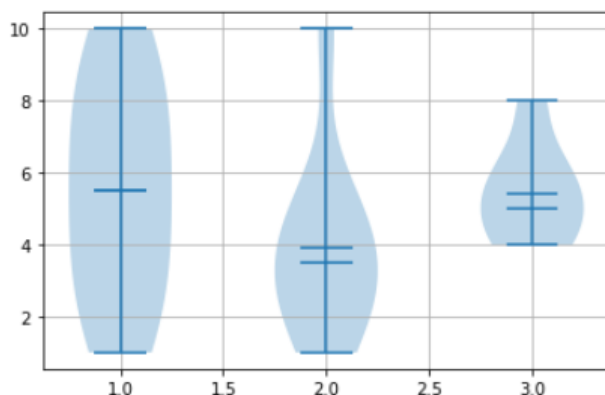

Pie Chart of data using matplotlib library:

```
In [54]: quat=[10,20,15,20]
         fruit=['a','b','c','d']

         plt.pie(quat,labels=fruit, autopct="%0.2f%%")
         plt.show()
```