EXP NO: **CLUSTERS ASSESSMENT: VISUALIZE THE CLUSTERS FOR ANY SYNTHETIC DATASET, IMPLEMENT THE**
DATE: **PROGRAM FOR CONVERTING THE CLUSTERS INTO HISTOGRAMS**

AIM:

BACKGROUND THEORY:

The histogram works by organizing and visualizing the distribution of data into intervals or bins along a continuous scale.

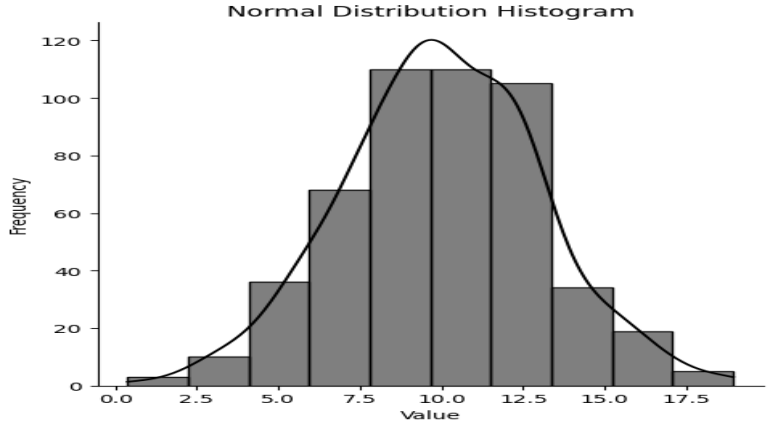
- The range of data values is divided into intervals called “bins.” The number of bins and their widths can be predefined or determined algorithmically based on the range and distribution of the data.
- Each data point in the dataset is assigned to a corresponding bin based on its value. As data points are assigned to bins, the frequency or count of data points falling within each bin is calculated.
- The histogram is constructed by plotting the bins along the x-axis and the frequencies (or densities) along the y-axis. Each bin is represented by a bar, and the height of the bar corresponds to the frequency of data points in that bin.
- By examining the histogram, you can gain insights into the distribution of the data. You can identify patterns, trends, central tendencies, variability, outliers, and other characteristics of the dataset. For example, a symmetric bell-shaped histogram suggests a, while skewed histograms indicate asymmetry in the data.

OUTPUT:

1) NORMAL HISTOGRAM:

PYTHON CODE:

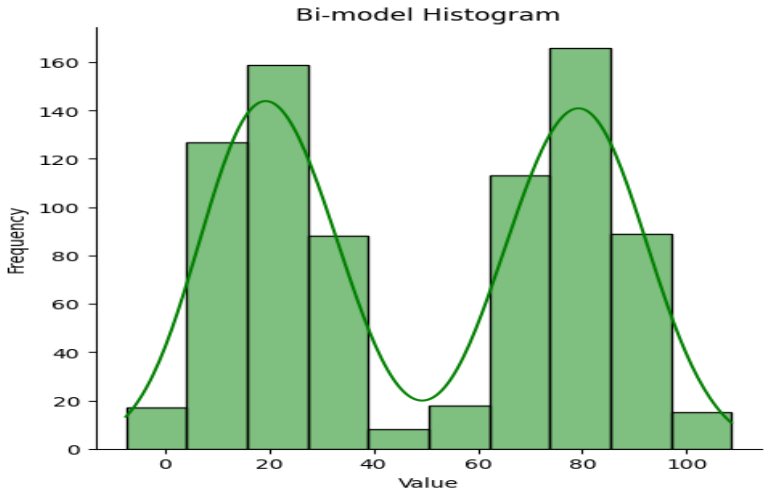
```
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
data = np.random.normal(10.0, 3, 500)
sns.displot(data, kde= True, bins=10, color='black')
plt.xlabel("Value")
plt.ylabel("Frequency")
plt.title("Normal Distribution Histogram")
plt.show()
```



2) BI-MODEL HISTOGRAM:

PYTHON CODE:

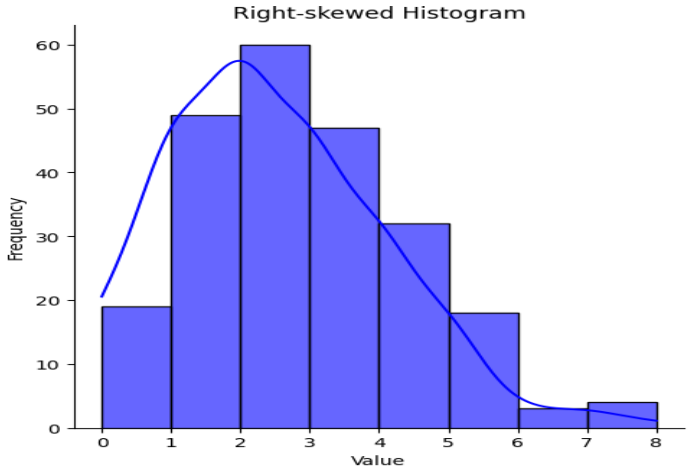
```
N=400
mu_1, sigma_1 = 80, 10
mu_2, sigma_2 = 20, 10
X_1 = np.random.normal(mu_1, sigma_1, N)
X_2 = np.random.normal(mu_2, sigma_2, N)
X = np.concatenate([X_1, X_2])
sns.displot(X,bins=10,kde=True , color='green')
plt.xlabel("Value")
plt.ylabel("Frequency")
plt.title("Bi-model Histogram")
plt.show()
```



3) RIGHT-SKEWED HISTOGRAM:

PYTHON CODE:

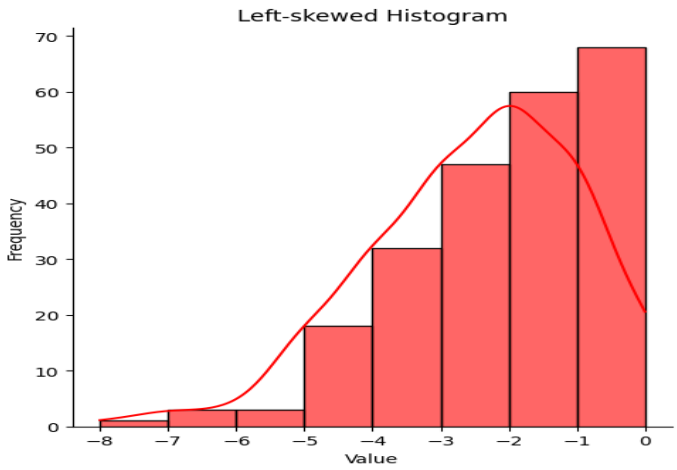
```
import matplotlib.pyplot as plt
import seaborn as sns
rdata = [0] * 19 + [1] * 49 + [2] * 60 + [3] * 47 + [4] * 32 + [5] * 18 + [6] * 3 + [7] * 3 + [8]
sns.displot(rdata, bins=8, kde=True, alpha=0.6, color='blue')
plt.xlabel("Value")
plt.ylabel("Frequency")
plt.title("Right-skewed Histogram")
plt.show()
```



4) LEFT-SKEWED HISTOGRAM:

PYTHON CODE:

```
import matplotlib.pyplot as plt
import seaborn as sns
ldata = [0] * 19 + [-1] * 49 + [-2] * 60 + [-3] * 47 + [-4] * 32 + [-5] * 18 + [-6] * 3 + [-7] * 3 + [-8]
sns.displot(ldata, kde=True, bins=8, alpha=0.6, color='red')
plt.xlabel("Value")
plt.ylabel("Frequency")
plt.title("Left-skewed Histogram")
plt.show()
```



RESULT: