Darshan
UNIVERSITY
योग: कर्मसु कौशलम्

Python Programming - 2301CS404

Lab - 12

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```
In [3]:   #import matplotlib below
          import matplotlib.pyplot as plt
          import numpy as np
```

```
In [58]:  x = range(1,11)
          y = [1,5,9,7,5,6,3,2,4,9]
          ax = plt.axes()
          ax.grid()
          # write a code to display the line chart of above x & y
          plt.plot(x, y, marker='D', linestyle='-', color='black', label='Data Line')
          plt.xlabel("X-axis")
          plt.ylabel("Y-axis")
          plt.title("Line Plot Chart")
          plt.legend()
          plt.show()
```

Line Plot Chart
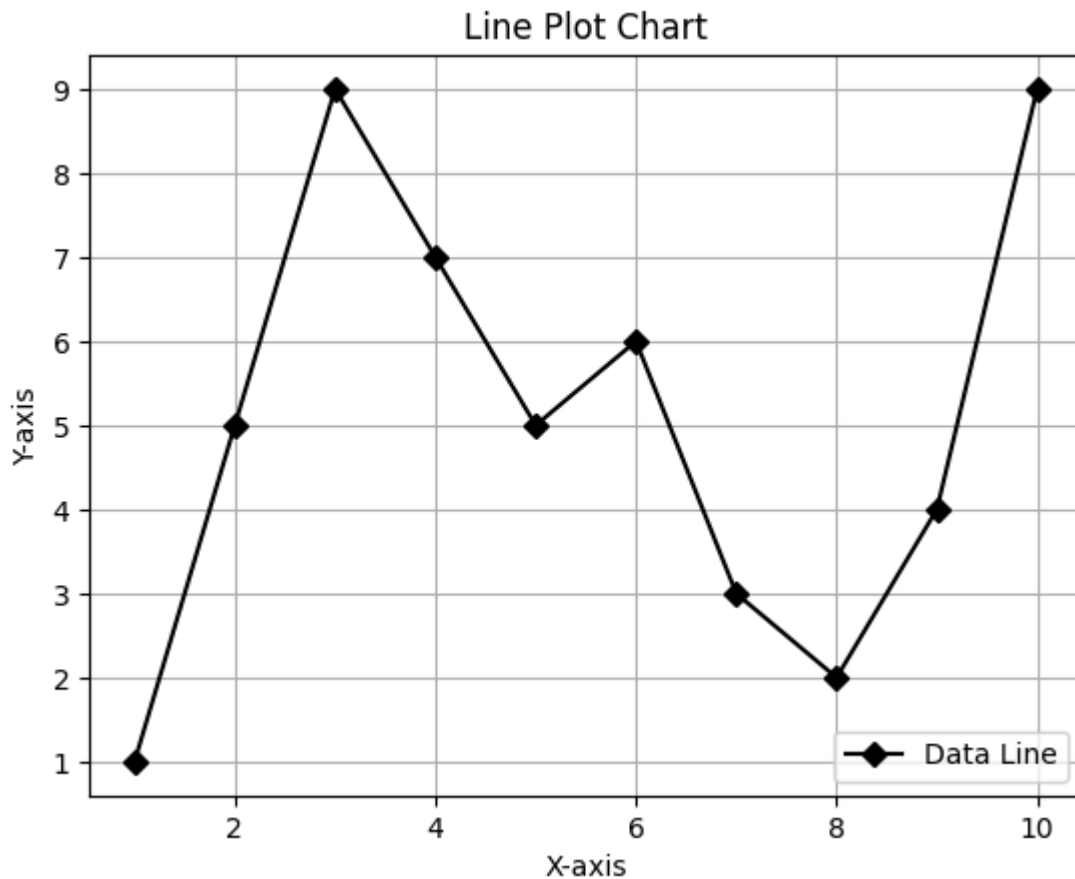

```
In [24]:  x = [1,2,3,4,5,6,7,8,9,10]
          cxMarks = [5,8,9,6,3,2,4,8,8,9]
          cyMarks = [8,9,6,3,5,7,4,1,2,6]
          ax = plt.axes()
          ax.grid()
          # write a code to display two lines in a line chart (data given above)
          plt.plot(x, cxMarks, marker='>', linestyle='--', color='r',label='cxMarks')
          plt.plot(x, cyMarks, marker='o', linestyle=':', color='b',label='cyMarks')
          plt.xlabel("X-axis")
          plt.ylabel("Y-axis")
          plt.title("Line Chart")
          plt.legend()
          plt.show()
```
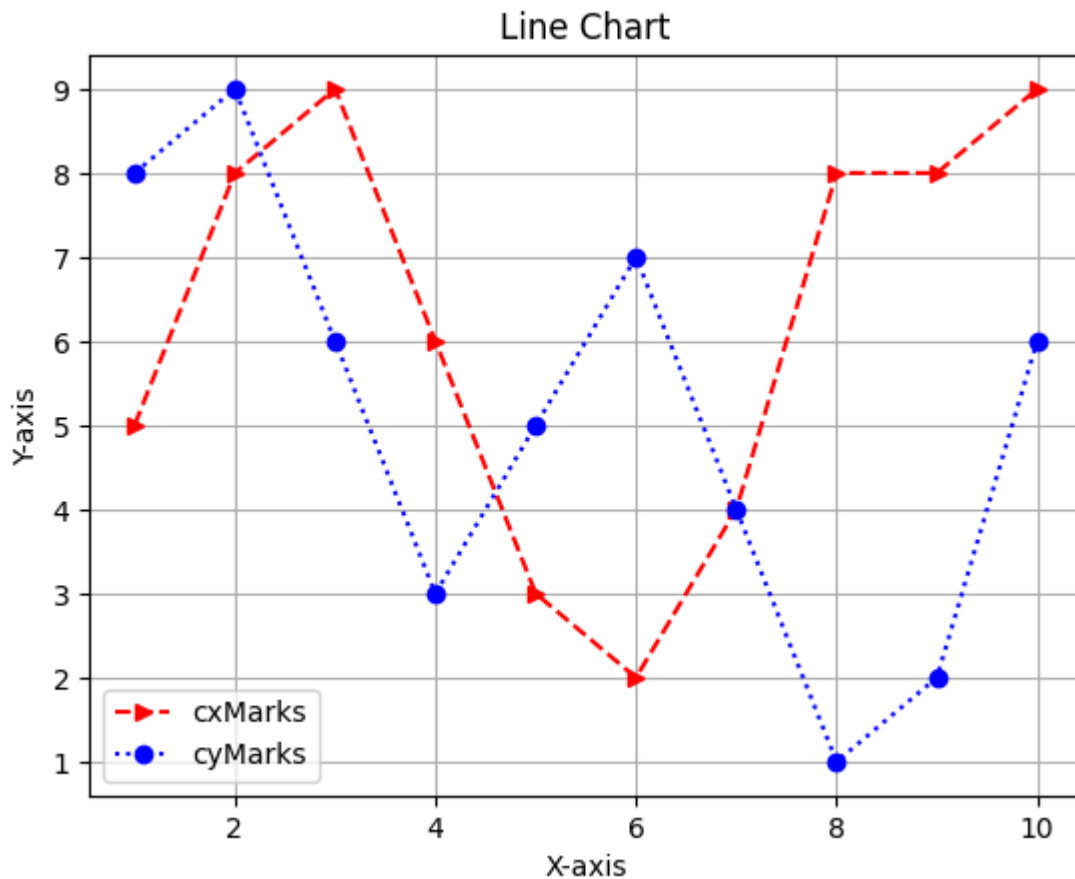
Line Chart

```
In [23]: x = range(1,11,1)
cxMarks= [8,9,6,3,5,7,4,1,2,6]
cyMarks= [5,8,9,6,3,2,4,8,8,9]

ax = plt.axes()
ax.grid()
# write a code to generate below graph
# write a code to display two lines in a line chart (data given above)
plt.plot(x, cxMarks, marker='>', linestyle='--', color='r',label='cxMarks')
plt.plot(x, cyMarks, marker='o', linestyle=':', color='b',label='cyMarks')
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.title("Line Chart")
plt.legend()
plt.show()
```
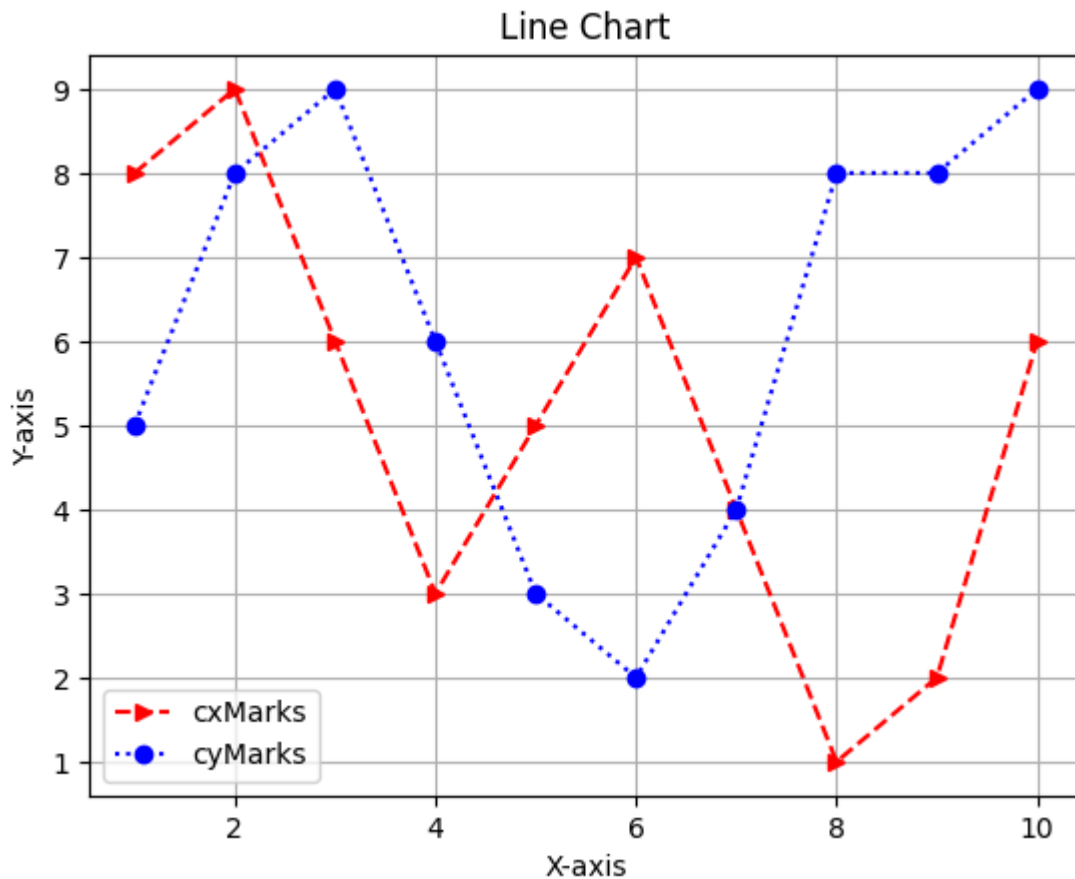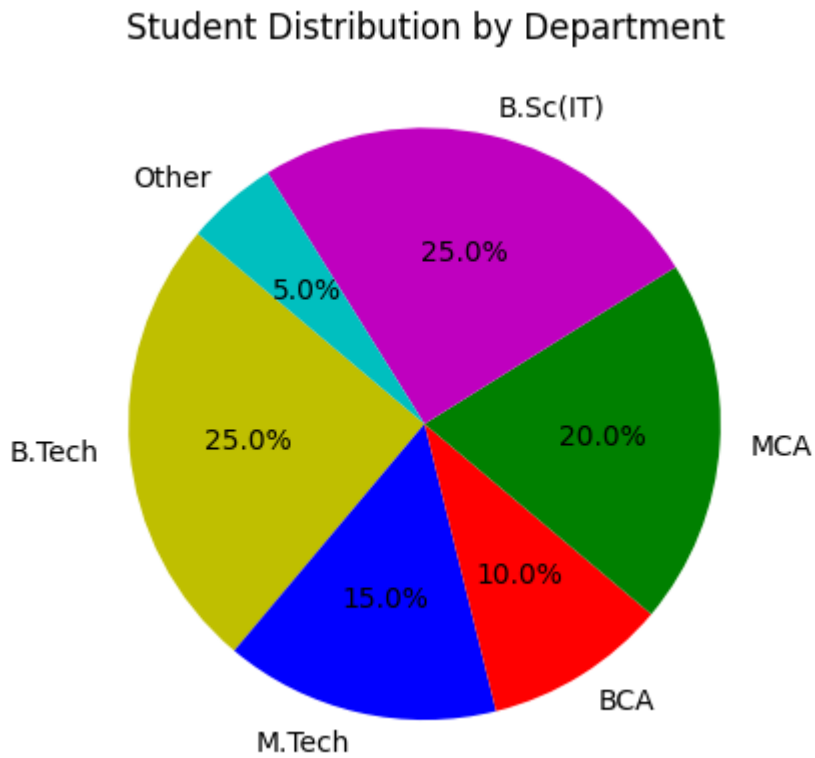
04) WAP to demonstrate the use of Pie chart.

```
In [7]:  dept = ["B.Tech", "M.Tech", "BCA", "MCA", "B.Sc(IT)", "Other"]
         x = [2500, 1500, 1000, 2000, 2500, 500]
         c = ['y', 'b', 'r', 'g', 'm', 'c']

         plt.pie(x, labels=dept, colors=c, autopct='%1.1f%%', startangle=140)
         plt.title("Student Distribution by Department")
         plt.show()
```

Student Distribution by Department

05) WAP to demonstrate the use of Bar chart.

In [10]:
```python
# Data for the bar chart
dept = ["B.Tech", "M.Tech", "BCA", "MCA", "B.Sc(IT)", "Other"]
students = [2500, 1500, 1000, 2000, 2500, 500]

# Creating the bar chart
plt.bar(dept, students, color='skyblue', edgecolor='black')

# Adding labels and title
plt.xlabel("Departments")
plt.ylabel("Number of Students")
plt.title("Student Distribution by Department")

# Display the chart
plt.show()
```

Student Distribution by Department
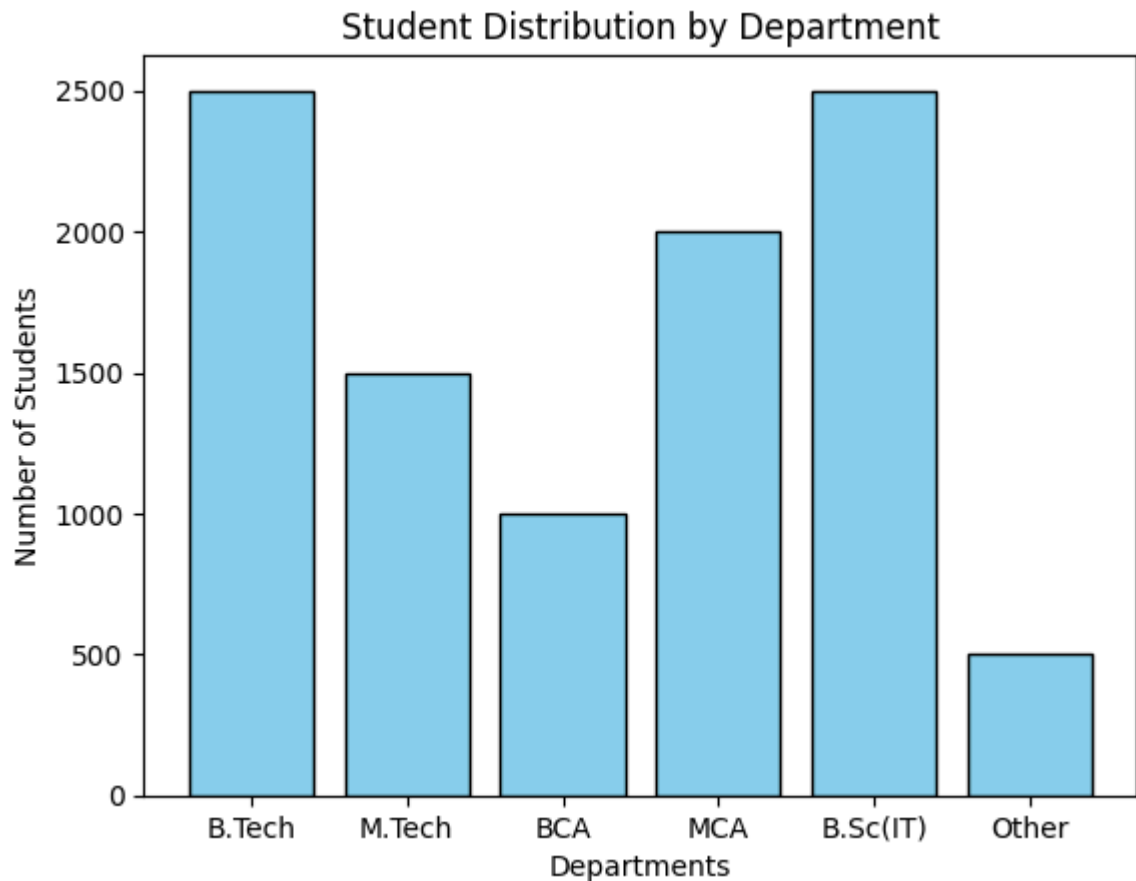
06) WAP to demonstrate the use of Scatter Plot.

In [11]:
```python
# Generate random data
no_stars = 50
x = np.random.rand(no_stars) * 10   # Random values between 0 and 10
y = np.random.rand(no_stars) * 10   # Random values between 0 and 10
ax = plt.axes()
ax.grid()
# Create a scatter plot
plt.scatter(x, y, color='white', marker='*', edgecolors='black', alpha=0.7,s=100

# Labels and title
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.title('Scatter Plot Example')

# Show the plot
plt.show()
```

Scatter Plot Example
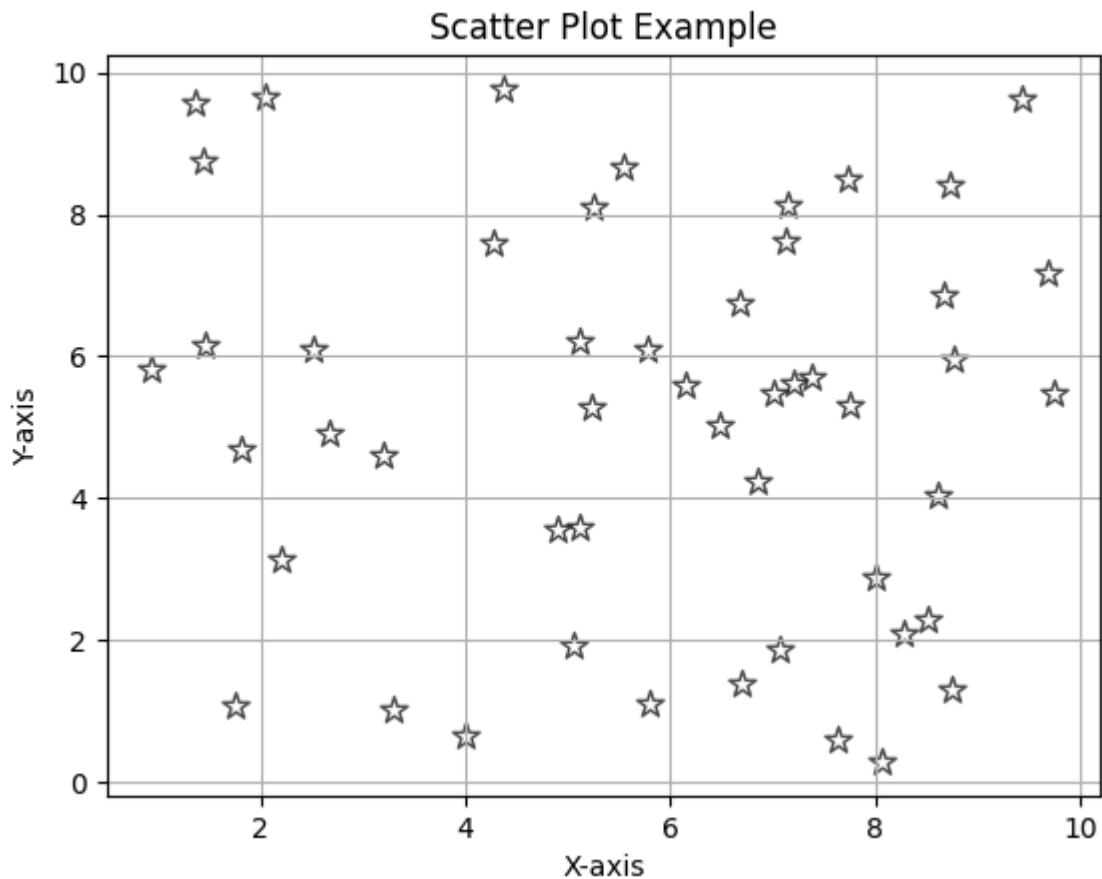


07) WAP to demonstrate the use of Histogram.

```python
In [61]: import matplotlib.pyplot as plt

# Generating random data
data = np.random.randn(1000)  # 1000 random numbers from a normal distribution

# Creating the histogram
plt.hist(data, bins=30, edgecolor='black')

# Adding titles and labels
plt.title('Histogram of Random Data')
plt.xlabel('Value')
plt.ylabel('Frequency')

# Displaying the plot
plt.show()
```

Histogram of Random Data
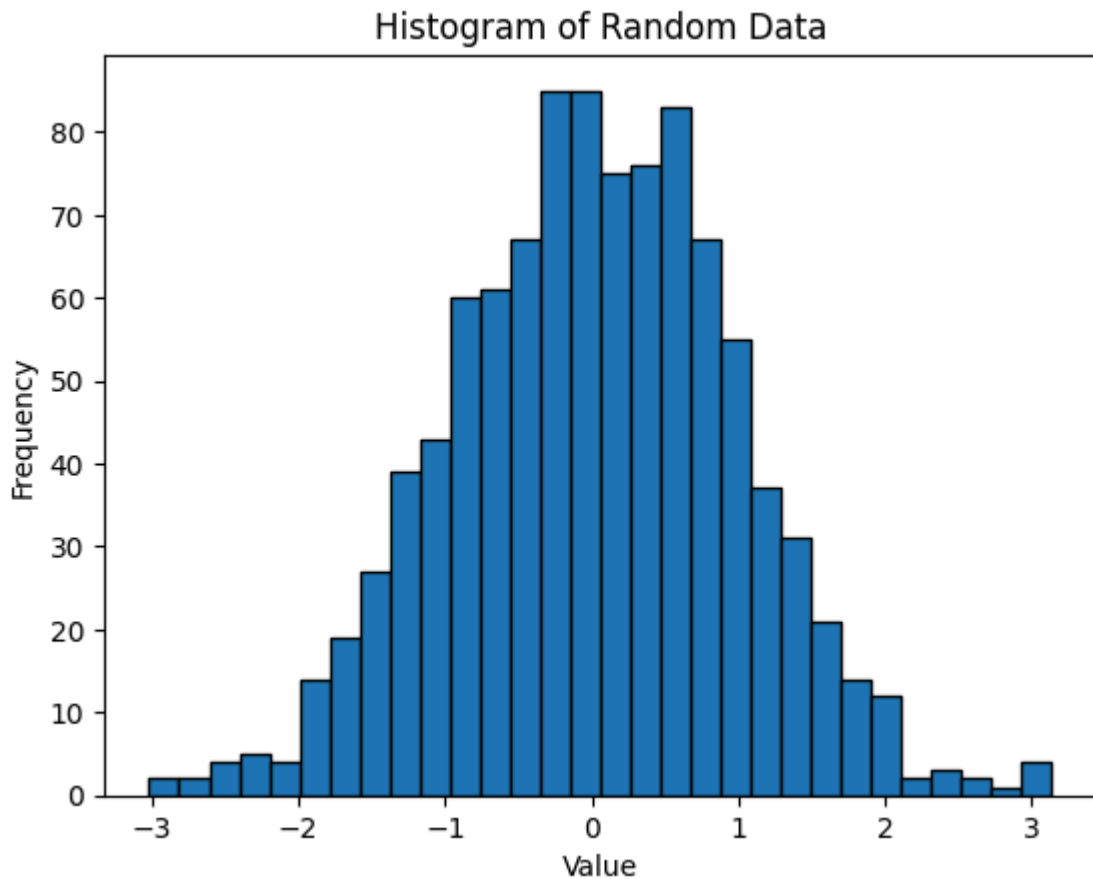
## 08) WAP to display the value of each bar in a bar chart using Matplotlib.

In [12]:
```python
# Data for the bar chart
dept = ["B.Tech", "M.Tech", "BCA", "MCA", "B.Sc(IT)", "Other"]
students = [2500, 1500, 1000, 2000, 2500, 500]

# Creating the bar chart
plt.bar(dept, students, color='skyblue', edgecolor='black')

# Adding labels and title
plt.xlabel("Departments")
plt.ylabel("Number of Students")
plt.title("Student Distribution by Department")

# Adding the value of each bar on top
for i, student_count in enumerate(students):
    plt.text(i, student_count + 10, str(student_count), ha='center', va='bottom'

# Display the chart
plt.show()
```

Student Distribution by Department
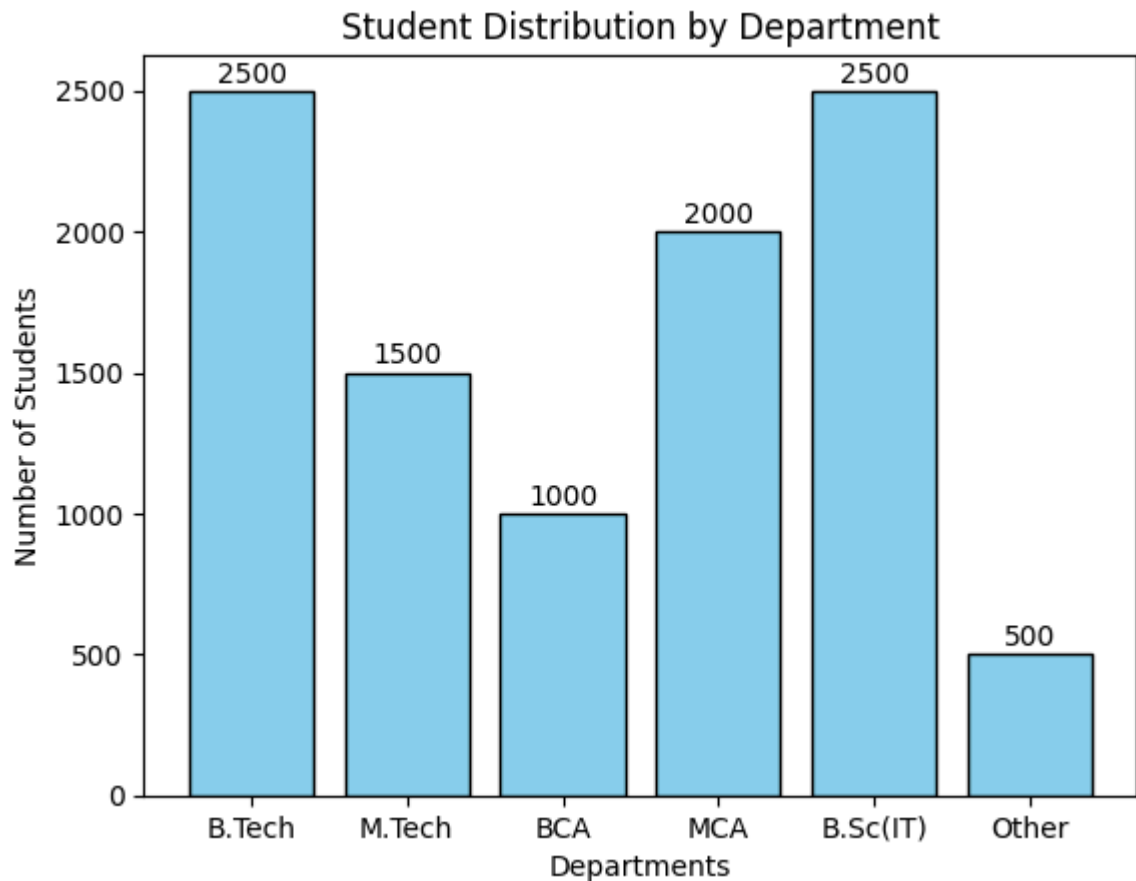
09) WAP create a Scatter Plot with several colors in Matplotlib?

In [16]:
```python
# Data for scatter plot
x = np.random.rand(50)  # Random x values
y = np.random.rand(50)  # Random y values
colors = np.random.rand(50)  # Random colors for each point

# Create the scatter plot
plt.scatter(x, y, c=colors, cmap='viridis', edgecolor='black', alpha=0.7)

# Adding labels and title
plt.xlabel("X values")
plt.ylabel("Y values")
plt.title("Scatter Plot with Multiple Colors")

# Display the plot
plt.colorbar()  # Show color bar to indicate the color scale
plt.show()
```
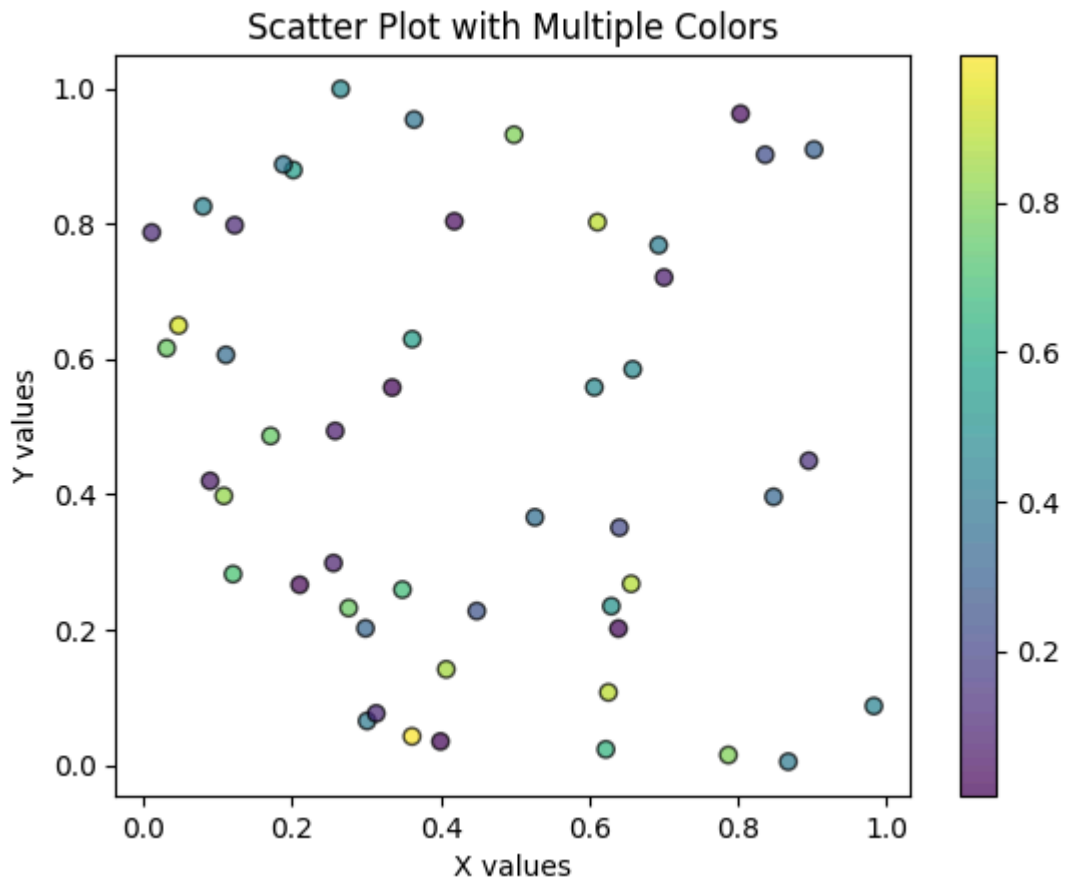
10) WAP to create a Box Plot.

```
In [20]:  # Data for the box plot
          data = [np.random.normal(0, 1, 100),   # Group 1
                  np.random.normal(1, 2, 100),   # Group 2
                  np.random.normal(2, 1, 100)]   # Group 3

          # Creating the box plot
          plt.boxplot(data, patch_artist=True, notch=True, vert=0, widths=0.7, meanline=Tr

          # Adding labels and title
          plt.xlabel("Values")
          plt.title("Box Plot")

          # Display the plot
          plt.show()
```

Box Plot