EXPERIMENT- 3

AIM

Create various types of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further, lable different axes in a plot and data in a plot.

SOFTWARE USED

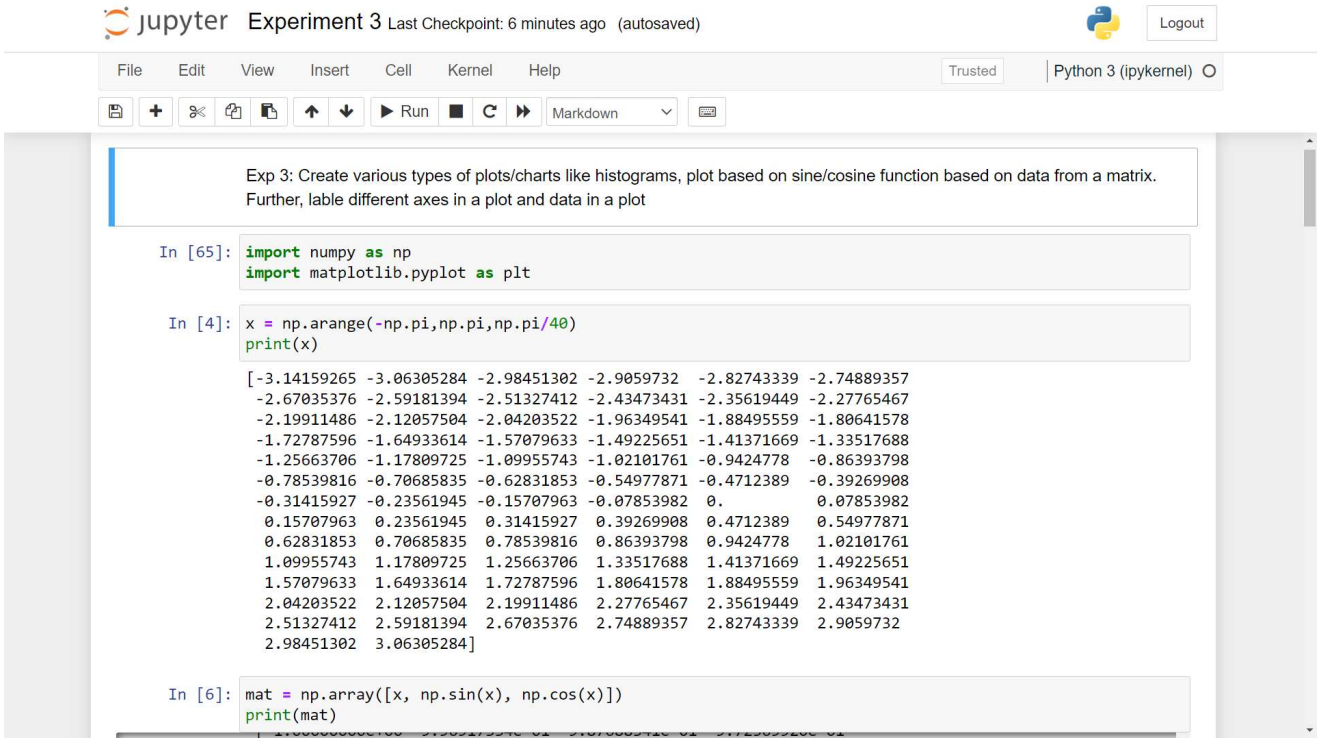
Jupyter Platform - Python Programming Language

PROGRAM CODE

```
# Exp 3: Create various types of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further, label different axes in a plot and data in a plot

import numpy as np
import matplotlib.pyplot as plt
import numpy as np

x = np.arange(-np.pi,np.pi,np.pi/40)
print(x)

mat = np.array([x, np.sin(x), np.cos(x)])
print(mat)

plt.plot(mat[0],mat[1], label="sin(x)")
plt.plot(mat[0],mat[2], label="cos(x)")

#Line Plot
plt.title("Line plot on Trigonometric Functions",fontsize='20')
plt.xlabel("Values of x"+r"$\rightarrow$")
plt.ylabel("Function values"+r"$\rightarrow$")
plt.axhline(y=0, color = "black")
plt.axvline(x=0, color = "black")
plt.legend()
plt.grid()

#Scatter Plot
plt.scatter(mat[0],mat[1], label="sin(x)")
plt.scatter(mat[0],mat[2], label="cos(x)")

plt.title("Scatter Plot on Trigonometric Functions",fontsize='20')
plt.xlabel("Values of x"+r"$\rightarrow$")
plt.ylabel("Function values"+r"$\rightarrow$")
plt.axhline(y=0, color = "black")
plt.axvline(x=0, color = "black")
plt.legend()
plt.grid()

#Box Plot
plt.boxplot([mat[0],mat[1],mat[2]], labels = ['x','sin(x)','cos(x)'])
plt.title("Box Plot",fontsize='20')
plt.xlabel("X"+r"$\rightarrow$")
```

```
plt.ylabel("Y"+r"$\rightarrow$")
plt.grid()


a = np.array(["A", "B", "C", "D"])
b = np.array([3, 8, 1, 10])
print(a)
print(b)

#Bar Graph
plt.bar(a,b, color='red')
plt.title('Bar Graph',fontsize='20')
plt.xlabel("Product Name"+r"$\rightarrow$")
plt.ylabel("Quantity"+r"$\rightarrow$")
plt.grid()

#Pie Chart
plt.figure(figsize=(6,6))
plt.pie(b, labels=a, autopct = "%1.1f%%",wedgeprops={'linewidth': 3.0, 'edgecolor': 'black'})
plt.title("Pie Chart",fontsize='20')

#Histogram
plt.hist(np.random.normal(23,19,22), color='green')
plt.title("Histogram",fontsize='20')
plt.xlabel("X"+r"$\rightarrow$")
plt.ylabel("Y"+r"$\rightarrow$")
plt.grid()
```

OUTPUT



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Run Markdown

In [6]:
```
mat = np.array([x, np.sin(x), np.cos(x)])
print(mat)
```

```
 -9.51056516e-01 -9.23879533e-01 -8.91006524e-01 -8.52640164e-01
 -8.09016994e-01 -7.60405966e-01 -7.07106781e-01 -6.49448048e-01
 -5.87785252e-01 -5.22498565e-01 -4.53990500e-01 -3.82683432e-01
 -3.09016994e-01 -2.33445364e-01 -1.56434465e-01 -7.84590957e-02
  6.12323400e-17  7.84590957e-02  1.56434465e-01  2.33445364e-01
  3.09016994e-01  3.82683432e-01  4.53990500e-01  5.22498565e-01
  5.87785252e-01  6.49448048e-01  7.07106781e-01  7.60405966e-01
  8.09016994e-01  8.52640164e-01  8.91006524e-01  9.23879533e-01
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  9.51056516e-01  9.23879533e-01  8.91006524e-01  8.52640164e-01
  8.09016994e-01  7.60405966e-01  7.07106781e-01  6.49448048e-01
  5.87785252e-01  5.22498565e-01  4.53990500e-01  3.82683432e-01
  3.09016994e-01  2.33445364e-01  1.56434465e-01  7.84590957e-02
  6.12323400e-17 -7.84590957e-02 -1.56434465e-01 -2.33445364e-01
 -3.09016994e-01 -3.82683432e-01 -4.53990500e-01 -5.22498565e-01
 -5.87785252e-01 -6.49448048e-01 -7.07106781e-01 -7.60405966e-01
 -8.09016994e-01 -8.52640164e-01 -8.91006524e-01 -9.23879533e-01
 -9.51056516e-01 -9.72369920e-01 -9.87688341e-01 -9.96917334e-01]]
```

In [68]:
```
plt.plot(mat[0],mat[1], label="sin(x)")
plt.plot(mat[0],mat[2], label="cos(x)")

plt.title("Line plot on Trigonometric Functions",fontsize='20')
plt.xlabel("Values of x"+r"$\rightarrow$")
```

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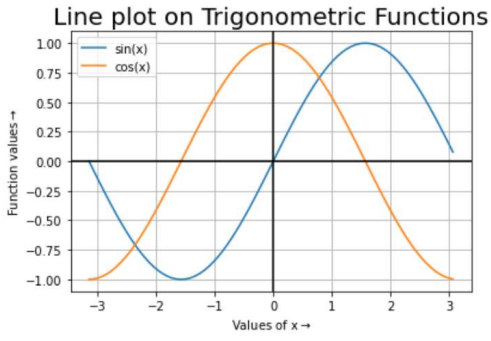
Run Markdown

In [68]:
```
plt.plot(mat[0],mat[1], label="sin(x)")
plt.plot(mat[0],mat[2], label="cos(x)")

plt.title("Line plot on Trigonometric Functions",fontsize='20')
plt.xlabel("Values of x"+r"$\rightarrow$")
plt.ylabel("Function values"+r"$\rightarrow$")
plt.axhline(y=0, color = "black")
plt.axvline(x=0, color = "black")
plt.legend()
plt.grid()
```



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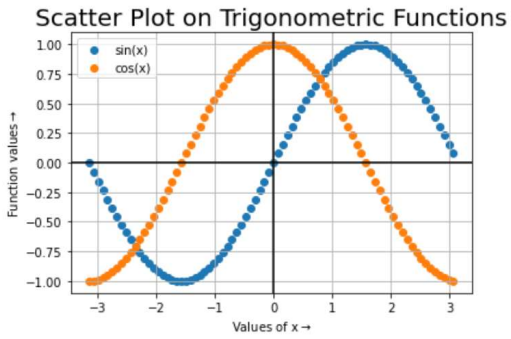
Run Markdown

In [86]:
```
plt.scatter(mat[0],mat[1], label="sin(x)")
plt.scatter(mat[0],mat[2], label="cos(x)")

plt.title("Scatter Plot on Trigonometric Functions",fontsize='20')
plt.xlabel("Values of x"+r"$\rightarrow$")
plt.ylabel("Function values"+r"$\rightarrow$")
plt.axhline(y=0, color = "black")
plt.axvline(x=0, color = "black")
plt.legend()
plt.grid()
```



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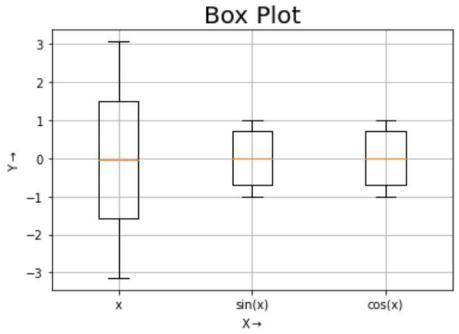
Run Markdown

In [87]:
```
plt.boxplot([mat[0],mat[1],mat[2]], labels = ['x','sin(x)','cos(x)'])
plt.title("Box Plot",fontsize='20')
plt.xlabel("X"+r"$\rightarrow$")
plt.ylabel("Y"+r"$\rightarrow$")
plt.grid()
```



In [11]:
```
a = np.array(["A", "B", "C", "D"])
b = np.array([3, 8, 1, 10])
print(a)
print(b)
```

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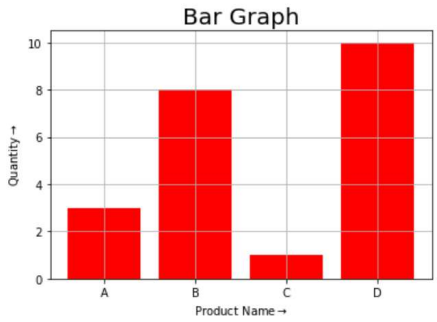
Run Markdown

In [11]:
```
a = np.array(["A", "B", "C", "D"])
b = np.array([3, 8, 1, 10])
print(a)
print(b)
```

```
['A' 'B' 'C' 'D']
[ 3  8  1 10]
```

In [67]:
```
plt.bar(a,b, color='red')
plt.title('Bar Graph',fontsize='20')
plt.xlabel("Product Name"+r"$\rightarrow$")
plt.ylabel("Quantity"+r"$\rightarrow$")
plt.grid()
```



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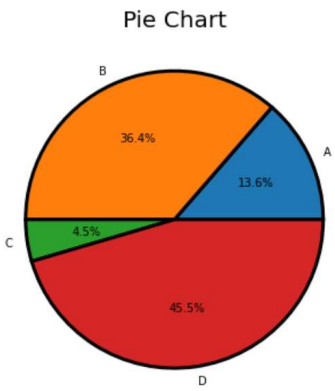
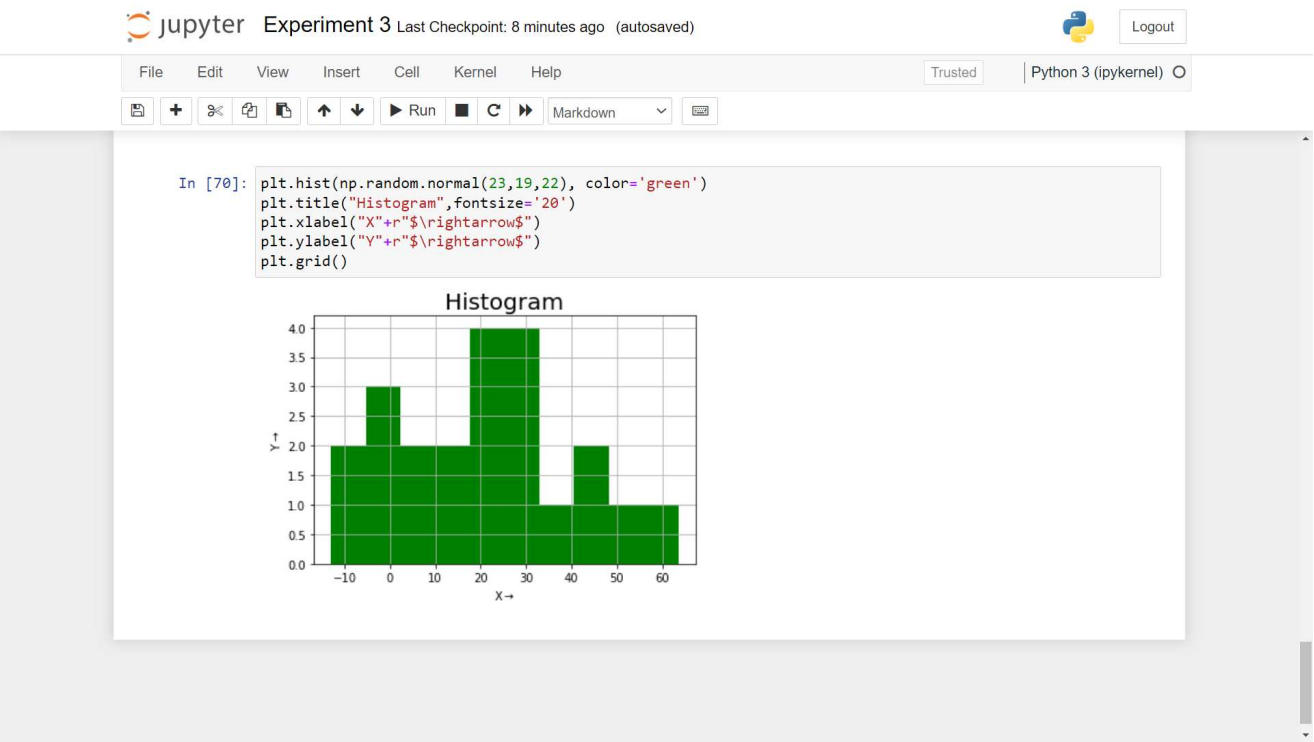
Run Markdown

In [64]:
```
plt.figure(figsize=(6,6))
plt.pie(b, labels=a, autopct = "%1.1f%%",wedgeprops={'linewidth': 3.0, 'edgecolor': 'black'})
plt.title("Pie Chart",fontsize='20')
```

Out[64]:
```
Text(0.5, 1.0, 'Pie Chart')
```



In [70]:
```
plt.hist(np.random.normal(23,19,22), color='green')
plt.title("Histogram",fontsize='20')
plt.xlabel("X"+r"$\rightarrow$")
```



DISCUSSION and CONCLUSION

The various types of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix, have been studied and created in the Jupyter platform. Further, labelling of different axes in a plot and data in a plot, have been performed.

CRITERIA	TOTAL MARKS	MARKS OBTAINED	COMMENTS
Concept (A)	2		
Implementation (B)	2		
Performance (C)	2		
Total	6		