A5

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#Exponential rnadom numbers (Exercise 1)

```
import numpy as np
N = 1000
u = np.random.uniform(0,1,size=N)
x = np.log(1-u)/3

print(x[:6])
```

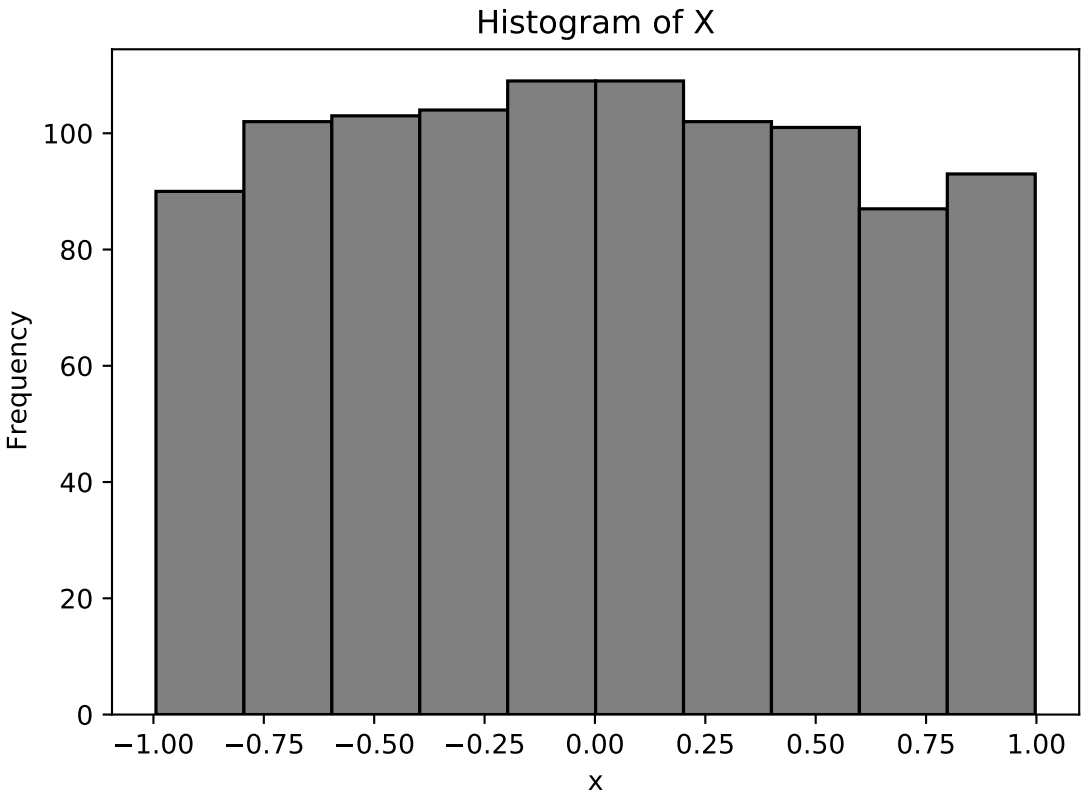
```
## [-0.23871152 -0.35290363 -0.32679083 -0.60128198 -0.36302216 -0.33846911]
```

#Histogram (uniform)

```
import numpy as np
import matplotlib.pyplot as plt
x = np.random.uniform(-1,1,size=1000)
plt.hist(x,color='gray',edgecolor='black',linewidth=1.2)
```

```
## (array([ 90., 102., 103., 104., 109., 109., 102., 101.,  87.,  93.]), array([-0.99429647, -0.7951405
##         0.00148317,  0.2006391 ,  0.39979503,  0.59895095,  0.79810688,
##         0.99726281]), <BarContainer object of 10 artists>)
```

```
plt.title('Histogram of X')
plt.xlabel('x')
plt.ylabel('Frequency')
plt.show()
```

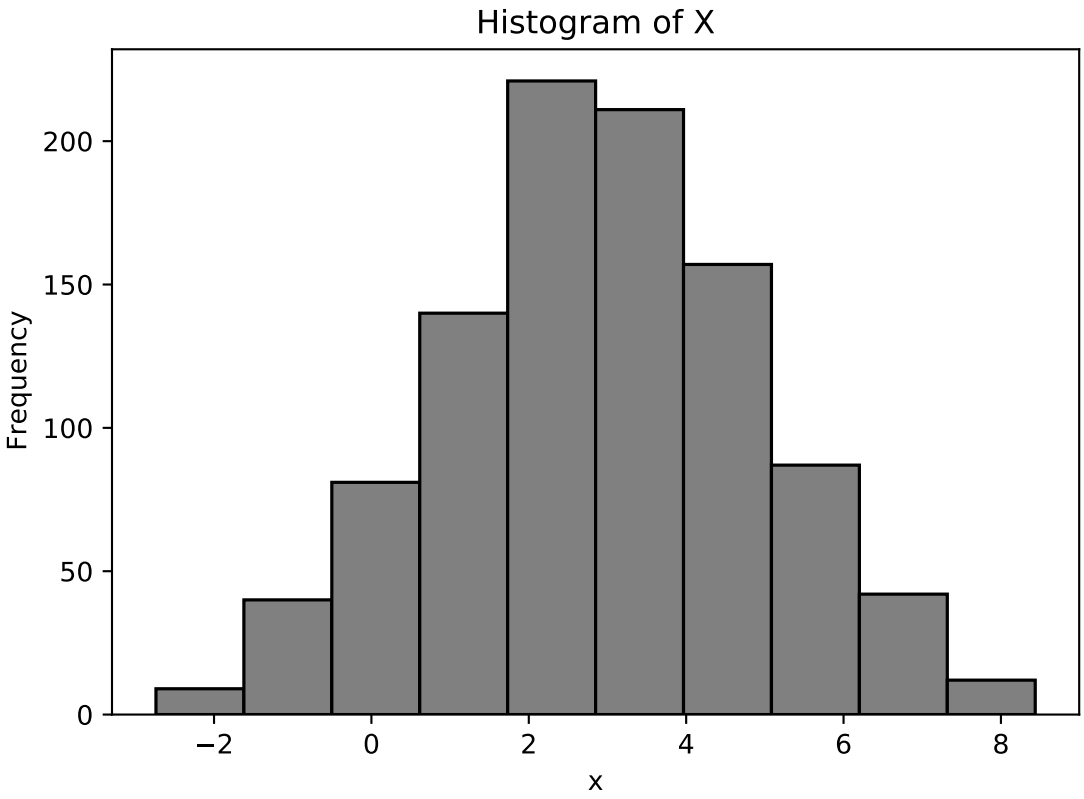


#Histogram (normal)

```
import numpy as np
import matplotlib.pyplot as plt
x = np.random.normal(3,2,size=1000)
plt.hist(x,color='gray',edgecolor='black',linewidth=1.2)
```

```
## (array([  9.,  40.,  81., 140., 221., 211., 157.,  87.,  42.,  12.]), array([-2.73801356, -1.6206158
##         2.8489748 ,  3.96637247,  5.08377014,  6.20116781,  7.31856549,
##         8.43596316]), <BarContainer object of 10 artists>)
```

```
plt.title('Histogram of X')
plt.xlabel('x')
plt.ylabel('Frequency')
plt.show()
```

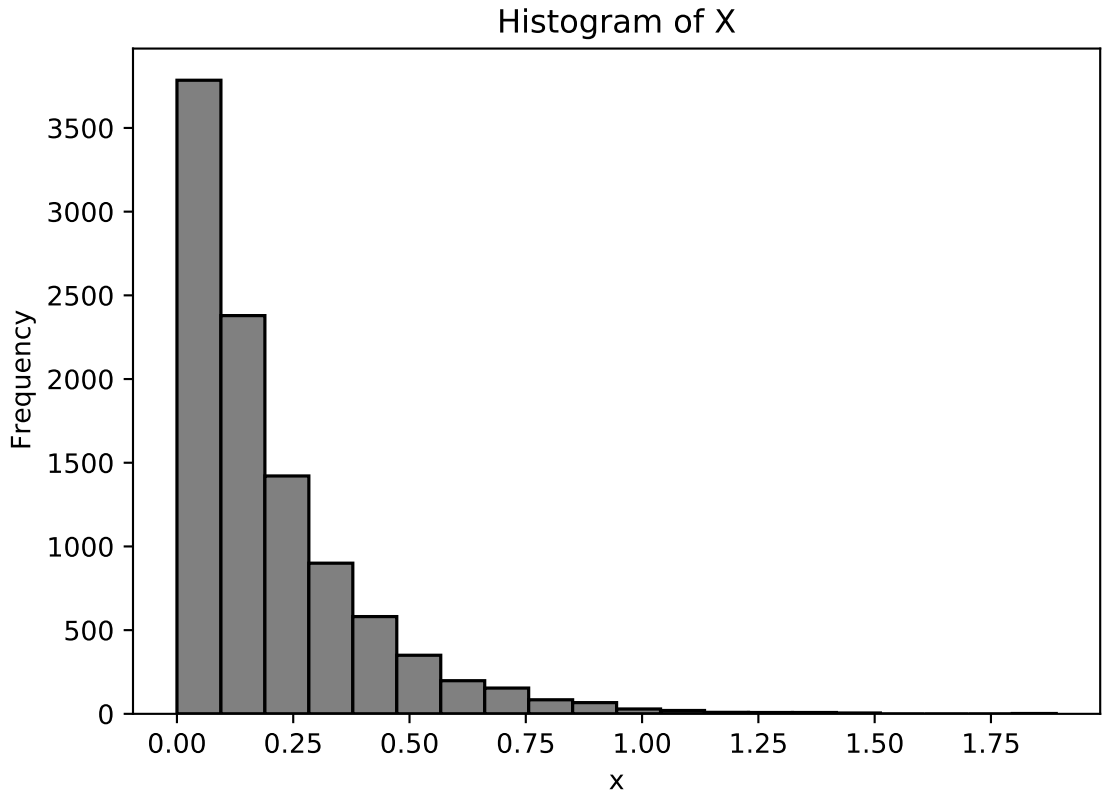


#Histogram (exponential)

```
import numpy as np
import matplotlib.pyplot as plt
x = np.random.exponential(1/5,size=10000)
plt.hist(x,bins=20,color='gray',edgecolor='black',linewidth=1.2)
```

```
## (array([3.785e+03, 2.379e+03, 1.421e+03, 9.000e+02, 5.810e+02, 3.500e+02,
##         1.980e+02, 1.540e+02, 8.400e+01, 6.700e+01, 2.900e+01, 2.000e+01,
##         9.000e+00, 8.000e+00, 8.000e+00, 5.000e+00, 0.000e+00, 0.000e+00,
##         0.000e+00, 2.000e+00]), array([5.23181530e-05, 9.45673425e-02, 1.89082367e-01, 2.83597391e-01
##         3.78112415e-01, 4.72627440e-01, 5.67142464e-01, 6.61657488e-01,
##         7.56172513e-01, 8.50687537e-01, 9.45202561e-01, 1.03971759e+00,
##         1.13423261e+00, 1.22874763e+00, 1.32326266e+00, 1.41777768e+00,
##         1.51229271e+00, 1.60680773e+00, 1.70132276e+00, 1.79583778e+00,
##         1.89035280e+00]), <BarContainer object of 20 artists>)
```

```
plt.title('Histogram of X')
plt.xlabel('x')
plt.ylabel('Frequency')
plt.show()
```



#Histogram (poisson)

```
import numpy as np
import matplotlib.pyplot as plt
x = np.random.poisson(5, size=10000)
plt.hist(x,bins=20,color='gray',edgecolor='black',linewidth=1.2)
```

```
## (array([6.400e+01, 3.490e+02, 8.560e+02, 1.431e+03, 0.000e+00, 1.718e+03,
##         1.705e+03, 1.458e+03, 1.051e+03, 0.000e+00, 6.930e+02, 3.770e+02,
##         1.700e+02, 7.000e+01, 0.000e+00, 4.100e+01, 1.500e+01, 1.000e+00,
##         0.000e+00, 1.000e+00]), array([ 0. ,  0.8,  1.6,  2.4,  3.2,  4. ,  4.8,  5.6,  6.4,  7.2,  8
##          8.8,  9.6, 10.4, 11.2, 12. , 12.8, 13.6, 14.4, 15.2, 16. ]), <BarContainer object of 20 artis
```

```
plt.title('Histogram of X')
plt.xlabel('x')
plt.ylabel('Frequency')
plt.show()
```