BINOMIAL DISTRIBUTION

M.Aamani(S20180020219)
V.Haneesha(S20180010184)

K.Keerthana(S20180010084)

CODE FOR VARYING p CONSTANT n

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

def factorial(k):
    if k==0:
        return 1
    return k*factorial(k-1)


x = []
for i in range(1,100):
    x.append(i)

p=0.2
n=100
for i in range(5):
    y=[]
    for j in range(len(x)):
        num= factorial(n)/(factorial(n-x[j])*(factorial(x[j])))*(p)**x[j]*(1-p)**(n-x[j])
        y.append(num)

    pyplot.bar(x,y,label='n=100 p={}'.format(p))

    p=p+0.2

pyplot.legend()
```

CODE FOR VARYING n CONSTANT p

```
import numpy as np
```

```
import matplotlib.pyplot as plt
from matplotlib import pyplot

def factorial(k):
    if k==0:
        return 1
    return k*factorial(k-1)


x = []
for i in range(1,25):
    x.append(i)

p=0.2
n=25
for i in range(5):
    y=[]
    for j in range(len(x)):
        num= factorial(n)/(factorial(n-x[j])*(factorial(x[j])))*(p)**x[j]*(1-p)**(n-x[j])
        y.append(num)

    pyplot.bar(x,y,label='n={} p=0.2'.format(n))

    n=n+25

pyplot.legend()
```

CODE FOR MEAN AND VARIANCE VS p

```
import numpy as np
import matplotlib.pyplot as plt
p=0.2
n=np.arange(10,20,2)
mean=n*p
var=n*p*(1-p)
plt.plot(n,mean,label='mean p=0.2')
plt.plot(n,var,label='variance p=0.2')
plt.legend()
```

CODE FOR MEAN AND VARIANCE VS n

```
import numpy as np
import matplotlib.pyplot as plt
p=np.arange(0.2,1,0.2)
```

```
n=10
mean=n*p
var=n*p*(1-p)
plt.plot(p,mean,label='mean n=10')
plt.plot(p,var,label='variance n=10')
plt.legend()
```

CENTRAL LIMIT THEOREM VERIFICATION

```
mui=1
varinace=1
n=100
ns=10
for i in range(4):

    samplemean=[]
    for j in range(ns):
        sum=0

        x = np.random.binomial(10,0.2,n)
        for k in x:
            sum=sum+k
        samplemean.append(sum/n)
    fig, ax = plt.subplots(figsize =(10, 7))
    ax.hist(samplemean, bins ='auto')

    plt.title("NUMBER OF SAMPLES ={}".format(ns))
    plt.show()
    ns=ns*10
```