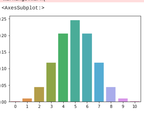
Importing Libraries

In [3]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from scipy.stats import binom
```

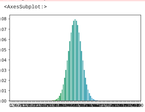
In [4]:
```
x_val=np.arange(0,11)
y_val=binom.pmf(n=10,k=x_val,p=0.5)
sns.barplot(x_val,y_val)
```

```
/Users/nikhilsanghi/opt/anaconda3/lib/python3.9/site-packages/seaborn/_decorators.py:36: FutureWarning: Pass the following variables as keyword args: x, y. From version 0.12, the only valid positional argument will be data', and passing other arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[4]:
```
<AxesSubplot:>
```


In [202]:
```
x_val=np.arange(0,101)
y_val=binom.pmf(n=100,k=x_val,p=0.5)
sns.barplot(x_val,y_val)
```

```
/Users/nikhilsanghi/opt/anaconda3/lib/python3.9/site-packages/seaborn/_decorators.py:36: FutureWarning: Pass the following variables as keyword args: x, y. From version 0.12, the only valid positional argument will be data', and passing other arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[202]:
```
<AxesSubplot:>
```


In [139]:
```
pd.value_counts(np.random.choice(["H","T"],size=10))
```

Out[139]:
```
T    6
H    4
dtype: int64
```

In [72]:
```
pd.value_counts(np.random.choice(["H","T"],size=100))
```

Out[72]:
```
T    51
H    49
dtype: int64
```

In [135]:
```
pd.value_counts(np.random.choice(["H","T"],size=1000))
```

Out[135]:
```
H    514
T    486
dtype: int64
```

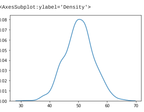
In [160]:
```
pd.value_counts(np.random.choice(["H","T"],size=10000))
```

Out[160]:
```
H    5007
T    4993
dtype: int64
```

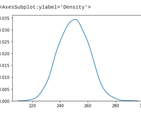
In [178]:
```
pd.value_counts(np.random.choice(["H","T"],size=100000))
```

Out[178]:
```
T    50216
H    49784
dtype: int64
```

In [199]:
```
h_val=[]
for i in range(1000):
    size=100
    h_val.append(pd.value_counts(np.random.choice(["H","T"],size=size))["H"])
sns.kdeplot(h_val)
```

Out[199]:
```
<AxesSubplot:ylabel='Density'>
```


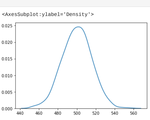
In [200]:
```
h_val=[]
for i in range(1000):
    size=500
    h_val.append(pd.value_counts(np.random.choice(["H","T"],size=size))["H"])
sns.kdeplot(h_val)
```

Out[200]:
```
<AxesSubplot:ylabel='Density'>
```


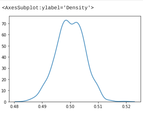
In [ ]:
```

```

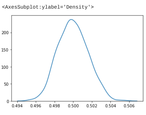
In [201]:
```
h_val=[]
for i in range(1000):
    size=1000
    h_val.append(pd.value_counts(np.random.choice(["H","T"],size=size))["H"])
sns.kdeplot(h_val)
```

Out[201]:
```
<AxesSubplot:ylabel='Density'>
```


In [194]:
```
h_val=[]
for i in range(1000):
    size=10000
    h_val.append(pd.value_counts(np.random.choice(["H","T"],size=size))["H"]/size)
sns.kdeplot(h_val)
```

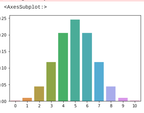
Out[194]:
```
<AxesSubplot:ylabel='Density'>
```


In [195]:
```
h_val=[]
for i in range(1000):
    size=100000
    h_val.append(pd.value_counts(np.random.choice(["H","T"],size=size))["H"]/size)
sns.kdeplot(h_val)
```

Out[195]:
```
<AxesSubplot:ylabel='Density'>
```


In [203]:
```
x_val=np.arange(0,11)
y_val=binom.pmf(n=10,k=x_val,p=0.5)
sns.barplot(x_val,y_val)
```

```
/Users/nikhilsanghi/opt/anaconda3/lib/python3.9/site-packages/seaborn/_decorators.py:36: FutureWarning: Pass the following variables as keyword args: x, y. From version 0.12, the only valid positional argument will be data', and passing other arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[203]:
```
<AxesSubplot:>
```


In [204]:
```
1-binom.cdf(n=10,k=6,p=0.5)
```

Out[204]:
```
0.171875
```

In [205]:
```
binom.pmf(n=10,k=7,p=0.5)+binom.pmf(n=10,k=8,p=0.5)+binom.pmf(n=10,k=9,p=0.5)+binom.pmf(n=10,k=10,p=0.5)
```

Out[205]:
```
0.1718749999999994
```

In [206]:
```
1-binom.cdf(n=100,k=69,p=0.5)
```

Out[206]:
```
3.925069822796612e-05
```

In [207]:
```
1-binom.cdf(n=1000,k=699,p=0.5)
```

Out[207]:
```
0.0
```

In [ ]:
```

```

In [ ]:
```

```

In [208]:
```
import math
n=1000
```

In [209]:
```
math.comb(n,k)*(p**k)*((1-p)**n-k)
```

Out[209]:
```
45
```

In [210]:
```
val=[]
for i in range(700,1001):
    val.append(math.comb(n,k)*(p**i)*((1-p)**n-i))
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/var/folders/hd/9z4ddcdb56dj541b7q8w7s4w0000gn/T/ipykernel_55906/1007463831.py in <module>
      1 val=[]
      2 for i in range(700,1001):
----> 3     val.append(math.comb(n,k)*(p**k)*((1-p)**n-k))

NameError: name 'n' is not defined
```

In [211]:
```
1-binom.cdf(n=1000,k=499,p=0.5)
```

Out[211]:
```
0.5126125098098918
```

In [212]:
```
0.025225018178360804
```

In [ ]:
```

```

In [ ]:
```

```

In [ ]:
```

```

In [ ]:
```

```

In [ ]:
```

```

In [ ]:
```

```

In [ ]:
```

```

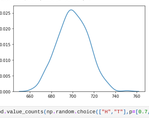
In [ ]:
```

```

In [ ]:
```

```

In [241]:
```
h_val=[]
for i in range(1000):
    size=1000
    h_val.append(pd.value_counts(np.random.choice(["H","T"],p=[0.7,0.3],size=size))["H"])
sns.kdeplot(h_val)
```

Out[241]:
```
<AxesSubplot:ylabel='Density'>
```


In [248]:
```
pd.value_counts(np.random.choice(["H","T"],p=[0.7,0.3],size=1000))
```

Out[248]:
```
H    679
T    321
dtype: int64
```

In [ ]:
```

```

In [242]:
```
1-binom.cdf(n=1000,k=699,p=0.7)
```

Out[242]:
```
0.5155935198141187
```

In [ ]:
```

```

In [243]:
```
h_val=[]
for i in range(1000):
    size=1000
    h_val.append(pd.value_counts(np.random.choice(["H","T"],p=[0.6,0.4],size=size))["H"])
sns.kdeplot(h_val)
```

Out[243]:
```
<AxesSubplot:ylabel='Density'>
```


In [244]:
```
norm.cdf(x.loc.scale)
norm.ppf(.95)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/var/folders/hd/9z4ddcdb56dj541b7q8w7s4w0000gn/T/ipykernel_55906/1647155091.py in <module>
----> 1 norm.cdf(x.loc.scale)
```

```
NameError: name 'norm' is not defined
```

In [ ]: