Inferential - Binomial Probability

January 14, 2021

[40]:
```
import math as m
import matplotlib.pyplot as plt
```

1 Binomial distribution and the expected value.

Creating a quick simulation of coin flips and plotting the probability distributions using binomial distribution.

[151]:
```
def random_variable(n,p):
    prob_distribution = []
    q = 1-p
    for k in range(0,n+1):
        n_c_k = m.factorial(n)/(m.factorial((n-k))*m.factorial(k))
        px = n_c_k*pow(p,k)*pow(q,(n-k))
        prob_distribution.append(px)
    return prob_distribution,n
```

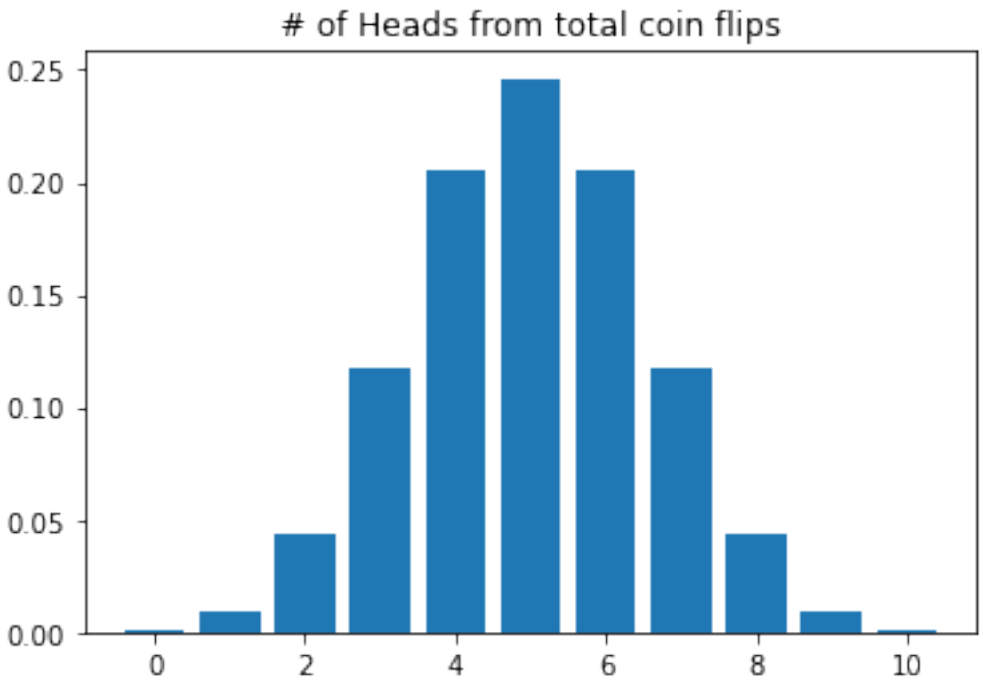
[190]:
```
cf_dist,n = random_variable(10,0.5)
```

[191]:
```
s = 0
for i in (range(0,len(cf_dist))):
    p = cf_dist[i]
    n = i
    s = s+(n*p)

expected_value = s
```

[192]:
```
plt.bar(range(0,len(cf_dist)),cf_dist)
plt.title('# of Heads from total coin flips')
print(n,'coin flips')
print('E(X)=',expected_value)
```

```
10 coin flips
E(X)= 5.0
```


# of Heads from total coin flips
0.25
0.20
0.15
0.10
0.05
0.00
0
2
4
6
8
10

[ ]: