

# simulating\_many\_coin\_flips

January 21, 2019

## 1 Simulating Many Coin Flips

```
In [1]: import numpy as np
```

```
In [11]: # number of heads from 10 fair coin flips  
np.random.binomial(10, 0.5)
```

```
Out[11]: 5
```

```
In [12]: # results from 20 tests with 10 coin flips  
np.random.binomial(10, 0.5, 20)
```

```
Out[12]: array([5, 3, 6, 5, 6, 5, 5, 6, 6, 1, 5, 5, 5, 3, 4, 8, 5, 4, 9, 5])
```

```
In [13]: # mean number of heads from the 20 tests  
np.random.binomial(10, 0.5, 20).mean()
```

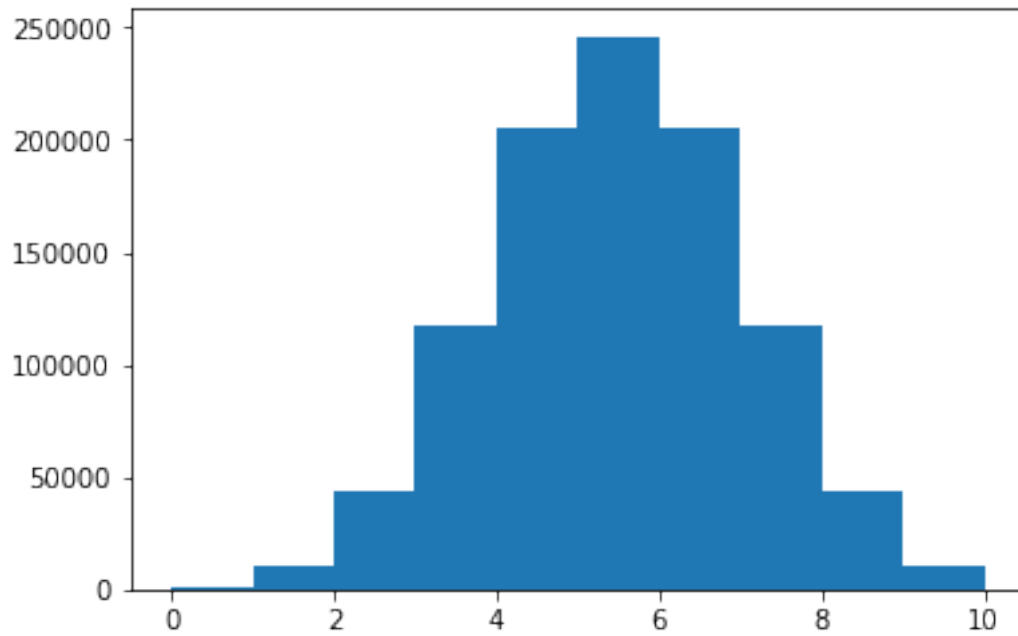
```
Out[13]: 4.8499999999999996
```

```
In [19]: # reflects the fairness of the coin more closely as # tests increases  
np.random.binomial(10, 0.5, 1000000).mean()
```

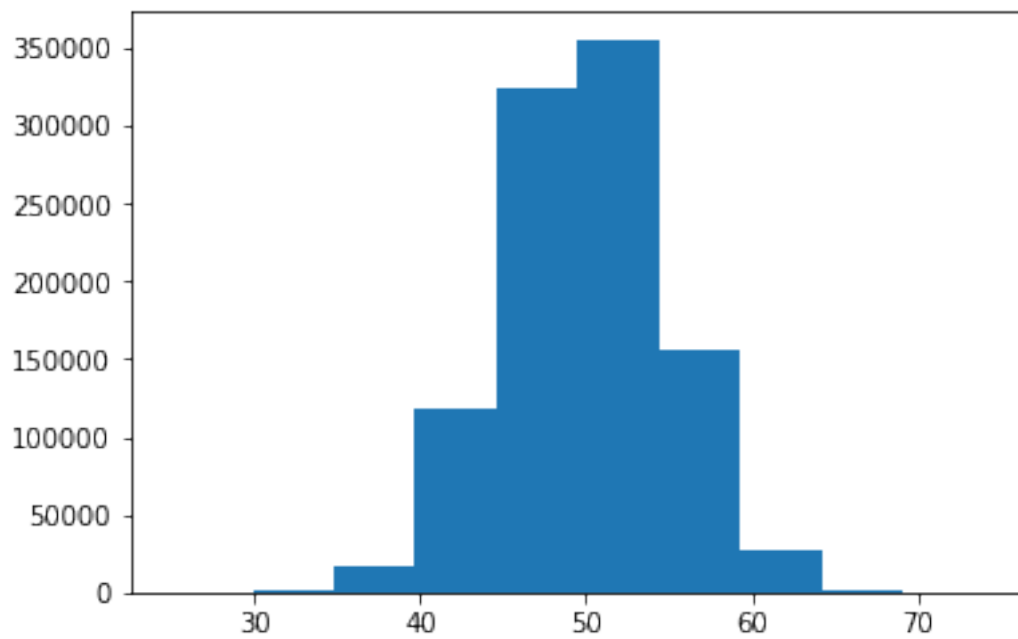
```
Out[19]: 5.0036009999999997
```

```
In [22]: import matplotlib.pyplot as plt  
% matplotlib inline
```

```
In [27]: plt.hist(np.random.binomial(10, 0.5, 1000000));
```



```
In [29]: # gets more narrow as number of flips increase per test  
plt.hist(np.random.binomial(100, 0.5, 1000000));
```



```
In [ ]:
```