Normal Distributions

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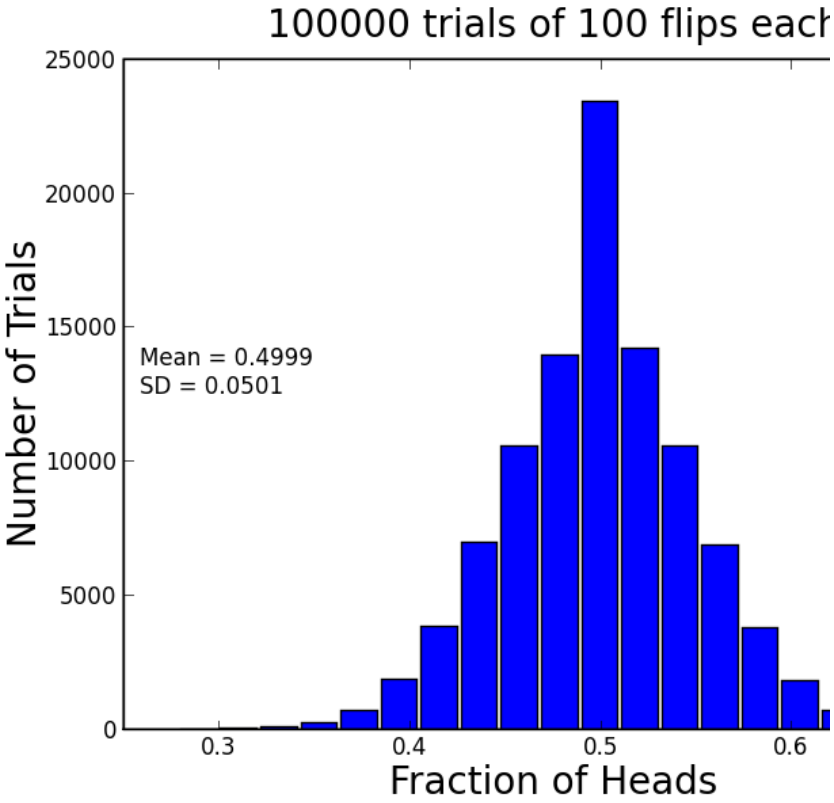
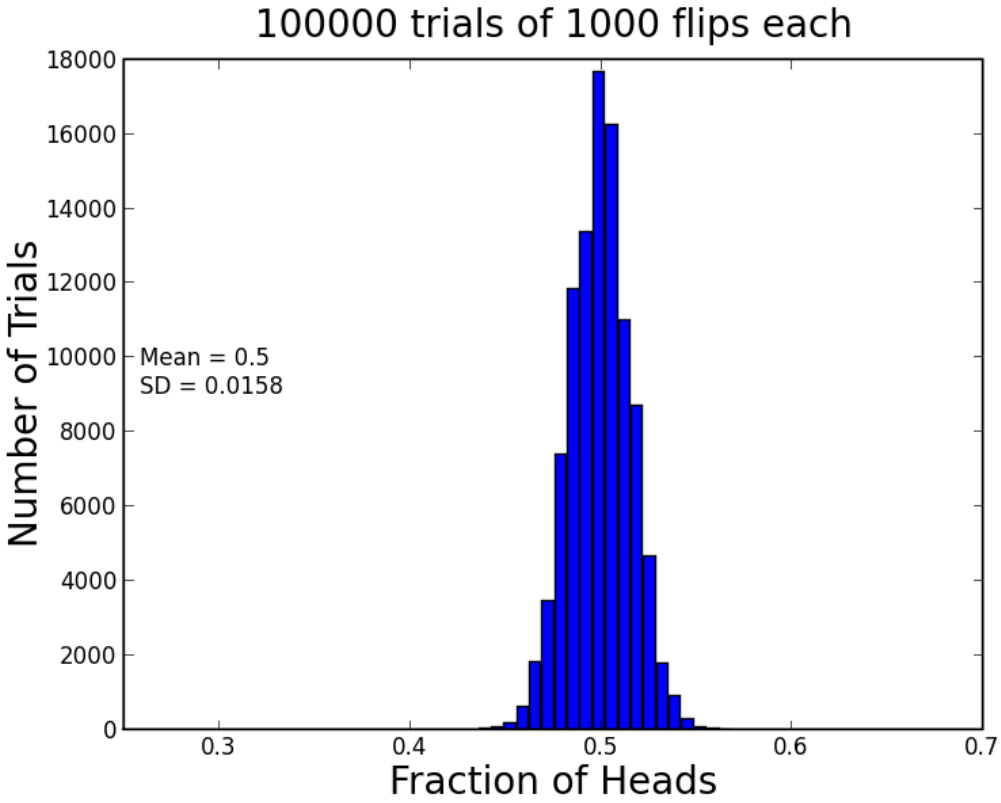

100000 trials of 100 flips each
Number of Trials
Fraction of Heads
Mean = 0.4999
SD = 0.0501
25000
20000
15000
10000
5000
0
0.3
0.4
0.5
0.6


100000 trials of 1000 flips each
Number of Trials
Fraction of Heads
Mean = 0.5
SD = 0.0158
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
0.3
0.4
0.5
0.6
0.7

Normal Distributions

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```
def makeNormal(mean, sd, numSamples):
    samples = []
    for i in range(numSamples):
        samples.append(random.gauss(mean, sd))
    pylab.hist(samples, bins = 101)
```

Confidence Levels and Intervals

Instead of estimating an unknown parameter by a single value (e.g., the mean of a set of trials), a confidence interval provides a range that is likely to contain the unknown value and a confidence level that the unknown value lays within that range.

Empirical Rule

of the data falls within 1 standard deviation of the mean

of the data falls within 2 standard deviations of the mean

of the data falls within 3 standard deviations of the mean