Parameter: a number that describe population
Statistic: a number that can be computed from the sample data

$\mu$: mean of the population
$\sigma$: standard deviation of the population
$\bar{x}$: mean of the sample
$s$: standard deviation of the sample.

Law of Large Numbers: Draw observation at random from any population with finite mean $\mu$. As the number of observations drawn increase, the mean $\bar{x}$ of the observation tend to approach to $\mu$.

Sampling distribution: took every one of the possible sample of a certain size, calculated the sample mean for each, and graphed.

Simulation: using softwares to imitate sampling distribution.

the sampling distribution of $\bar{x}$ has mean $\mu$ and standard deviation $\sigma/\sqrt{n}$

=> SRS of size $n$, mean $\mu$ and standard deviation $\sigma$
Since $\bar{x}$ is always equals to $\mu$, $\bar{x}$ is an unbiased estimator
* $\bar{x}$ must sample all pares of data.

The larger the population is, smaller the standard deviation of the sampling distribution is. $\bar{x} = \sigma/\sqrt{n}$. The variable of the average is less.
The shape of the sampling distribution depends on the shape of the population distribution
=> the population distribution is Normal, then the sampling distribution is Normal
individual observation: $N(\mu, \sigma)$ => sample mean $\bar{x}$ of the SRS: $(\mu, \sigma/\sqrt{n})$.

Central Limit Theorem
$n\uparrow$, the destribution of sample more like Normal distribution, less like population
=> when $n$ is large, the sample distribution is approximately Normal, $N(\mu, \sigma/\sqrt{n})$