Finding the estimates

Method of Moments

Estimates are found out by equating the first k sample moments to the corresponding k population moments

Maximum of Likelihood

Uses a model and the values in the model to maximize a likelihood function. This results in the most likely parameter for the inputs selected

Bayes' Estimators

Minimizes the average risk (an expectation of random variables)

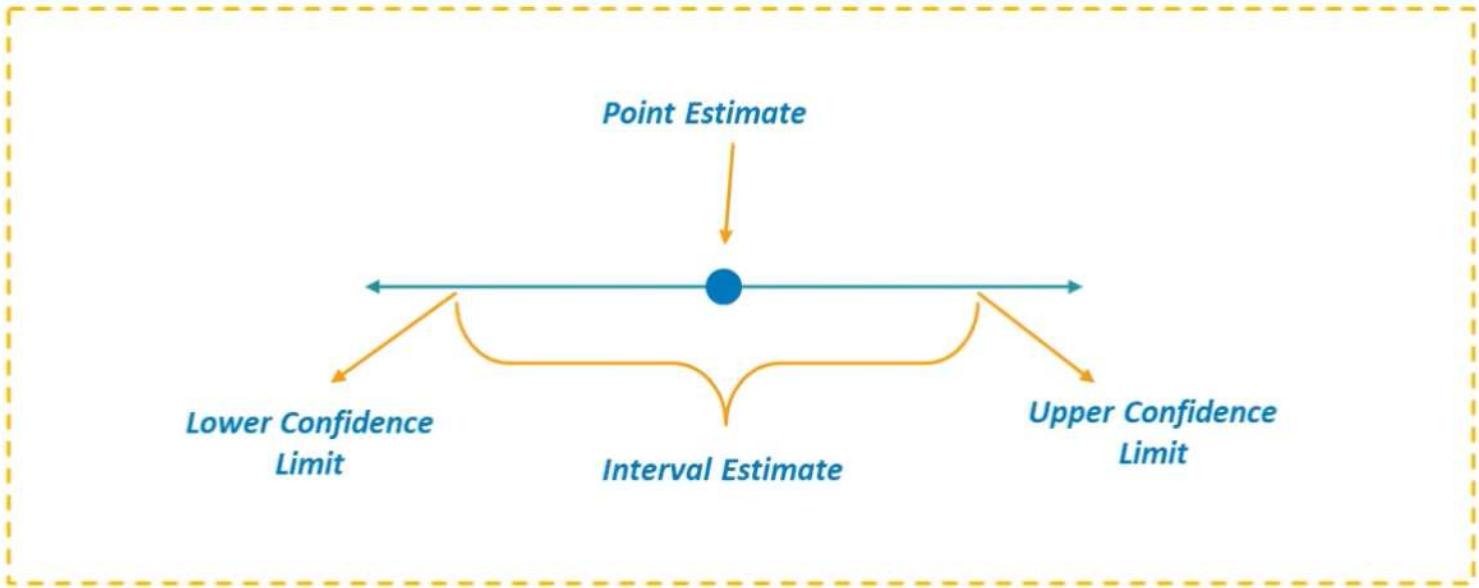
Best Unbiased Estimators

Several unbiased estimators can be used to approximate a parameter (which one is "best" depends on what parameter you are trying to find)

Image Source: www.edureka.co/data-science

Interval Estimates

An Interval, or range of values, used to estimate a population parameter is called Interval Estimate.



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Confidence Interval

01

Confidence Interval is the measure of your confidence, that the interval estimate contains the population mean, μ

Statisticians use a confidence interval to describe the amount of uncertainty associated with a sample estimate of a population parameter

02

03

Technically, a range of values so constructed that there is a specified probability of including the true value of a parameter within it

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Margin of Error

- Difference between the point estimate and the actual population parameter value is called the **Sampling Error**
- When μ is estimated, the sampling error is the difference $\mu - \bar{x}$

Margin of Error E, for a given level of confidence is the greatest possible distance between the point estimate and the value of the parameter it is estimating

$$E = Z_c \frac{\sigma}{\sqrt{n}}$$

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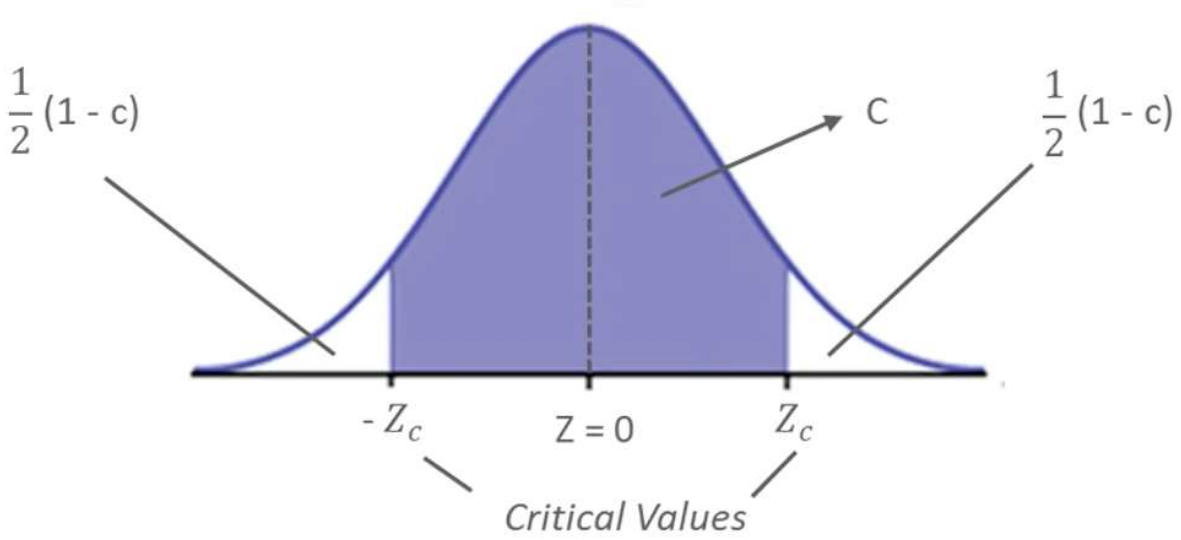
Estimating Level of Confidence

The level of confidence c, is the probability that the interval estimate contains the population parameter.



C is the area beneath the normal curve between the critical values
Corresponding Z score can be calculated using the standard normal table

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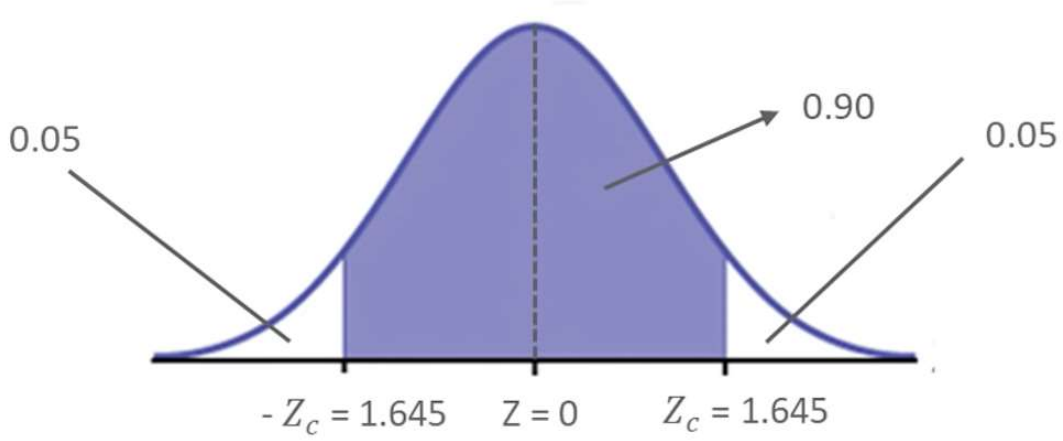
Estimating Level of Confidence

If the level of confidence is 90%, this means that you are 90% confident that the interval contains the population mean, μ.



The Corresponding Z – scores are ± 1.645

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Margin of Error: Use Case

A random sample of 32 textbook prices is taken from a local college bookstore. The mean of the sample is $\bar{x}$ = 74.22, and the sample standard deviation is S = 23.44. Use a 95% confidence level and find the margin of error for the mean price of all textbooks in the bookstore

You know by formula,

$$E = Z_c \frac{\sigma}{\sqrt{n}}$$

$$E = 1.96 * (23.44/\sqrt{32}) \approx 8.12$$

Image Source: www.edureka.co/data-science