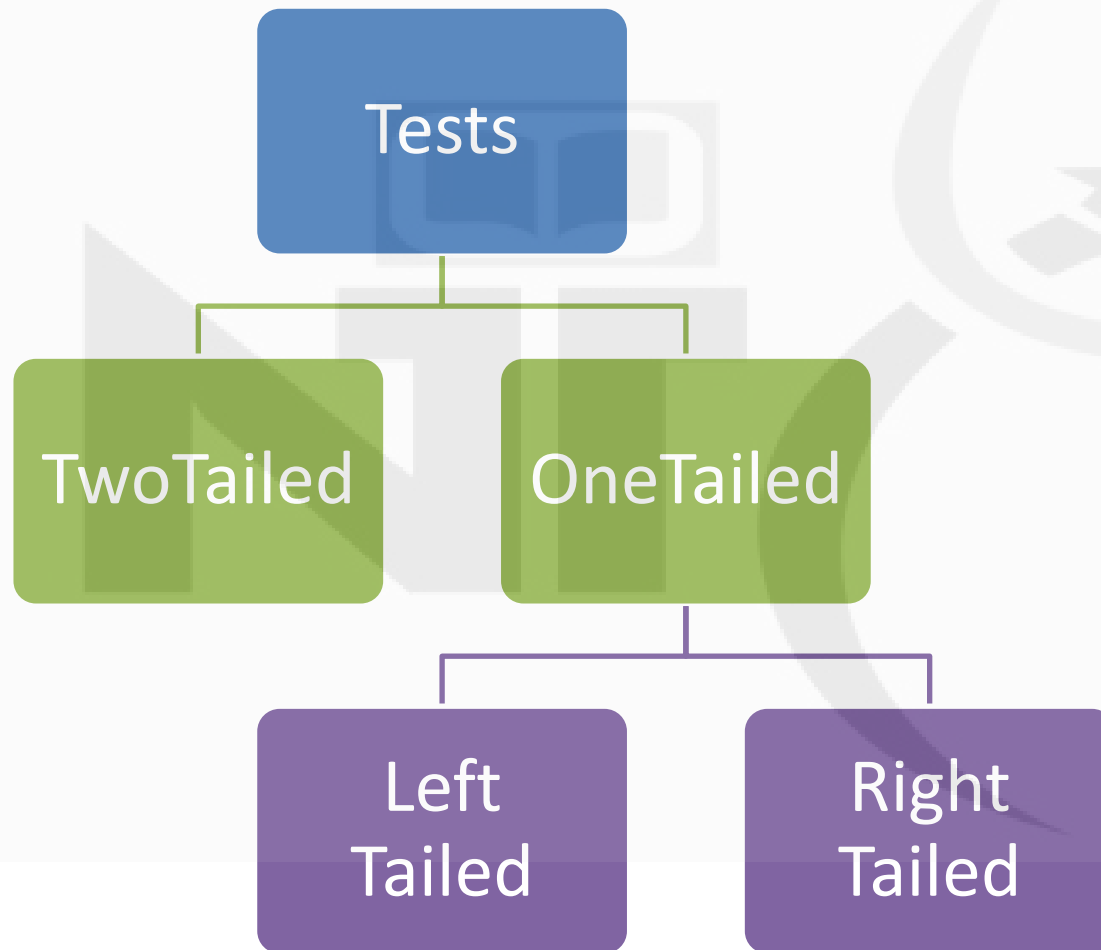




# TYPES OF TESTS

-MUKESH KUMAR

# Based on tails



# Two-Tailed

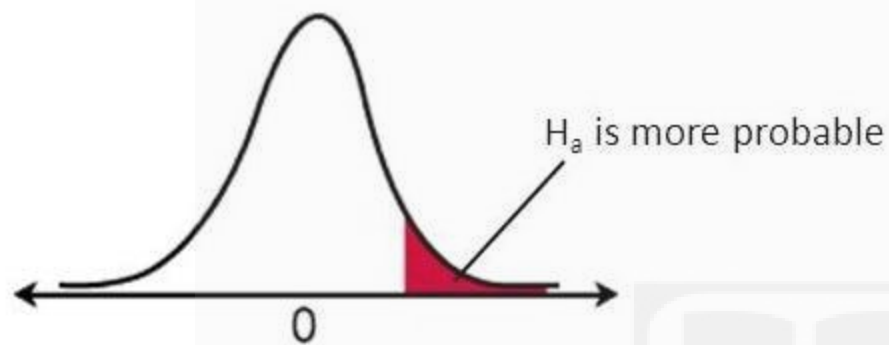
- **Hypotheses:**
  - **Null Hypothesis ( $H_0$ ):** The sample mean is equal to the population mean ( $\mu = \mu_0$ ).
  - **Alternative Hypothesis ( $H_1$ ):** The sample mean is not equal to the population mean ( $\mu \neq \mu_0$ ).
- **Critical Regions:** Located in both tails of the distribution. The total significance level ( $\alpha$ ) is split between the two tails (e.g., if  $\alpha = 0.05$ , each tail gets 0.025).
- **Interpretation:** If the test statistic falls in either tail, you reject the null hypothesis.
- **Example:** Testing if a new drug has a different effect than the current standard (it could be either more effective or less effective).

# Right-Tailed

- **Hypotheses:**
  - **Null Hypothesis ( $H_0$ ):** The sample mean is less than or equal to the population mean ( $\mu \leq \mu_0$ ).
  - **Alternative Hypothesis ( $H_1$ ):** The sample mean is greater than the population mean ( $\mu > \mu_0$ ).
- **Critical Region:** Located in the right tail of the distribution.
- **Interpretation:** If the test statistic falls in the right tail, you reject the null hypothesis.
- **Example:** Testing if a new teaching method is more effective than the traditional method (expecting the new method to result in higher scores).

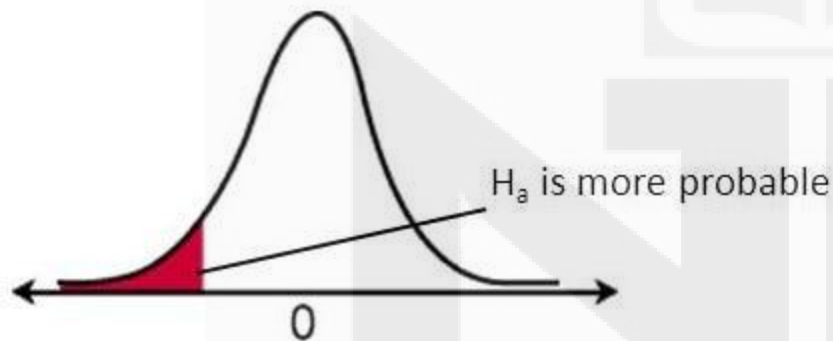
# Left Tailed

- **Hypotheses:**
  - **Null Hypothesis ( $H_0$ ):** The sample mean is greater than or equal to the population mean ( $\mu \geq \mu_0$ ).
  - **Alternative Hypothesis ( $H_1$ ):** The sample mean is less than the population mean ( $\mu < \mu_0$ ).
- **Critical Region:** Located in the left tail of the distribution.
- **Interpretation:** If the test statistic falls in the left tail, you reject the null hypothesis.
- **Example:** Testing if a new fuel additive reduces the average miles per gallon (expecting the additive to decrease fuel efficiency).



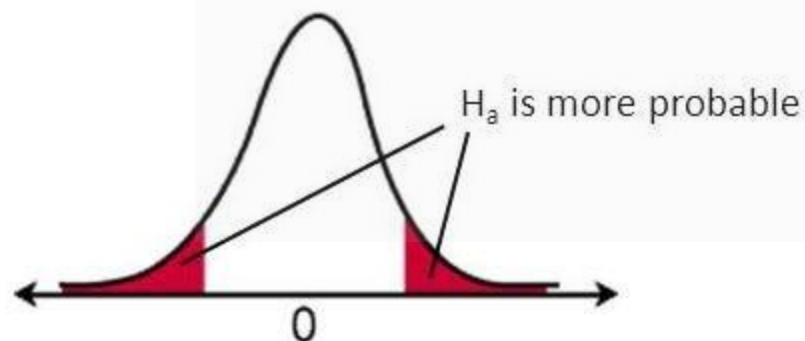
Right-tail test

$$H_a: \mu > \text{value}$$



Left-tail test

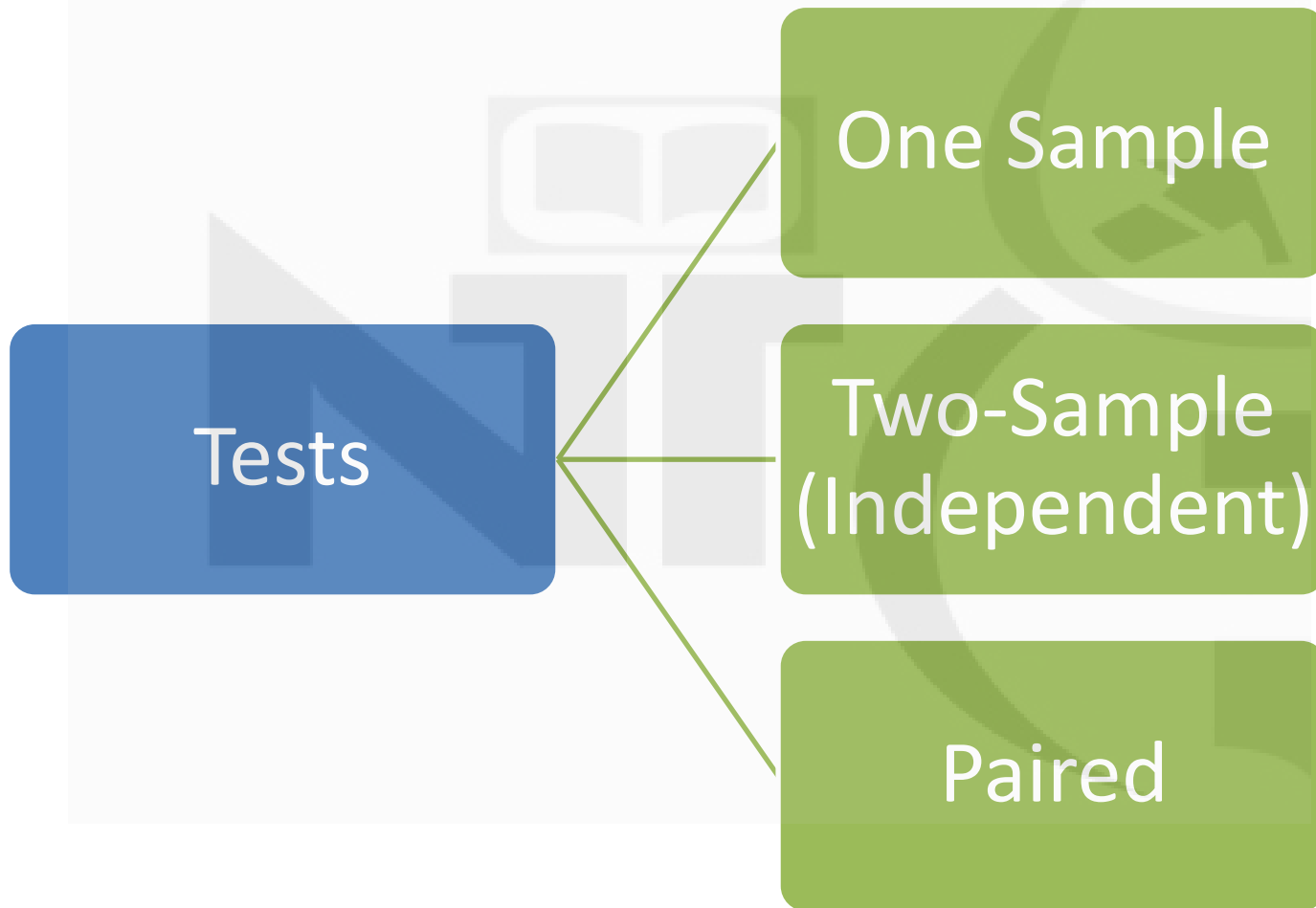
$$H_a: \mu < \text{value}$$



Two-tail test

$$H_a: \mu \neq \text{value}$$

# Based on Samples



# Based on statistics

