TWO SAMPLE t TEST

Two-Sample t Test	Two-tailed Test	One-tailed Test	Example
A two-sample t-test is a statistical method used to determine whether the means of two independent groups are significantly different from each other. It's commonly used in experiments or observational studies where you want to compare outcomes between two groups.	**The Hypotheses** **Null Hypothesis (H_0):** The means of the two populations are **equal**. Mathematically: $H_0: \mu_1 = \mu_2$ **Alternative Hypothesis (H_1 or H_a):** The means of the two populations are **not equal** (or greater/less than, depending on the test type). There are **three versions** of the alternative hypothesis depending on the research question: **Two-tailed test** (most common): $H_a: \mu_1 \neq \mu_2$ →Tests for **any difference** in means.	**Left-tailed test**: $H_a: \mu_1 < \mu_2$ →Tests if group 1 has a **smaller** mean than group 2. **Right-tailed test**: $H_a: \mu_1 > \mu_2$ →Tests if group 1 has a **larger** mean than group 2.	**Example Scenario** Suppose you're comparing average exam scores between two classes: **H_0**: The average scores are the same. **H_1**: The average scores are different (two-tailed), or one class scores higher/lower (one-tailed).