Tutorial # 4
Software: Minitab Statistical Software

- Version: Any version from Minitab 17 and later
- Skill Level: Beginner
- Topic: Point and Interval Estimation

Example Dataset: Point and Interval Estimation

This is a simple dataset for heights (in cm) of 20 students:

167, 170, 168, 172, 169, 171, 166, 173, 170, 168,
167, 169, 172, 171, 170, 169, 168, 167, 170, 171

Step 1: Entering Data in Minitab

1. Open Minitab.
2. In the worksheet, name **Column C1** as Height.
3. Copy and paste or manually enter the 20 height values into C1.

Step 2: Point Estimation (Mean and Standard Deviation)

Steps:

1. Go to **Stat > Basic Statistics > Display Descriptive Statistics**.
2. Select **Height** as the variable.
3. Click **OK**.

Output Includes:

- **Mean** (point estimate of population mean)
- **Standard deviation**
- **N** (sample size)
- **Minimum / Maximum / Range** (optional)

Interpretation:

Descriptive Statistics: X

Variable	Total Count	Mean	StDev	Minimum	Maximum	Range
X	20	169.40	1.93	166.00	173.00	7.00

Then:

- The **point estimate** of the population mean height is **169.45 cm**.
- The **point estimate** for the standard deviation is **1.93 cm**.

Step 3: Interval Estimation (Confidence Interval for the Mean)

Steps:

1. Go to **Stat > Basic Statistics > 1-Sample t...**
2. Select the variable **Height**.
3. Choose Summarized data or enter column data.
4. Click **OK**. (Make sure the default **Confidence level is 95%**.)

Output Includes:

- **Sample Mean**
- **95% Confidence Interval for the Mean**

Interpretation:

Suppose the output shows:

Variable	N	Mean	StDev	95% CI for μ
Height	20	169.45	2.13	(168.41, 170.49)

Then:

- We are **95% confident** that the **true population mean height** lies between **168.41 cm and 170.49 cm**.
- This is the **interval estimate** of the population mean.

Interval Estimation for a Proportion (if you had categorical data)

If you had binary data like **"Pass" or "Fail"**, here's how you would estimate the proportion.

Example:

Say we had this data in column C2 named Result:

Pass, Pass, Fail, Pass, Fail, Pass, Pass, Fail, Pass, Pass

Steps:

1. Go to **Stat > Basic Statistics > 1 Proportion**.
2. Choose Summarized data or enter column data.
3. Enter number of events and trials (e.g., 7 Passes out of 10).
4. Make sure **Confidence level = 95%**.
5. Click **OK**.

OR

Choose **Stat > Basic Statistics > 1 Proportion**.

2 Choose **Summarized data**.

3 In **Number of events**, enter *560*. In **Number of trials**, enter *950*.

4 Check **Perform hypothesis test**. In **Hypothesized proportion**, enter *0.65*.

5 Click **Options**. Under **Alternative hypothesis**, choose **Proportion > hypothesized proportion**. Click **OK** in each dialog box.

Output Includes:

- **Sample proportion**
- **Confidence interval for proportion**

Test and CI for One Proportion

Sample	X	N	Sample p	95% CI
1	7	10	0.700000	(0.347547, 0.933260)