**Box or Whisker Plot**

### **Box (or Whisker) Plot**

A **Box Plot**, also called a **Box-and-Whisker Plot**, is a graphical representation of the distribution of a dataset. It shows key statistical measures such as the **minimum, first quartile (Q1), median (Q2), third quartile (Q3), and maximum**.

### **Components of a Box Plot**

A box plot consists of:

1. **Minimum (Lower Whisker)** – The smallest data point (excluding outliers).
2. **First Quartile (Q1, 25th percentile)** – The median of the lower half of the dataset.
3. **Median (Q2, 50th percentile)** – The middle value of the dataset.
4. **Third Quartile (Q3, 75th percentile)** – The median of the upper half of the dataset.
5. **Maximum (Upper Whisker)** – The largest data point (excluding outliers).
6. **Outliers (if any)** – Data points that are unusually far from the rest.

### **Box Plot Interpretation**

* The **box** represents the **Interquartile Range (IQR = Q3 - Q1)**, which contains the middle 50% of the data.
* The **whiskers** extend to the smallest and largest values within **1.5 × IQR** from Q1 and Q3.
* Any **points beyond the whiskers** are considered **outliers**.

### **Example of a Box Plot**

Consider the dataset:  
 **{10, 15, 20, 25, 30, 35, 40, 45, 50}**

* **Minimum** = 10
* **Q1 (25th percentile)** = 20
* **Median (Q2, 50th percentile)** = 30
* **Q3 (75th percentile)** = 40
* **Maximum** = 50

The box plot for this dataset will:

* Have a **box** spanning from **Q1 (20) to Q3 (40)**.
* A **line at the median (30)** inside the box.
* **Whiskers extending** from 10 to 50.

### **Advantages of Box Plots**

✅ **Summarizes large datasets visually** ✅ **Easily identifies skewness and outliers** ✅ **Good for comparing multiple distributions**

### **When to Use a Box Plot?**

* Comparing distributions across different groups (e.g., test scores of students in different schools).
* Identifying **skewness** (left-skewed, right-skewed, symmetric).
* Detecting **outliers** in a dataset.

