Department of Statistics
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SATS 101

Introduction to Probability and Statistics

Yarmouk University

Second Semester

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Chapter 1:Describing Data with Graphs

- **Population:** it is the set of object that we need to test and study.
- **Sample:** it is a subset of population.
- **Random sample:** it means that every element in the population has same chance to be selected.
- **Experimental unit:** It is the object that we collect the observations form.
- **Variable:** It is a characteristic that change according to different conditions,

- **Variables have you measured:**
  o **Univariate data:** One variable is measured on a single experimental unit.
  o **Bivariate data:** Two variables are measured on a single experimental unit.
  o **Multivariate data:** More than two variables are measured on a single experimental unit.

- **Type of variables:**
  o **Quantitative:**
  It is representing numbers that we may apply all algebra operation on them.
  ▪ **Discrete Quantitative:**
  it has finite or countable possible outputs.
  ▪ **Continuous Quantitative**:
  it has an uncountable set of possible outputs.
  o **Qualitative:**
 It contains no number.

Dotplots
- The simplest graph for quantitative data
- Plots the measurements as points on a horizontal axis, stacking the points that duplicate existing points.
- **Example:** The set   4, 5, 5, 7, 6
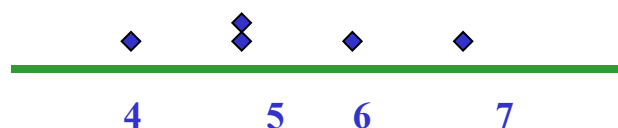
Stem and Leaf Plots (for continuous variables)
- A simple graph for quantitative data
- Uses the actual numerical values of each data point.
  - Divide each measurement into two parts: the **stem** and the **leaf.**
  - List the stems in a column, with a **vertical line** to their right.
  - For each measurement, record the leaf portion in the **same row** as its matching stem.
  - **Order** the leaves from lowest to highest in each stem.
  - Provide a **key** to your coding.
  - Find the max and the min through :
    - MAX = Number * Leaf Unit
    - MIN = Number * Leaf Unit
  - Leaf unit = 1 → steam unit = 10
  - Leaf unit = 10 → steam unit = 100
  - Leaf unit = 0.1 → steam unit = 1
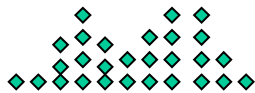
Interpreting Graphs: Shapes
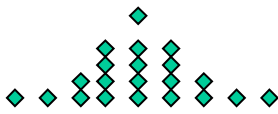
Mound shaped and symmetric (mirror images)
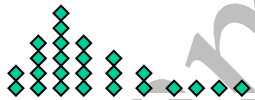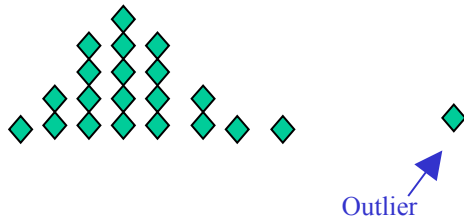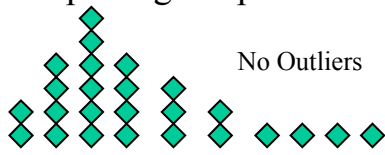
Skewed right: a few unusually large measurements
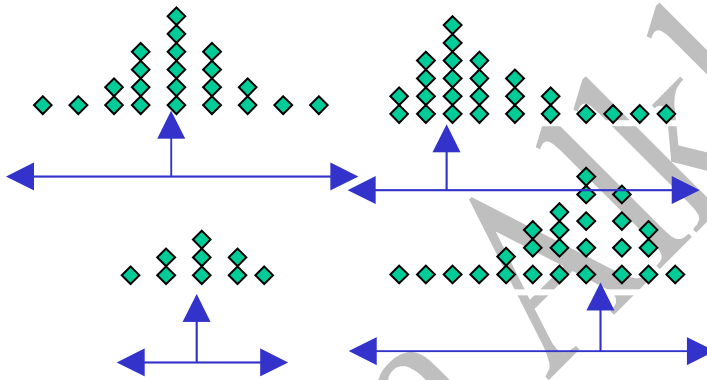
Skewed left: a few unusually small measurements

Bimodal: two local peaks

Interpreting Graphs: Outliers

No Outliers

Outlier

Interpreting Graphs:

Location and Spread

- Where is the data centered on the horizontal axis, and how does it spread out from the center?