

Chapter 2 – Tables and Graphs for Summarizing Data

Terminology

- If we measure or record ...
 - ... one observation from each individual or object we have **univariate data** (e.g. height of each person)
 - ... two observations from each individual or object we have **bivariate data** (e.g. height and weight from each person)
 - ... more than two observations ... **multivariate data** (e.g. gender, height, weight, blood pressure, and cholesterol of each person)
- Types of data
 - **Categorical or qualitative** – non-numerical observations that may be placed in categories
 - **Numerical or quantitative** – observations that are numbers
- A numerical data set is ...
 - ... **discrete** if its set of possible values is a finite set or a countably infinite set (i.e. an infinite sequence with a 1st value, 2nd value, etc) (usually associated with counting, e.g. “the number of ...”)
 - ... **continuous** if its set of possible values is an infinite set that forms an interval on the number line (usually associated with measuring)

Example (Example 2.3, p. 30) – A researcher obtained the following observations. Classify each resulting data set as categorical or numerical. If the data set is numerical, determine whether it is discrete or continuous.

- (a) The number of books read by middle-school students during an academic year.
- (b) The position of the drawbridge in Belmar, New Jersey at noon on days in July. Assume the drawbridge is not moving, and is either open or closed to boat traffic.
- (c) The length of time (in minutes) it takes to get a haircut.
- (d) The number of garage sales advertised in a local newspaper.
- (e) The types of candy received at houses on Halloween.
- (f) The air pressure in footballs at the beginning of college games.
- (g) The type of plumbing problem reported by the next person who contacts the Plumbing Pros.

To summarize or display or analyze categorical data

Example (Example 2.4, p. 33) – A random sample of cruise ships leaving from the Port of New York showed the following destinations.

Bermuda	Southampton	Mediterranean	Southampton	Caribbean
Southampton	Bermuda	Southampton	Caribbean	Caribbean
Caribbean	Bermuda	Mediterranean	Caribbean	Southampton
Caribbean	Southampton	Mediterranean	Southampton	Southampton
Bahamas	Bermuda	Bahamas	Southampton	Southampton

- (a) Construct a **frequency distribution** to describe these data.
- (b) Construct a **frequency bar chart**. How would you construct a **relative frequency bar chart**?
- (c) What proportion of cruise ships did not go to Southampton?

To summarize or display or analyze numerical data

Example – For each person at a small company the distance (in miles) that they commute to work is recorded. The data is below.

6, 11, 14, 17, 18, 19, 21, 22, 22, 22, 23, 26, 27, 27, 29, 31, 33, 34, 38, 39

- (a) Construct a **frequency distribution** using seven equally wide class intervals starting with $6 \leq \text{Distance} < 11$.

- (b) Construct a **frequency histogram**. How would you construct a **relative frequency histogram**? (Note – The histogram shows the **distribution** of the variable Distance.)

- (c) What percent of the workers commute 26 or more miles?

- (d) Describe the **shape** of the distribution. Select from the terminology: **unimodal**, **bimodal**, **multimodal**, **uniform**, **left skewed**, **right skewed**, **bell-shaped**, **symmetric**.