14.1 Organizing and Visualizing Data



Statistics is the science of collecting and analyzing data.

The set of all things being studied is called the **population**.

A **sample** is a subset of the population that is being studied.

Example:

Populations:

- all people
- all UT students
- all cars

Samples:

- the people who reply to a survey
- the students in this class
- the cars in Toledo

A sample has **bias** if it is not representative of the population.

Example: A study trying to measure the safety of all cars, but only uses as a sample cars made this year.

A collection of data is called a **distribution**.

Counting how often a data value occurs is its **frequency**. Counting the percent is its **relative frequency**.

Frequency distribution (or **table**) is the collection of data with its frequency.

Similar for **Relative frequency distribution**.

Find the frequency table of the numbers

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Data	Frequency
1	1
2	2
3	3
4	2
5	2

Find the relative frequency table of the numbers

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Data	Relative Frequency
1	1/10 = 10%
2	2/10 = 20%
3	3/10 = 30%
4	2/10 = 20%
5	2/10 = 20%

Data can also be grouped in ranges.

Data: 51 56 58 53 60 53 61 53 59 57 53 56 61 54 58 59 52 55 56 56



Data can also be grouped in ranges.

Data: 51 56 58 53 60 53 61 53 59 57 53 56 61 54 58 59 52 55 56 56

Range	Frequency	Rel Freq
50 - 52	2	10%
53 – 55	6	30%
56 – 58	7	35%
59 – 61	5	25%

Data Visualizing

A bar graph is 2 dimensional

- x-axis is data (or ranges)
- y-axis is (relative) frequency
- draw the height of a rectangle equal to its (relative frequency)

Evaluation	Frequency
Е	4
А	7
V	8
В	4
Р	2
Total	25



Example: Draw the bar graph for the relative frequency.

Pounds Lost	Rel Frec
0 to 10	21.5%
10+ to 20	35.4%
20+ to 30	26.2%
30+ to 40	12.3%
40+ to 50	4.6%

Example: Draw the bar graph for the relative frequency.

Pounds Lo	st
0 to 10	
10+ to 20	
20+ to 30	
30+ to 40	
40+ to 50	

Rel Freq 21.5% 35.4% 26.2% 12.3% 4.6%





What is the smallest number of hurricanes?

What is the largest number?

How many total hurricanes were recorded?



What is the smallest number of hurricanes? 4 What is the largest number? 19 How many total years were studied? 1+1+6+6+9+4+6+10+5+5+3+1+1=58 years

A **stem-and-leaf** plot splits numerical data into two pieces:

- stem = first digit
- leaf = last digit

Place all unique stems in one column, And write all leaves (even duplicates) in another column.



46 43 40 47 49 70 65 50 73 49 47 48 51 58 50



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Back-to-back stem-and-leaf: 1975–1989: 38 38 52 40 48 48 31 37 40 36 37 37 49 39 47

1993–2007: 46 43 40 47 49 70 65 50 73 49 47 48 51 58 50

1975–1989		1993-2007
98877761	3	
988700	4	03677899
2	5	0 0 1 8
	6	5
	7	03