① Nametags

② Index cards : Name, major, year

What do we mean by
"statistics" and "data" (especially
"big data")?
How does this field affect you,
personally? (Give examples.)

③ Hand out syllabus

④ Announcements / Housekeeping / Deliverables :

- Problems due Friday : _____.

- Writing assignment due Monday (find reading
on Canvas).

- READ THE SYLLABUS — it's our contract!

⑤ Today's topic : Introduction to data/sampling.

⑥ Form groups of 4-5

Statistics is the science behind collection, analysis, interpretation, and presentation of data.

- DESCRIPTIVE statistics : organizing & summarizing data  (e.g., plotting, computing mean/median/mode...)

- INFERENTIAL statistics : using data to draw conclusions, and using probability to determine confidence in those conclusions (e.g., 60% chance of rain tomorrow; 5-1 odds that the home team wins the tournament,...)

A whack of definitions...

- A population is a collec'n of persons, things, or objects under study.

- To study a population, we select a sample : a portion (subset) of the population that can practically be studied to gain information.

- The information we care about (why we're studying the population) is the parameter of interest.

- The information we collect from the sample, to answer our question about the parameter, is called the statistic. Answers "what's the value of the param.?"

- A variable (denoted w. capital letters like X or Y) is a characteristic we're interested in knowing (or predicting) for each person / member of the population.

- When we actually collect the values of the variables for members of the sample, those values are called data, and we use lowercase letters: $x, y, z$, etc.

| EXAMPLE 1.1, p.7 | We want to know the mean amount of money spent by $1^{st}$-year MCLA students on school supplies that do |

not include books. We randomly survey 100 students in their $1^{st}$ year at MCLA. Three of those students spent $150, $200, and $225, respectively.

The    population is... $1^{st}$-year MCLA students.

The    sample is... the 100 students we survey(ed).

The    parameter is... the mean amt. of money spent on
                          school supplies (excl. textbooks)

The    statistic is... the (actual!) mean amt. ...  —— " ——

The    variable is... how much money a student spends
                          on school supplies (excl. books).

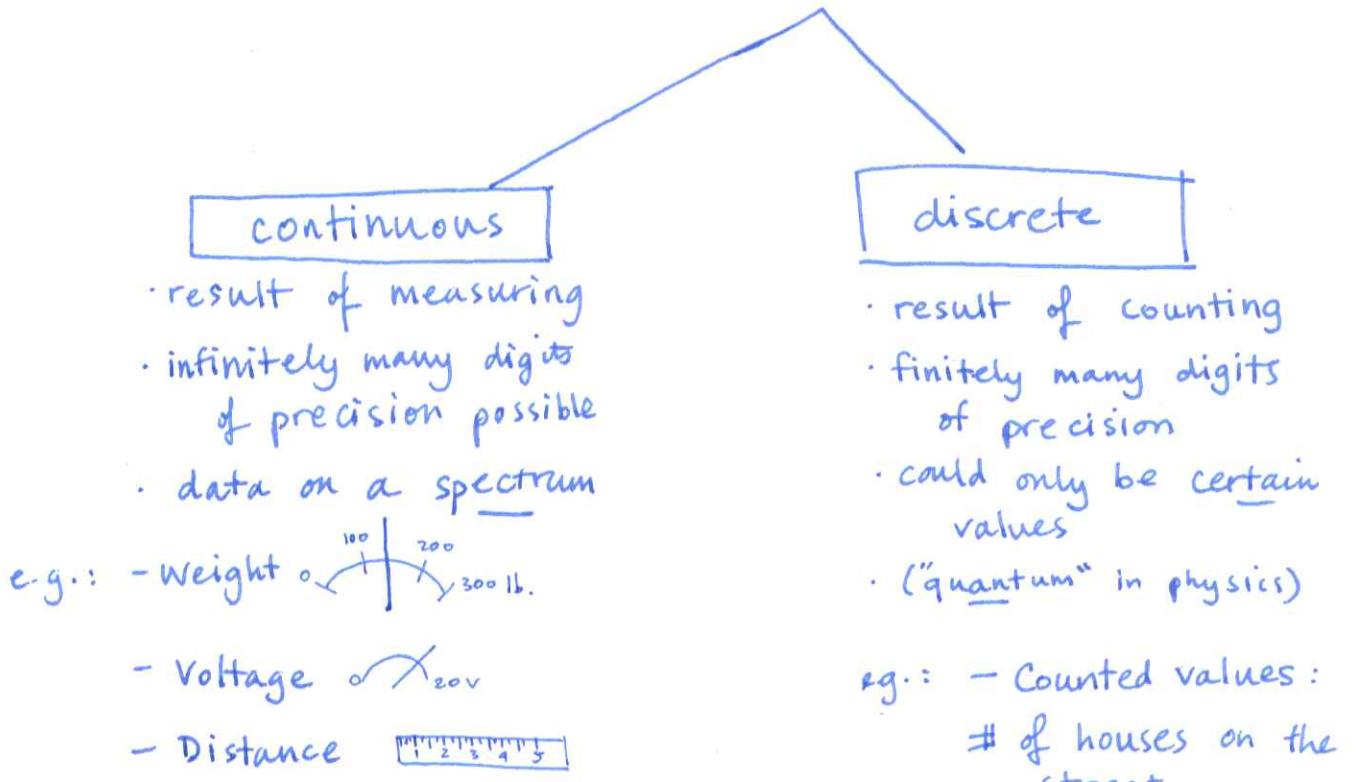The    data are... { $150, $200, $225, ... }
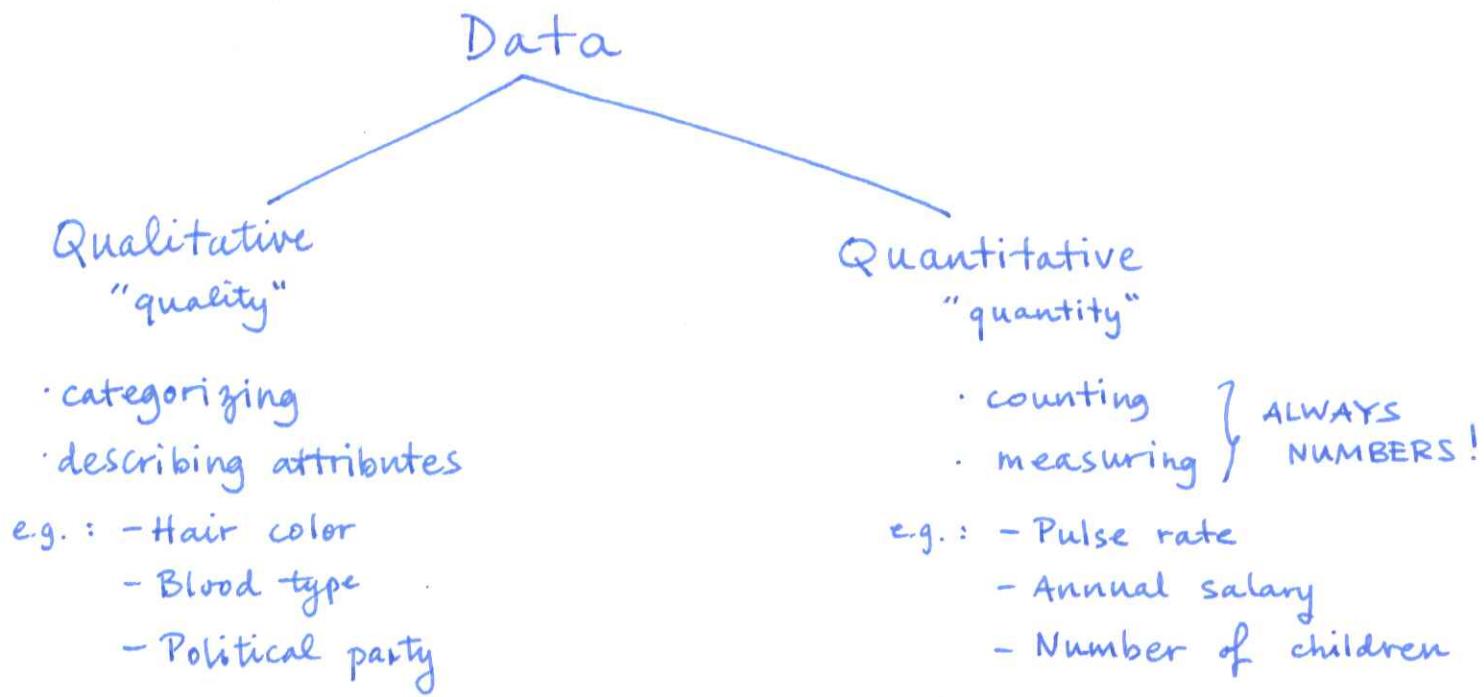
GROUP : "Try it", p.8 :

We want to know the mean amount of money spent on school uniforms each year by families with children at Knoll Academy (?). We randomly survey 100 families with children there. Three of the families spent $65, $75, and $95, respectively.

"Bonus" : What does "respectively" mean, used this way?

Take 4 minutes.

If you finish early, consider Example 1.3, p.9 :

# Data

## Qualitative
### "quality"

- categorizing
- describing attributes

e.g.:  – Hair color
       – Blood type
       – Political party

## Quantitative
### "quantity"

- counting    } ALWAYS
- measuring   } NUMBERS!

e.g.:  – Pulse rate
       – Annual salary
       – Number of children

### continuous

- result of measuring
- infinitely many digits of precision possible
- data on a spectrum

e.g.:  – Weight ∘⟨100│200⟩ 300 lb.

     – Voltage ∘⟨20v

     – Distance 〔1 2 3 4 5〕

Can have weight 154.3519728....
   – as accurately + precisely as someone can read the scale!!

### discrete

- result of counting
- finitely many digits of precision
- could only be certain values
- ("quantum" in physics)

e.g.:  – Counted values:
     # of houses on the street
     – Dollar amount spent on books

Can't have units less than one penny:
$75.345206...
is impossible!

<div style="border:1px solid">EXAMPLES<br>1.5, 1.6, p.11</div>

• The data are the number of books students carry in their backpacks. You sample five students, and obtain the data set:
$$\{ 3, 3, 4, 2, 1 \}.$$
↳ "curly" braces are standard notation for <u>sets</u> in math.

Are these data <u>discrete</u> or <u>continuous</u> quantitative data?

• If you instead collect the <u>weights</u> of the books that students carry, and obtain $\{ 6.2, 7, 6.8, 9.1, 4.3 \}$, are these discrete or cts.?

<div style="border:1px solid">GROUP:<br>(5 mins)</div> Try it, 1.6, p.11: Areas of lawns (in sq. ft.):
DISC. or CTS. ?

EX. 1.7, 1.8 if you finish:

Homework, p. 52-53:   probs. 43 - 63 ODD  (11 probs. total).

Pay attention to :

- Examples from Sections $\overset{1.1}{\cancel{1.2}}$ ; $\overset{1.2}{\cancel{1.3}}$ , p. 5-18

- Key terms, p. 45-46

- Chapter review (1.1 & 1.2), p. 46-47

- Practice problems, p. 47-48 (future chapters—
  starting at chapter 3 — have practice sol'ns printed
  in the book's appendices).

If your solutions are identical to those in the
various solution guides you may find online, you
will not receive credit for the assignment !!

Due Friday at beginning of class.