Ch 1-4 Math

Ch 5-10 Statistics

Statistics: The study of data collection, description, analysis and prediction.

5.1 Variables and Data

Population: The entire set of measurements of interest

e.g. salaries of all Canadians

Sample: A subset of the population

e.g. salaries of 1,000 Canadians

It would be impractical to measure all salaries.

Must ensure sample is representative (sample looks like population).

Variable: A characteristic that changes over time or from object to object.

Experimental Unit: Object on which a variable is measured.

Ex:

Student	Height (m)
Alice	1.51
Bob	1.83
⋮	

Experimental Unit: a student
Variable(s): Height

Ex: Temperature of a coffee over time.

Time	Temp (°C)
1:52pm	89
1:54pm	85
⋮	

Experimental Unit: the coffee
Variable(s): Time, Temperature

Ex: Cars in Parking Lot 3

Make	Model	Year
Toyota	Yaris	2007
Honda	Civic	2012
⋮		

Experimental Unit: a car
Variable(s): Make, Model, Year

Univariate data has one variable

e.g. Height
⋮

Bivariate data has two variables

e.g.

Time	Temp
⋮	

Multivariate data has more than two variables

e.g.

Make	Model	Year
⋮		

Quantitative variable: Measurement is a quantity.

e.g. height
time
number of students in a class

Qualitative variable: Measurement is not a quantity.

e.g. favourite season
make of a car

Quantitative variables have two types:
discrete and continuous.

Discrete variable: Can only have a countable number of values.

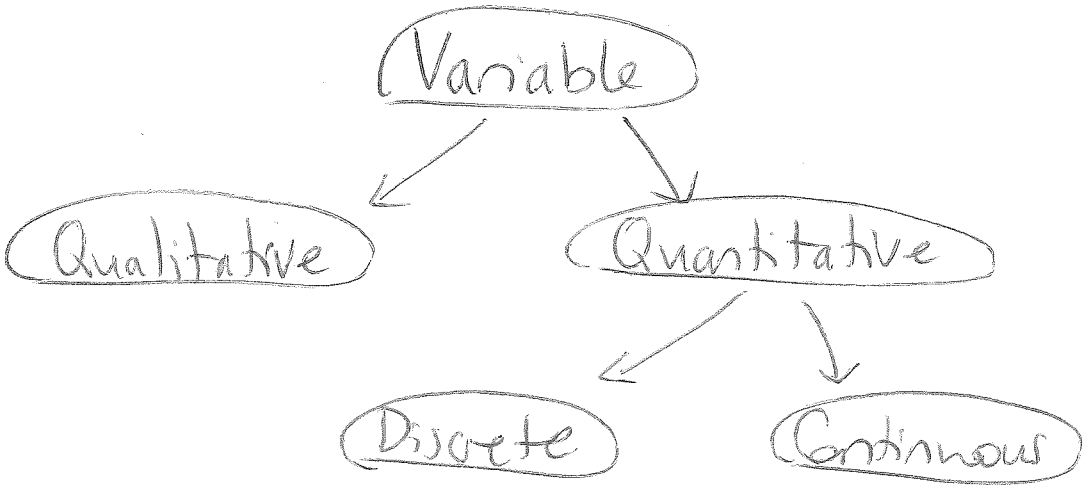
e.g. Number of students in a class is $0, 1, 2, \ldots$

Shoe size is $\ldots, 7, 7\frac{1}{2}, 8, 8\frac{1}{2}, \ldots$

Continuous variable: Can have infinitely-many decimal places.

e.g. Mass can be $8.314262\ldots$ kg
Temperature

If a variable is rounded then the measurements are discrete.
Mass of an apple (to nearest 0.1 kg): $0, 0.1, 0.2, \ldots, 1.8$
is a discrete variable.


Variable
Qualitative
Quantitative
Discrete
Continuous