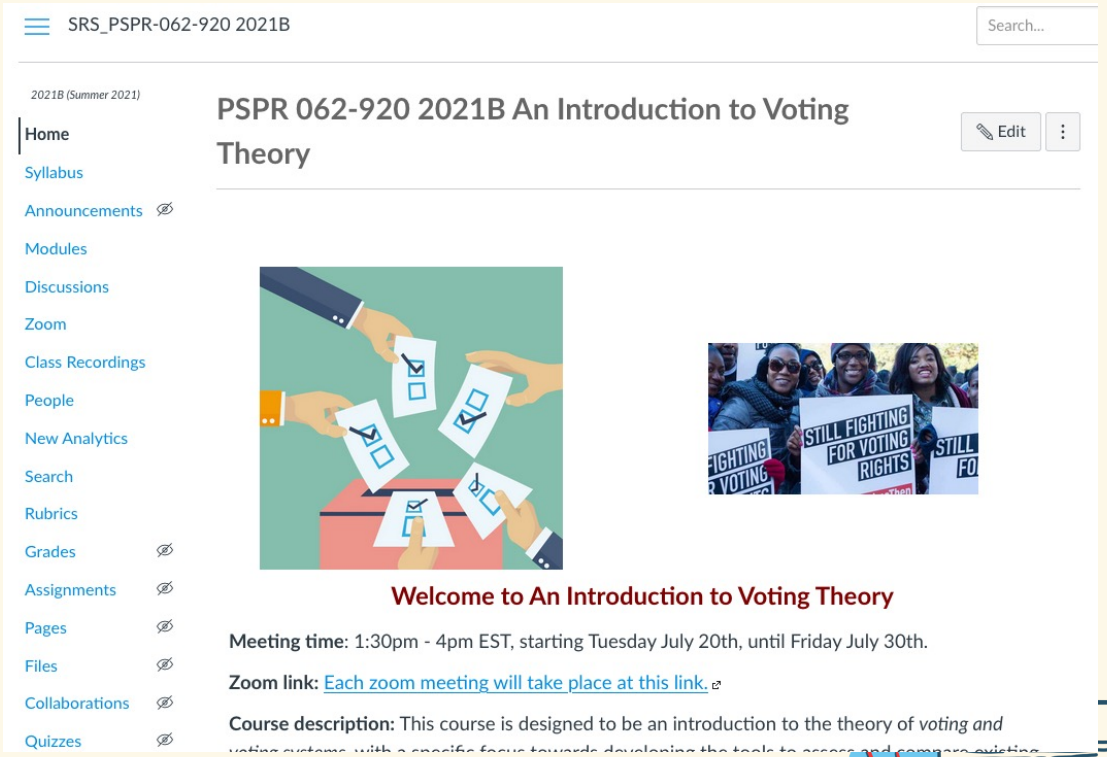
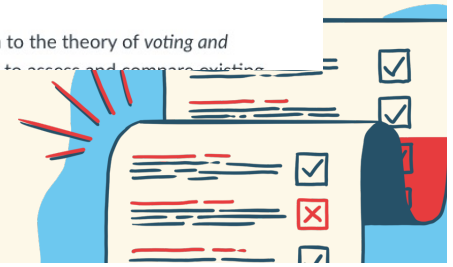
0. Intro

Canvas

Go to canvas.upenn.edu and make sure you have access to the Canvas page for this site.

- The ***syllabus*** will be posted under the "Syllabus" tab
- ***Lecture notes*** will be posted under "Modules"





Office hours

I will have regular office hours over Zoom – every day from ***4:30 to 5:30pm EDT***.

I really recommend coming if you can make it.

All communication will be done through Canvas, and will be sent out to your SAS email. So if you don't have access to Canvas or a UPenn email, let me know ASAP.

Class time + assignments

The plan for class time is as follows:

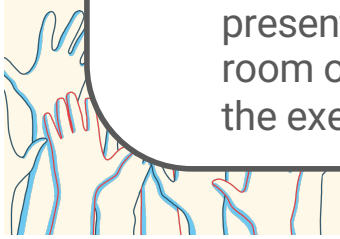
The night before, watch any videos that are sent out. Jot down any questions you might have.

- lecture + questions
- 10min break
- discussion or exercises in breakout rooms
- each breakout room presents to the main room on their solution to the exercises

Depending on how much time we have for breakout room exercises, we may leave a few questions as homework each night. These won't be collected or graded.

The main assignment for this class is a ***final presentation***. Each student will present on a voting system of their choice on Friday, July 30th for 5-10 mins over Zoom.

We will talk more about the final presentations at the end of this week, so don't stress about it now ☺



Among Us night

Monday, July 26th at 4:30-5:30pm EDT (instead of office hours).

Administrative questions?

What is voting theory? (a quick overview)

Voting

The act of ***voting*** is how we come to collective decisions or understandings based on lots of individual preferences.

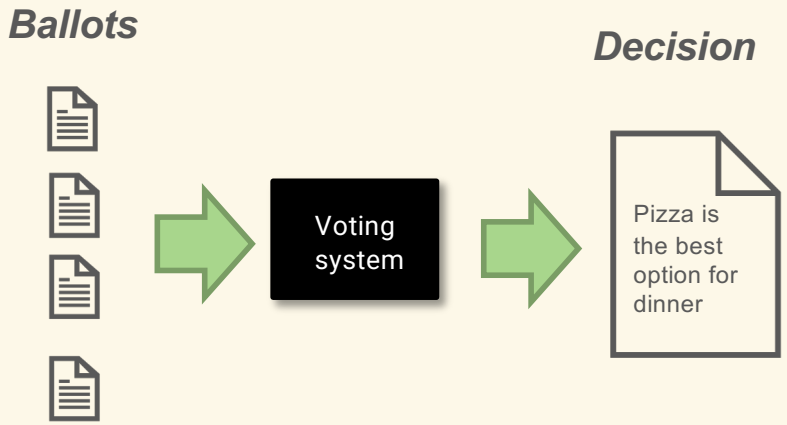
Examples:

1. A group of people want to decide where to go for dinner
2. A country of people want to elect someone to represent them (e.g. a president)
3. People leaving reviews for products on websites
4. RottenTomatoes or similar sites aggregating critic's opinions

Voting system

We're going to use the phrase "***voting system***" a lot over the course of this class.

We should think about a voting system as a black box or a mysterious machine, that inputs people's preferences (or ballots) and outputs some collective decision.



Voting systems can be:

well-known: "whoever gets the most votes wins"

confusing: "disregard the weakest pairwise defeat until one candidate is unbeaten"

goofy: "if there is only one candidate with red hair, they are the winner. if not, candidates fight to the death"

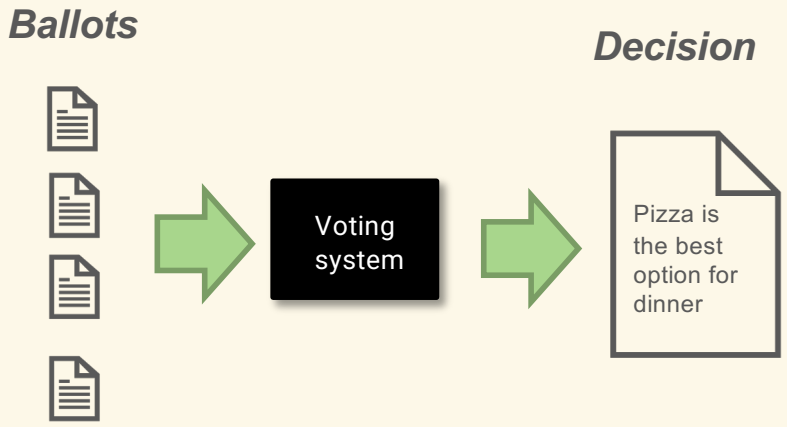
So our working definition of a ***voting system*** will be that it is *"any set of rules that decide an outcome given some input preferences"*

Even a bad or ridiculous set of rules.

A "***ballot***" on the other hand, we are also going to think of a bit more abstractly. Most likely when we think of ballots, we think of "mark your favorite candidate." Here are some other types of "ballots":

- put a checkbox next to all the candidates you like
- give each candidate a rank from 1 to 10
- you have 5 points to distribute amongst the candidates in any way you want
- write down the candidate you hate the most
- rank all the candidates in order from first to last
- draw a tree and put the candidates along the tree, with candidates you like closer to the base of the tree

Voting system



So our working definition of a ***ballot*** will be "any type of information that represents a voter's opinion or preferences."

Voting system

We are going to study voting systems in the same way we might study something in experimental physics.

We're going to feed data in, in the form of elections, and see what comes out the other side.

When we feed in certain elections, we might expect to see certain things come out. (for example if everyone votes for the same candidate, we should expect to have that candidate win). Think about this like a science experiment in a lab.

We will call these ***voting criteria***. Voting systems will either ***pass*** or ***fail*** these experiments, in which case we say they "***satisfy the criterion***" or they "***violate the criterion.***"