MA111: Contemporary mathematics

Entrance Slip (due 5 min past the hour):

Five friends are trying to decide on where to have lunch.

	Avery	Blair	Casey	Dee	Elisha
Favorite	Ovid's	Ovid's	Ovid's	K-Lair	K-Lair
Fine	K-Lair	K-Lair	K-Lair	Starbucks	Starbucks
Least	Starbucks	Starbucks	Starbucks	Ovid's	Ovid's

If they only go to one location for lunch, which location will make the group happiest? Explain why.

Schedule:

- HW 1 is due 7am Tuesday, Sep 9th, 2014
- Mini-exam 1 is in-class on Thursday, Sep 11th, 2014
- HW 2 is due 7am Tuesday, Sep 16th, 2014
- HW 3 is due 7am Tuesday, Sep 23rd, 2014
- Exam 1 is in-class on Thursday, Sep 25th, 2014

Today we try to get more specific with our rules

Schedule for today

- Please turn in your entrance slips. We will do this every non-exam day.
  Please bring your own 3x5 index cards.
- Work in groups of 3-6 (probably your table is 3, and you can combine 2 tables if you want)
- After 5 minutes will present some answers
- Next we'll get back into groups to critique the answers, and then present again
- Then I'll go over the old-ideas quickly
- Finally we have the exit quiz (last 10 minutes of class)

Activity: The winner depends on the rules

- Last class we had two very wise things said:
- We often want a medium candidate (not someone half-hated and half-loved)
- The majority rules (most of the time)
- On the quiz: which candidate was preferred by the majority?
- On the quiz: which was the medium candidate?

Old ideas and new meanings for old words

- Most of the homework will focus on old ideas (the exams will include our new ideas too)
- Sometimes the hardest part in answering a question is understanding what it is asking. What do the words mean?
- I want us all to have a common understanding of some words. You can think of them as a foreign language that only uses English words in funny ways.

Today's words

- A **ballot** is an ordered list of possibilities.
- A **preference schedule** counts how many ballots of each type there are.

	Avery	Blair	Casey	Dee	Elisha
Favorite	Ovid's	K-Lair	Starbucks	Ovid's	Starbucks
Fine	K-Lair	Ovid's	K-Lair	K-Lair	K-Lair
Least favorite	Starbucks	Starbucks	Ovid's	Starbucks	Ovid's

	2	1	2
1st	O	K	S
2nd	K	O	K
3rd	S	S	O

- I'll use words like "favorite" and "first place vote"

Three more words

- A **voting method** takes a preference schedule and returns a single ballot for the group
- The **plurality method** just counts first place votes. Whoever has the most "favorites" on the individual ballots will be the favorite on the group's summary ballot
- A **majority winner** is a possibility that has more than half of the first place votes.
- Groups that have a majority winner are much easier to summarize than ones that don't

Voting methods using points

- Give points for all votes (more for first, less for second, etc.), order choices by number of points
- **Standard borda count** gives 1 point for every choice at or below. So if 5 choices, 1st place gets 5, 2nd place gets 4, 3rd place gets 3, 4th place gets 2, and 5th place gets 1
- **Daisia's rule** gives 1 point for 1st, 1 point for 2nd, and none otherwise
- **"Soccer" variation** gives 3 for 1st, 1 for 2nd, and none otherwise.
- **Plurality** gives 1 point for 1st, and none otherwise

Elimination methods

- Elimination: Use a voting method to find the worst choice, eliminate it, and start over. Continue until you have a winner.
- **Standard elimination** uses plurality to choose the loser (least first place votes).
- **Robin's rule** requires us to eliminate anyone who has the majority of last place votes
- Reality TV typically eliminates most last place votes (even if not a majority)

Exit quiz

- A group is trying to decide on lunch.

Alex		Blake		Charlie		Dakota		Emory	
1st	O	1st	O	1st	O	1st	O	1st	K
2nd	K	2nd	K	2nd	K	2nd	K	2nd	S
3rd	S	3rd	S	3rd	S	3rd	S	3rd	O

- If they use the Soccer rule, how many points does each candidate get? Label them and circle the winner.
- If they use Daisia's rule, how many points does each candidate get? Label them and circle the winner
- How does Emory feel about the soccer rule?