MA111: Contemporary mathematics

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Schedule:

- Participation quiz on BB should be done **today** (and take like 30 seconds)
- HW 0B is due Wednesday, Aug 31st, 2011.
- HW 1A is due Friday, Sep 2nd, 2011.
- Exam 1 is Monday, Sep 12th, during class.

Today we will look at how voters can get more out of an election

Review: Ranking – Preference Schedule

- Math is unambiguous, so we need to **formalize** voting a little
- We think of voters as just **rankings** of the choices
- The decision should be made solely based on **how many voters have each ranking**
- We only need to write down the rankings and their popularity

Review: An example election

"Real life"

- There are three choices, Apple, Banana, and Cherry
- There are five voters, Rob, Stu, Ted, Uwe, and Val who have various feelings about fruit and are complicated human beings with history and context who make their decisions in an increasingly fast-paced and long-winded world

"First attempt at Math"

- Rob ranks them Apple, Banana, Cherry
- Stu ranks them Banana, Cherry, Apple
- Ted ranks them Apple, Banana, Cherry
- Uwe ranks them Cherry, Banana, Apple
- Val ranks them Apple, Cherry, Banana

Preference schedule:

2	1	1	1
A	A	B	C
B	C	C	B
C	B	A	A

Class-developed alternatives (too brief but cool)

- Section 6 developed some very good summaries of voters
- Ali T's group had a clear majority favorite and a clear majority least favorite, so they used that as their summary
- Kavin's group recorded a square table.

Instead of

	2	1	1	1
1st	A	A	B	C
2nd	B	C	C	B
3rd	C	B	A	A

they had

	A	B	C
1st	3	1	1
2nd	0	3	2
3rd	2	1	2

- Two other groups chose the most popular entry from each row:

	A	B	C
1st	**3**	1	1
2nd	0	**3**	2
3rd	2	1	**2**

to get

1st	A	(3/5)
2nd	B	(3/5)
3rd	C	(2/5)

Great we have the summary, what now?

- Ok, let's look at a simple election:

	35	33	32
1st	A	B	C
2nd	B	C	B
3rd	C	A	A

- If everyone just votes for their favorite, who wins?

Great we have the summary, what now?

- Ok, let's look at a simple election:

	35	33	32
1st	A	B	C
2nd	B	C	B
3rd	C	A	A

- If everyone just votes for their favorite, who wins?

- How many people prefer B to win?

Great we have the summary, what now?

- Ok, let's look at a simple election:

	35	33	32
1st	A	B	C
2nd	B	C	B
3rd	C	A	A

- If everyone just votes for their favorite, who wins?
- How many people prefer B to win?
- "Is that fair?"

Great we have the summary, what now?

- Ok, let's look at a simple election:

	35	33	32
1st	A	B	C
2nd	B	C	B
3rd	C	A	A

- If everyone just votes for their favorite, who wins?
- How many people prefer B to win?
- "Is that fair?" is kind of whiney
- "Can we do something about it?" might change things
- Can those 32 C-B-A people do something to "fix" the election?

Can you do it?

- Now that we realize not everybody tells the truth in politics, can we still win?
- Divide into groups of 8-10 (first three rows, then split down the middle and aisles) and decide how your group is going to vote to get the best outcome
- Here are your rankings:

1st	A	A	B	B	C	C	D	D
2nd	B	C	C	C	A	B	B	B
3rd	C	D	A	D	B	D	A	C
4th	D	B	D	A	D	A	C	A

- If your first place winner wins, you get full points; if your second place winner wins, you get 90%; then 80%; then 70%

Sample election

- Here is another election where it is not clear who to throw your support in with:

12	12	6	3
B	D	A	D
C	A	C	C
A	C	B	B
D	B	D	A

- Divide into groups of 8-10 and determine an argument for your assigned candidate to win.

Homework

- Participation (15%): There is a quiz on blackboard, under **Assignments**. Should do it today. Due by Tuesday.
- Participation (15%): There is a survey repeating our election activity, but you are in a random group. Can you still win?
- Read section 1.2 of the textbook.
- Online homework (30%):
  - 0B is due Wednesday.
  - 1A is due Friday. Should do it today.