Intro to Contemporary Math Voting Review

Nicholas Nguyen nicholas.nguyen@uky.edu

Department of Mathematics UK

September 19, 2016

Agenda

- ► Exam Format
- ► Review

WebWork

► The fourth homework assignment (HW3) is due tonight.

Exam Format

Two parts:

- ▶ 16 Multiple Choice questions
 - ► No partial credit
 - Record answers on front page of exam
- Short Answer (SA) questions
 - ▶ Length of SA is about same as mini-exam

What to Expect

- Know how the various voting methods work.
- Know what the fairness criteria are and how to test if they are satisfied or violated.
 - For each criterion, know what it means to violate or always satisfy it.

In the preference schedule, which columns give Candidate A 2 Borda points per vote?

Α	Α	В	В	С	С
В	С	Α	С	Α	В
С	В	C	Α	В	Α

- a) Columns 1 and 2
- b) Columns 3 and 4
- c) Columns 3 and 5
- d) Columns 4 and 6
- e) Columns 5 and 6

In the preference schedule, which columns give Candidate A 2 Borda points per vote?

Α	Α	В	В	С	С
В	С	Α	С	A	В
С	В	С	Α	В	Α

- a) Columns 1 and 2
- b) Columns 3 and 4
- c) Columns 3 and 5
- d) Columns 4 and 6
- e) Columns 5 and 6

If Candidate A is eliminated, which column will give C additional first place votes?

Α	Α	В	В	С	С
В	С	Α	С	Α	В
С	В	C	Α	В	Α

- a) Column 1
- b) Column 2
- c) Column 3
- d) Column 4
- e) No column

If Candidate A is eliminated, which column will give C additional first place votes?

Α	Α	В	В	С	С
В	C	Α	С	Α	В
С	В	С	Α	В	Α

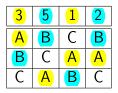
- a) Column 1
- **b)** Column 2
- c) Column 3
- d) Column 4
- e) No column

In the A vs. B comparison, how many voters would be in A's camp?

3	5	1	2
Α	В	С	В
В	С	Α	Α
С	Α	В	С

- a) 2
- b) 3
- c) 4
- d) 6
- e) 7

In the A vs. B comparison, how many voters would be in A's camp?



- a) 2
- b) 3
- c) 4
- d) 6
- e) 7

An election with four candidates A, B, C, and D was won by Candidate D. A ballot that originally had D in last place was changed during testing for compliance with the Monotonicity criterion. The new ballot reads D, B, A, C. Which of these is the original ballot before the change?

- a) A, B, C, D
- b) B, C, A, D
- c) C, A, B, D
- d) B, A, C, D
- e) B, A, D, C

An election with four candidates A, B, C, and D was won by Candidate D. A ballot that originally had D in last place was changed during testing for compliance with the Monotonicity criterion. The new ballot reads D, B, A, C. Which of these is the original ballot before the change?

- a) A, B, C, D
- b) B, C, A, D
- c) C, A, B, D
- d) B, A, C, D
- e) B, A, D, C

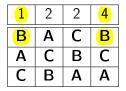
MC Example 4 (Explanation)

Ballot changes must preserve the order of the losing candidates. Since the new ballot reads D, B, A, C, the correct choice must have B before A, and A before C.

The following election uses an unknown method. You will use this election to test this method against the MA criterion.

1	2	2	4
В	Α	С	В
Α	С	В	С
С	В	Α	Α

▶ Which candidate got over 50% of the first place votes? Press the candidate's letter.



► Candidate B got over 50% (5 out of 9) first place votes. That makes Candidate B the majority candidate.

- ▶ If A is the winner, does this test show:
- a) violation
- b) satisfaction
- c) (nothing) inconclusive

▶ If A is the winner, does this test show:

a) violation

B is the majority candidate, but someone else, A, was declared the winner. This violates the MA criterion, which says B should win.

- ▶ If B is the winner, does this test show:
- a) violation
- b) satisfaction
- c) (nothing) inconclusive

- ▶ If B is the winner, does this test show:
- c) (nothing) inconclusive

 Just because the majority candidate B won this time does not tells us if they can lose in a different election or win in all elections.

Next time

- ► The exam is this Wednesday. Bring a calculator that is not a cell phone.
- ▶ The fourth homework assignment is due tonight.