# Unit 5 Day 1
# 1.1 and 1.2

## Plurality, Borda Method, Runoff Method, & Sequential Runoff

# Grab a Unit 5 Election Theory Packet!

## Write down tonight's HW:
## Packet p. 1-3

# Warm-Up: Homecoming King and Queen Elections

You have been chosen to serve on the committee that decides who this year's Homecoming King and Queen will be. As a committee, you have already determined the three sets of finalists to be, in no particular order, Alan and Alice, Bob and Betty, and Carl and Cathy. Please note that all finalists are seniors. Furthermore, you have already held elections through class meetings and have collected the following results:

|  | **Freshmen** | **Sophomores** | **Juniors** | **Seniors** |
|---|---|---|---|---|
| **1st** | Alan/Alice | Bob/Betty | Carl/Cathy | Carl/Cathy |
| **2nd** | Bob/Betty | Alan/Alice | Bob/Betty | Bob/Betty |
| **3rd** | Carl/Cathy | Carl/Cathy | Alan/Alice | Alan/Alice |
| **class size** | 60 students | 50 students | 40 students | 30 students |

You'll look at how the couples should be ranked as an individual and a small group, then as a class….

# Warm-Up: Homecoming King and Queen Elections

|  | **Freshmen** | **Sophomores** | **Juniors** | **Seniors** |
|---|---|---|---|---|
| **1st** | Alan/Alice | Bob/Betty | Carl/Cathy | Carl/Cathy |
| **2nd** | Bob/Betty | Alan/Alice | Bob/Betty | Bob/Betty |
| **3rd** | Carl/Cathy | Carl/Cathy | Alan/Alice | Alan/Alice |
| **class size** | 60 students | 50 students | 40 students | 30 students |

1. In your opinion, which couple should be Homecoming King and Queen? Who would finish 2nd and 3rd? Justify your answer.

In your group:

2. Compare the results within your group. Does everyone have the same result? Discuss your reasoning. Were there reasons that you did not take into account? Do you feel that these reasons are valid?

3. As a group, come to consensus as to which couple should finish 1st, 2nd, and 3rd. Explain, in detail, the method your group used in determining this order.

**Decision Making** is an important part of life.

You will make many important **individual** decisions.

But, in our society we make many decisions as a **group**.

So, how are the wishes of many individuals combined to yield a single result?

Examples of **Group Decision Making**:

1. Political Offices
2. Nielson TV Ratings
3. Heisman Trophy
4. Olympics Venue

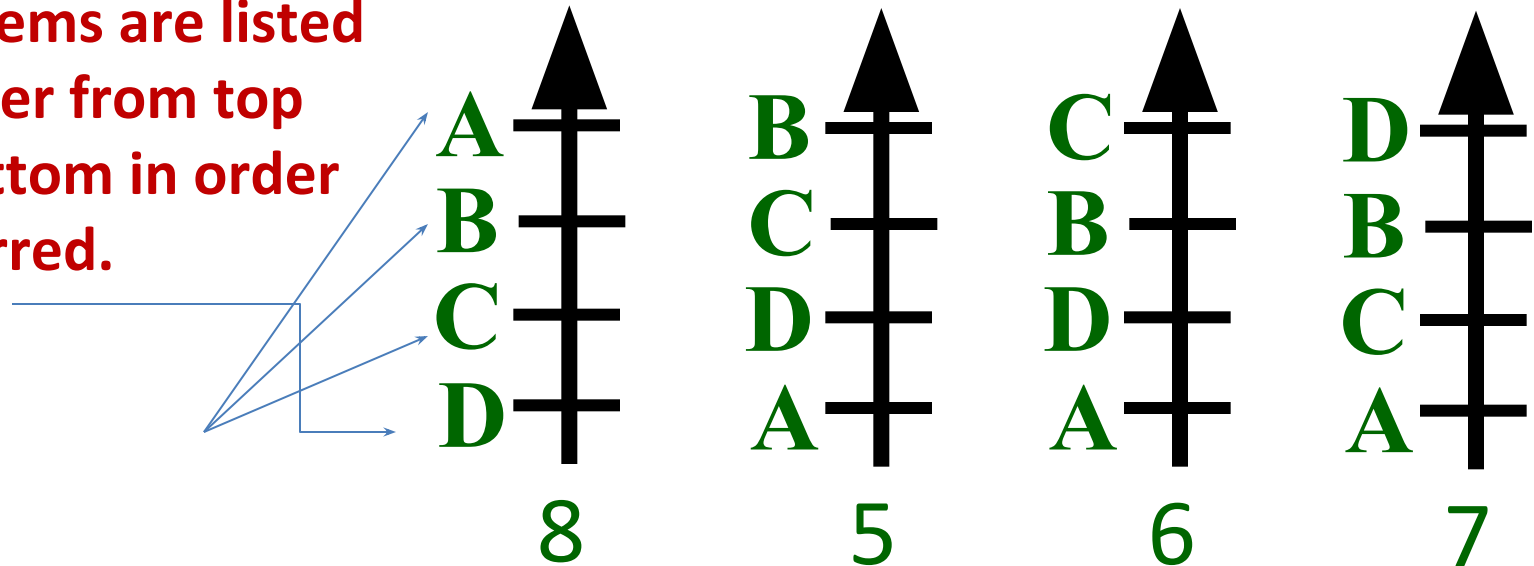# Are Group Decisions FAIR?

# Unit 6 Notes Day 1: Election Methods

# Preference Schedules

- A way to represent the preferences of one or more individuals.

- Ex.

**The items are listed in order from top to bottom in order preferred.**

| 8 | 5 | 6 | 7 |
|---|---|---|---|
| A | B | C | D |
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |

Total # of voters = 8 + 5 + 6 + 7 = **26**

# Preference Schedules

When your class members voted, they ranked the couples from first through third.

However, voters in most U.S. elections do not get to rank candidates. Do you think allowing voters to rank candidates would be a good practice? Explain.

# **Preference Schedules**

- How many preference schedules are possible if there are 4 choices?

$$4! \text{ or } 4 \times 3 \times 2 \times 1 =$$
$$24 \text{ total preference schedules}$$

- If there are 5 choices? 6 choices? 7 choices?

$$5! = 120 \qquad 6! = 720 \qquad 7! = 5040$$

# 1.2: Group Ranking Methods and Algorithms

# Plurality

**Winner is determined by who has the most 1$^{st}$ place votes**

| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
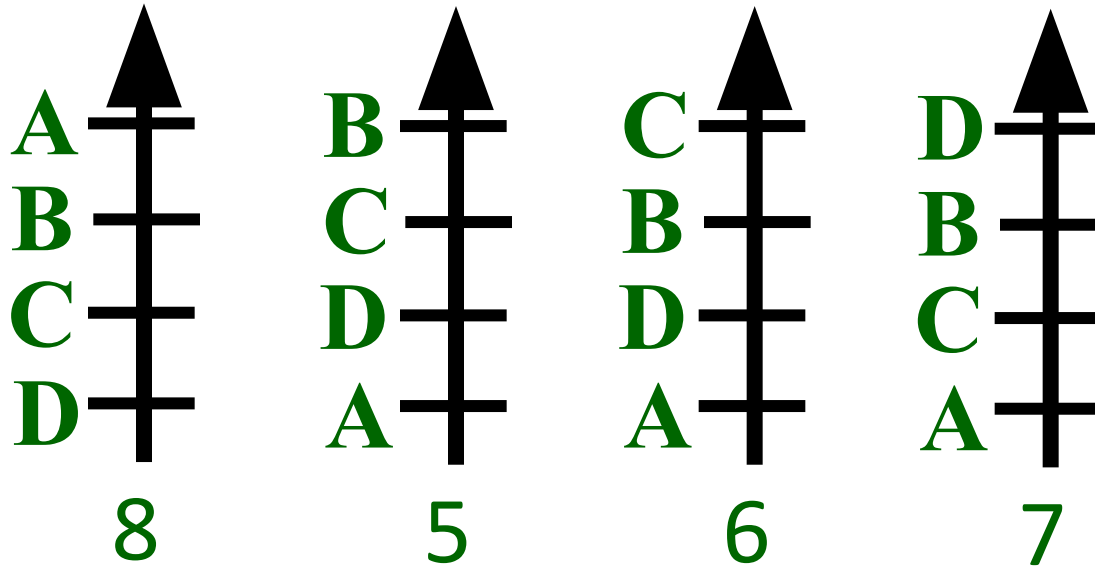
**The <u>Plurality</u> winner is A with 8 first-place votes.**

**Notice that's only 30.8% of the votes ( 8 out of 26 ).**

# Majority

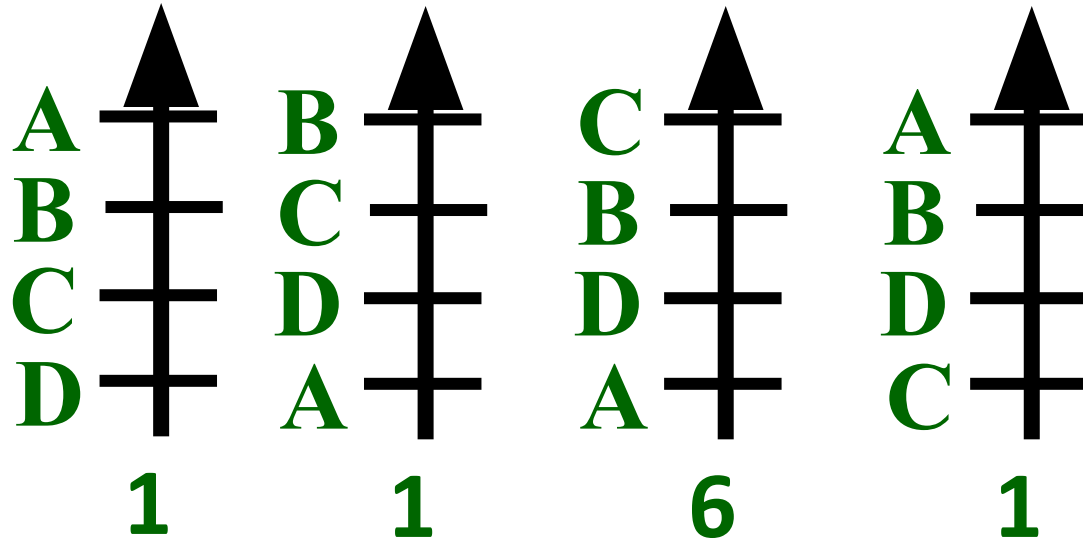**Candidate with _over_ ½ the 1ˢᵗ place votes wins**

– **There is not always a majority winner**

| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| **8** | **5** | **6** | **7** |
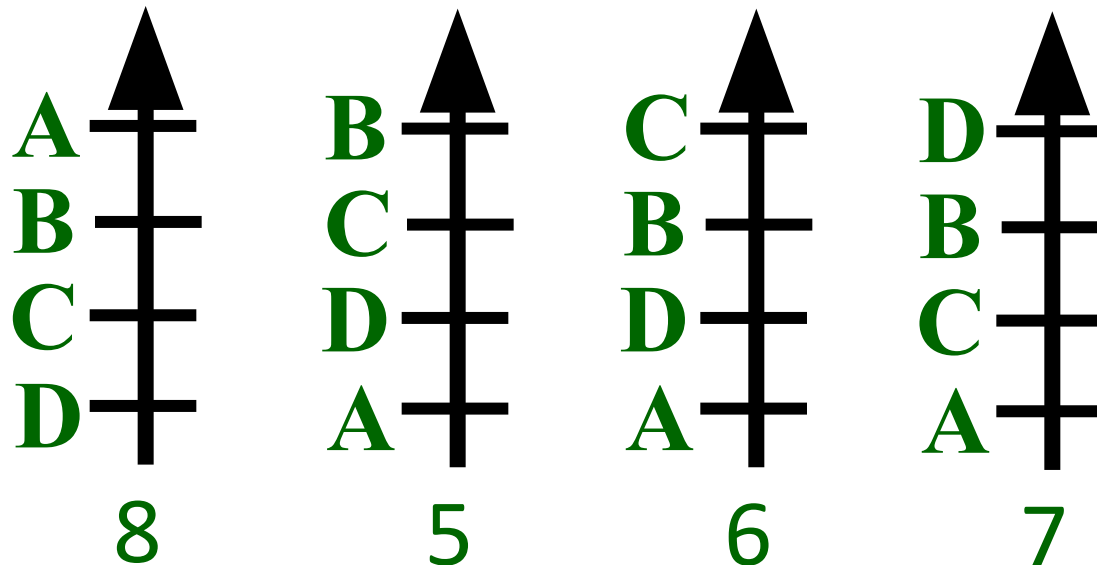
– **How many votes would be needed for there to be a majority winner?**

**14**

# Example:

| A | B | C | A |
|---|---|---|---|
| B | C | B | B |
| C | D | D | D |
| D | A | A | C |
| **1** | **1** | **6** | **1** |

__**C**__ is a <u>plurality</u> winner and <u>majority</u> winner.

# Borda Method

Assigning points to develop a ranking is called the BORDA Method or BORDA Count.

It is named for Jean-Charles de Borda, a French cavalry officer, naval captain, mathematician and scientist. He preferred a method that assigned points to rank individuals because he was dissatisfied with the plurality method.

- Determine the winner by assigning point values to $1^{st}$, $2^{nd}$, $3^{rd}$, and $4^{th}$ place votes.
- With 4 places it will look like this:
  - $1^{st}$ place vote    ☐ 4 points
  - $2^{nd}$ place vote    ☐ 3 points
  - $3^{rd}$ place vote    ☐    2 points
  - $4^{th}$ place vote    ☐    1 point

# Ex 1: Borda Count

| | | | |
|---|---|---|---|
| A | B | C | D |
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
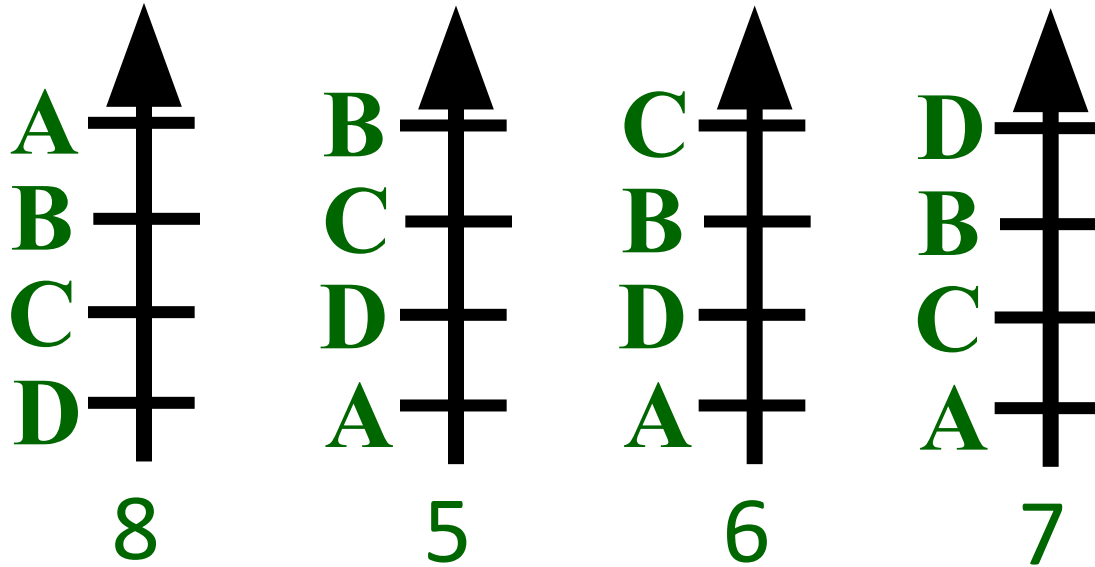
Notice: The plurality winner, A, does not bode well here…

A:

B:

C:

D:

# Ex 1 ANSWERS: Borda Count



| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
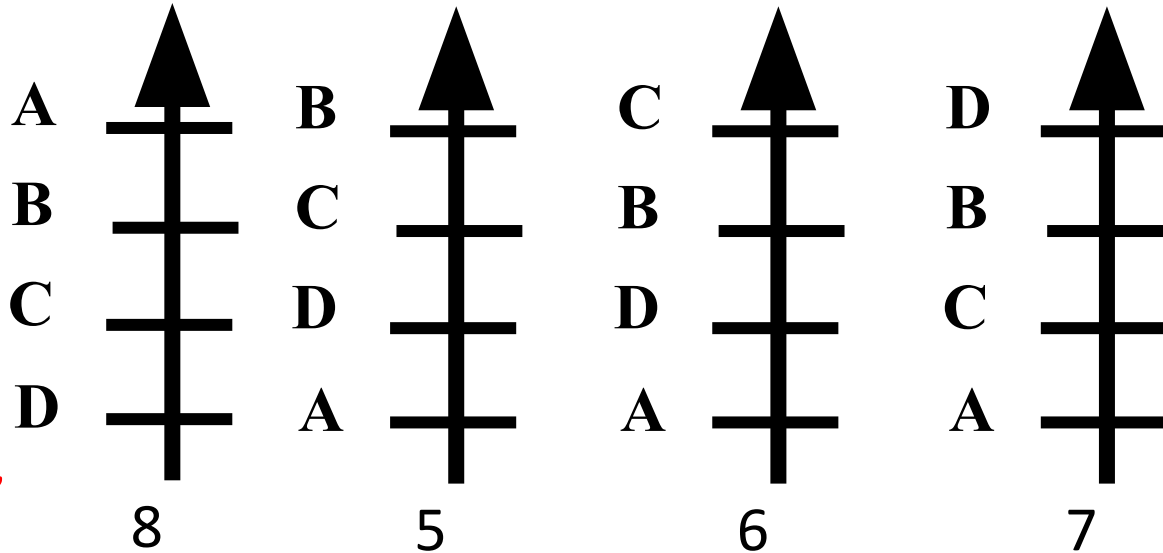
**Notice: The plurality winner, A, does not bode well here…**

A: $8(4) + 5(1) + 6(1) + 7(1) = 50$

B: $8(3) + 5(4) + 6(3) + 7(3) = 83$

C: $8(2) + 5(3) + 6(4) + 7(2) = 69$

D: $8(1) + 5(2) + 6(2) + 7(4) = 58$

# EX. 2 YOU TRY!

| | Number of votes received | | | |
|---|---|---|---|---|
| Place | 390 | 360 | 300 | 450 |
| 1st | Shawn | Gail | Gail | Ricco |
| 2nd | Twanda | Twanda | Twanda | Twanda |
| 3rd | Ricco | Ricco | Shawn | Shawn |
| 4th | Gail | Shawn | Ricco | Gail |

Using the Borda Count Method, determine the total number of points awarded to the following candidates in this election

1. Shawn
2. Gail
3. Twanda
4. Ricco



6. Using the Borda Count Method, who wins this election?

7. Who is the plurality winner?  Why?

8. Who is the majority winner?  Why?

# Runoff

- **Often used when there is no majority winner.**

- **Many elections require a majority winner. If there is no majority winner, a run-off election between the top two candidates is held.**

- **To conduct a runoff, determine the number of firsts for each choice.**

- **Then narrow the selection to the top TWO candidates.**

- *Negative Aspects***:**
  - **Time consuming and costly.**
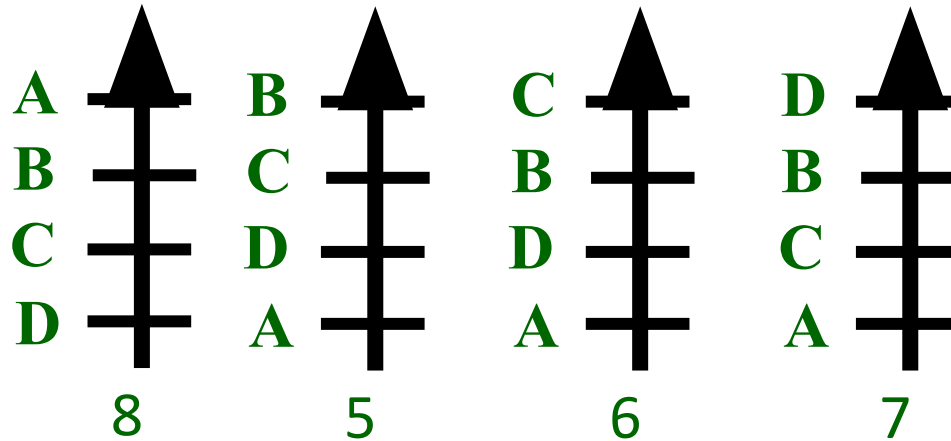  - **Lower voter turnout the second time around.**

# Example: Runoff

| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
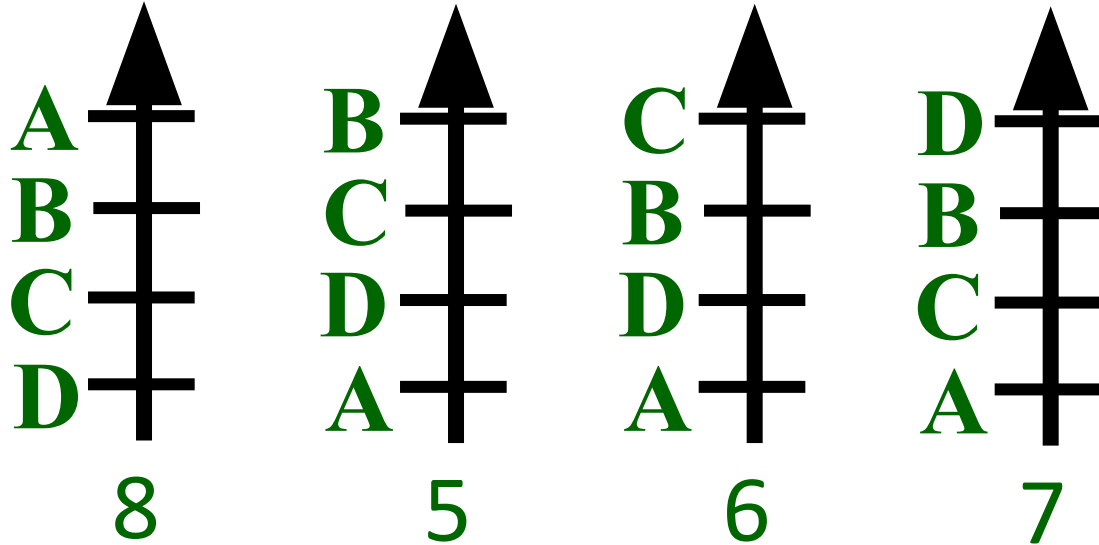
- **Is there a majority winner?**
- **Who are the top two candidates?**

- **Eliminate the other candidates and compare again!**

| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
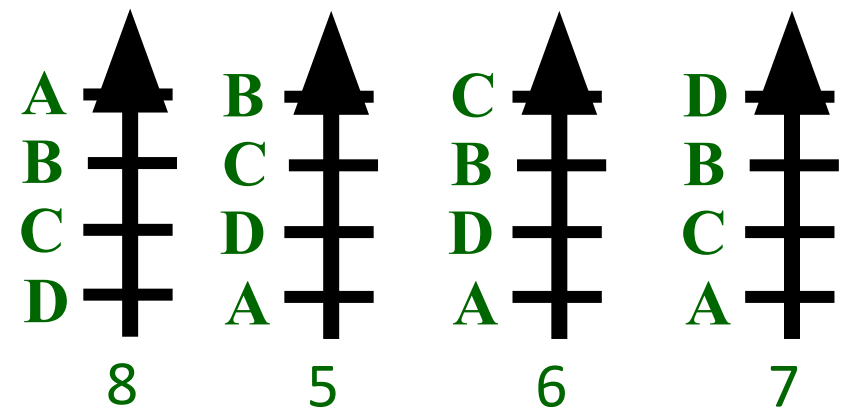
- **Now A has _____ 1$^{st}$ place votes and D has _____ 1$^{st}$ place votes, so the winner is _____!**

# Example ANSWERS: Runoff

| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |

- **Is there a majority winner?** **No**
- **Who are the top two candidates?**

  **A with 8 first place votes and D with 7 first place votes**

- **Eliminate the other candidates and compare again!**

| ~~A~~ | ~~B~~ | ~~C~~ | ~~D~~ |
|---|---|---|---|
| ~~B~~ | ~~C~~ | ~~B~~ | ~~B~~ |
| ~~C~~ | ~~D~~ | ~~D~~ | ~~C~~ |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
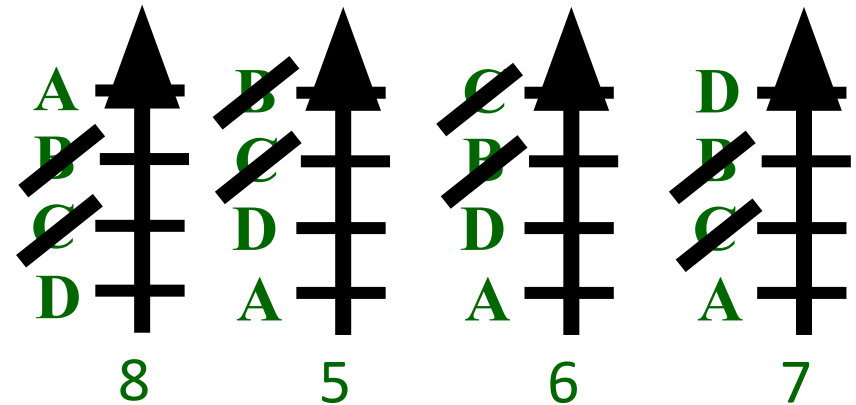
- **Now A has __8__ 1st place votes and D has __18__ 1st place votes, so the winner is __D__ !**

# USE EX. 2 FROM EARLIER…

| Place | Number of votes received | | | |
|-------|------|------|------|------|
| Place | 390 | 360 | 300 | 450 |
| 1st | Shawn | Gail | Gail | Ricco |
| 2nd | Twanda | Twanda | Twanda | Twanda |
| 3rd | Ricco | Ricco | Shawn | Shawn |
| 4th | Gail | Shawn | Ricco | Gail |

## FIND THE RUNOFF WINNER



Ricco wins with 840 votes!

# Sequential Runoff

Some elections, such as the voting to determine the site for the Olympic Games, are conducted by a variation of the runoff method that eliminates one choice at a time.

| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |

Eliminate _____ because it has the least amount of 1$^{st}$ place votes. Then reevaluate.

Now _____ has the least amount of 1$^{st}$ place votes. (After B is eliminated, C has 11 1$^{st}$ place votes) So, eliminate D. Reevaluate again.

Lastly _____ has the fewest 1$^{st}$ place votes. So, _____ is the winner.

# Sequential Runoff ANSWER

Some elections, such as the voting to determine the site for the Olympic Games, are conducted by a variation of the runoff method that eliminates one choice at a time.
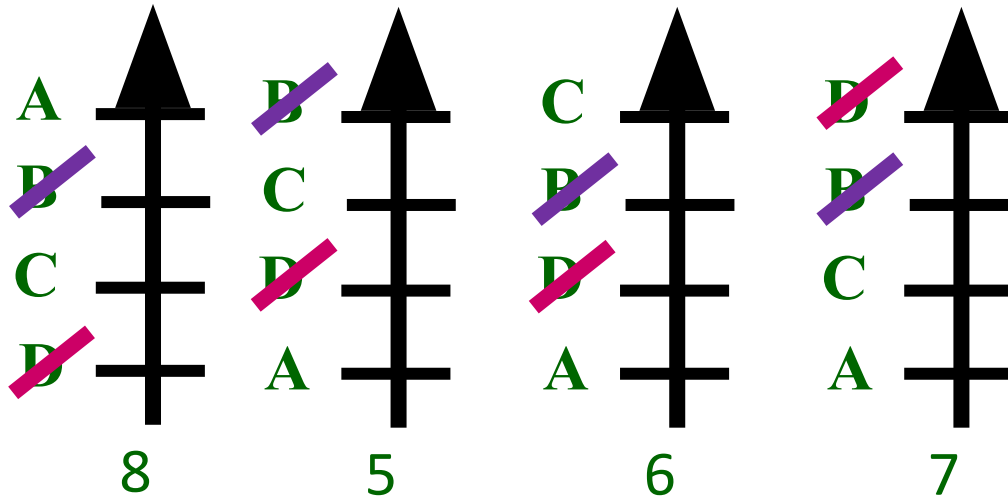
| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
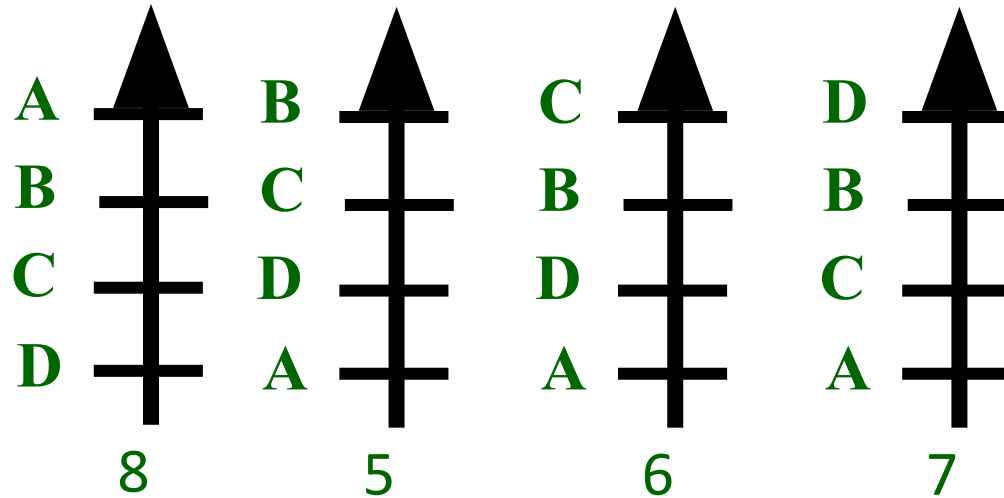
Eliminate __B__ because it has the least amount of 1$^{st}$ place votes. Then reevaluate.

Now __D__ has the least amount of 1$^{st}$ place votes. (After B is eliminated, C has 11 1$^{st}$ place votes) So, eliminate D. Reevaluate again.

Lastly __A__ has the fewest 1$^{st}$ place votes. So, __C__ is the winner.

# FIND THE SEQUENTIAL RUNOFF WINNER

| | Number of votes received | | | |
|---|---|---|---|---|
| Place | 130 | 120 | 150 | 100 |
| 1st | Grizzlies | Indians | Broncos | Jets |
| 2nd | Hoosiers | Broncos | Hoosiers | Grizzlies |
| 3rd | Broncos | Jets | Grizzlies | Hoosiers |
| 4th | Indians | Grizzlies | Jets | Indians |
| 5th | Jets | Hoosiers | Indians | Broncos |

Broncos win with 270 votes!

# Bringing it all together…
## So who was the *real* winner?

| A | B | C | D |
|---|---|---|---|
| B | C | B | B |
| C | D | D | C |
| D | A | A | A |
| 8 | 5 | 6 | 7 |
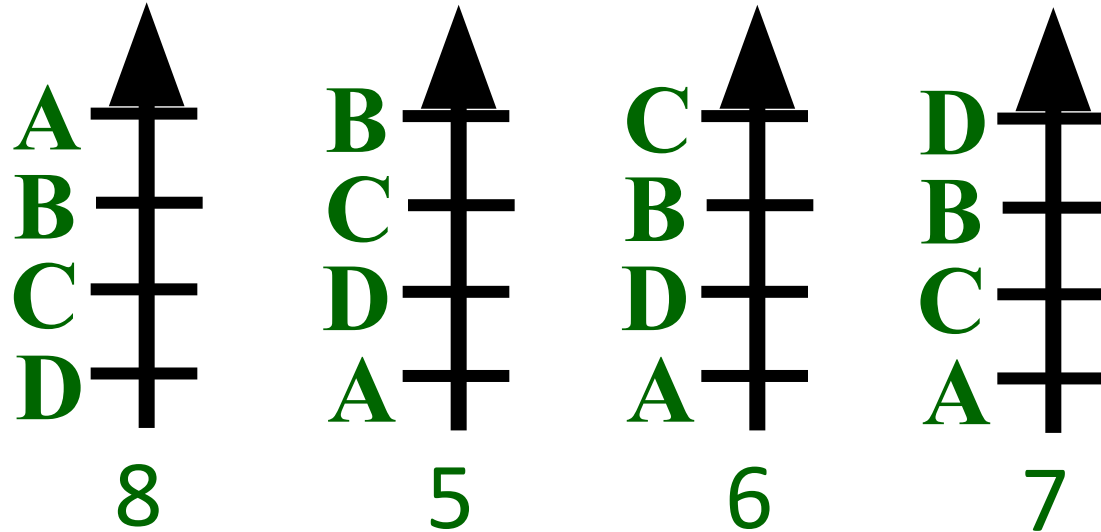
- Plurality Winner:  A
- Majority Winner:  None
- Borda Winner:  B
- Runoff Winner:  D
- Sequential Runoff Winner:  C
- ????

And the winner is….

# PRACTICE: KAHOOT

## GO TO KAHOOT.IT ON YOUR DEVICE. 😊

https://play.kahoot.it/#/k/2626a720-72c4-41bf-9dd4-dd0e49005adf

# HOMEWORK: PACKET P.1-3

# NEXT UP:  OLD SLIDES…
# MAYBE USE IN FUTURE

# Get in groups of 4
## Each group will randomly chose a candidate to research

**Presidential Candidate**

Hillary Clinton

Donald Trump

Gary Johnson

Jill Stein

**Vice Presidential Candidate**

Tim Kaine

Mike Pence

Bill Weld

Ajamu Baraka

Groups will research your candidate and present to the class why your candidate should be elected. This can be done in whatever manner you choose but must remain in good taste.

Topics should include but are not be limited to:

Give a brief background description of the candidate. Where are they from? What party? What is their role in politics?

- The economy
- Job growth          Be specific!
- Immigration
- Education

Groups should write down their findings on the given handout and turn them in at the end of their presentation.

- Summarize why your candidate should be elected at the end of your presentation

**Decision Making** is an important part of life.

You will make many important **individual** decisions.

But, in our society we make many decisions as a **group**.

So, how are the wishes of many individuals combined to yield a single result?

Examples of **Group Decision Making**:

1. Political Offices
2. Nielson TV Ratings
3. Heisman Trophy
4. Olympics Venue

# Are Group Decisions FAIR?

# Rank the Candidates

On your ballot, list the candidates in this order and rank them in order from 1 to 4.

**President** on one side and **Vice President** on the other side.

**Presidential Candidate**

Hillary Clinton _____

Donald Trump _____

Gary Johnson _____

Jill Stein _____

**Vice Presidential Candidate**

Tim Kaine _____

Mike Pence _____

Bill Weld _____

Ajamu Baraka _____

# Election Ballots

**Your ballot has the following Presidential Candidates listed.**

Donald Trump, Hillary Clinton, Jill Stein, Gary Johnson

**Your group's task is to devise <u>2 different methods</u> of combining the rankings of all the individuals in your class into a single class ranking. Your group's methods should produce a 1st, 2nd, 3rd, and 4$^{th}$ place Presidential candidate for the entire class.**

**Describe each method that your group used to obtain the ranking.**

**Each group will present their methods to the class.**

**Strive for clarity when making your presentation.**

| Use tally marks | 1st | 2nd | 3rd | 4th |
| --- | --- | --- | --- | --- |
| Clinton | | | | |
| Trump | | | | |
| Johnson | | | | |
| Stein | | | | |

# Presidential Candidate Ballots

 Did all the group rankings produced in our class have the same candidate ranked 1st?  If not, which candidate  was ranked 1st most often? 2nd? 3rd? 4th?

 Did anyone in the class use a method similar to yours? Explain why you think they were similar.

 Did any of your methods result in any ties?  How could you modify your method to break a tie?

 Do you think the ranking your methods produced are fair? Do all group members think it is fair?  Explain.