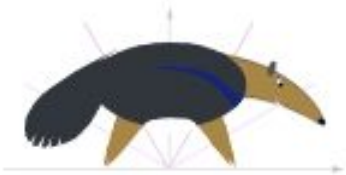

UC IRVINE MATH CEO

Community Educational Outreach

Meeting 6 Student's Booklet

Election Season

November 2, 2016 @ UCI

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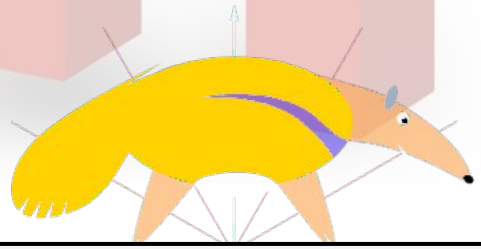
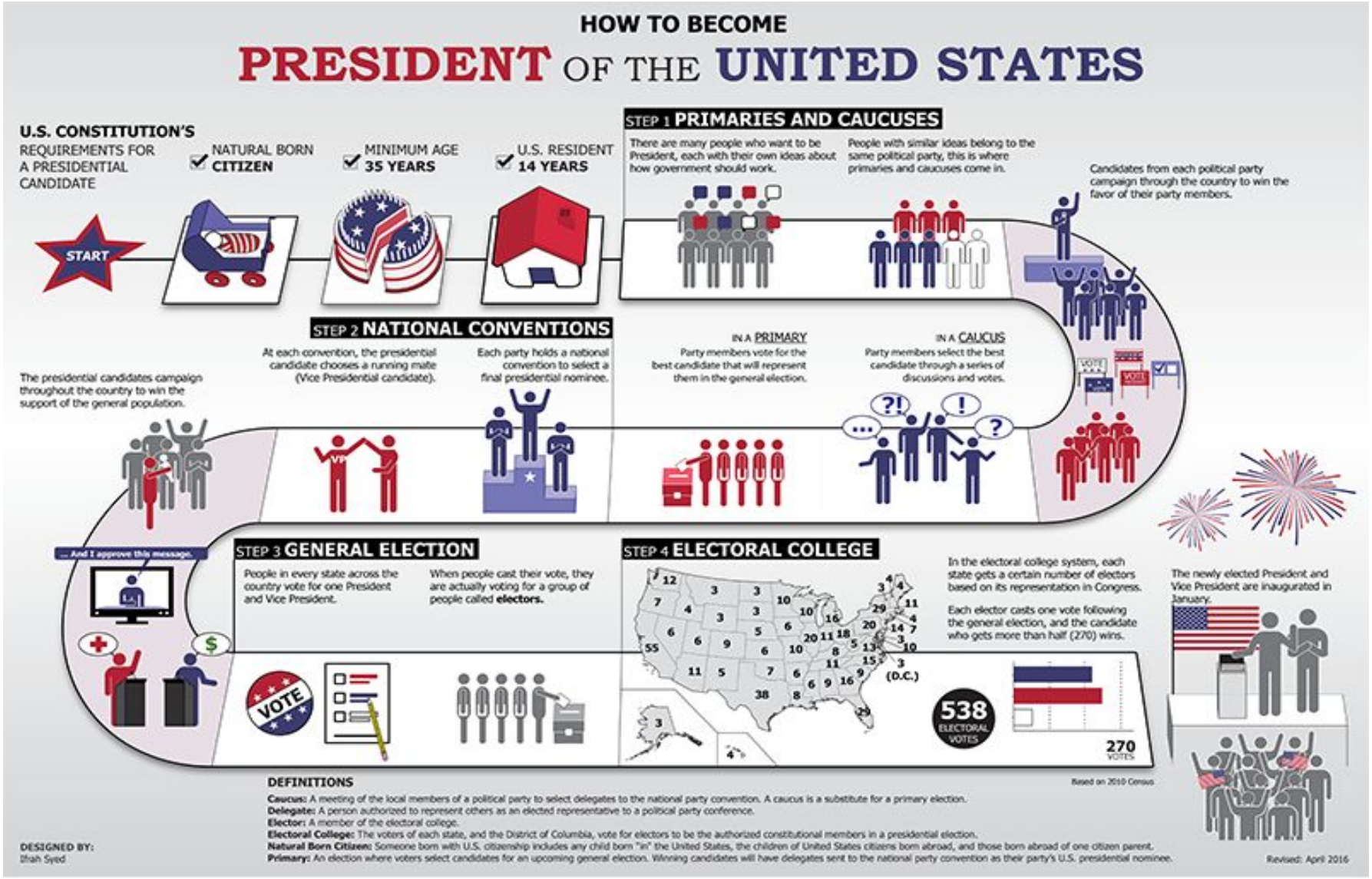


UC IRVINE MATH CEO

http://www.math.uci.edu/mathceo/

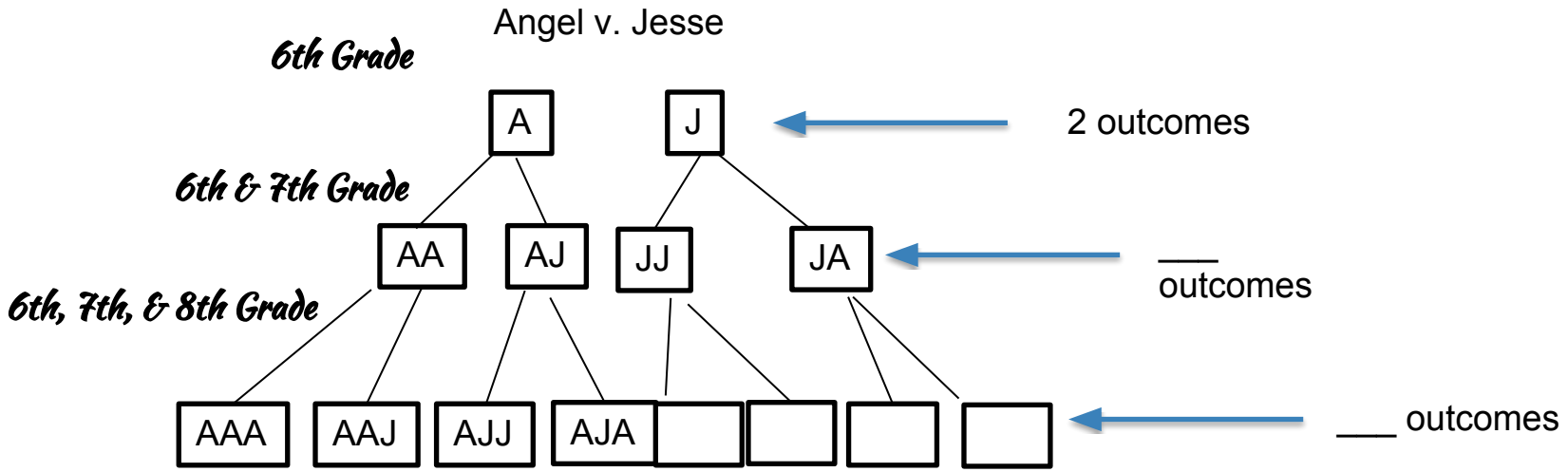


[Election Video (1)]

[Election Video (2)]

1 School Election

Angel and Jesse are both running for school president. In this election, they are competing for the votes from 6th, 7th, & 8th graders. We won't count individual votes, but we will count winning an entire grade level. This means only one person can win a grade level, so there are many possibilities! Look at the different possibilities they can achieve below and find out the rest of the information.



What pattern or rule do you see between the number of elections and the number of outcomes?

_____

_____

School Elections

a) Is it possible to have a tie between these two candidates when only 6th, 7th, and 8th graders vote?

b) What percentage of all the outcomes does Angel win?

c) What percentage of all the outcomes does Jesse win?

School Elections

c) How many outcomes can there be if we included 4^{th} and 5^{th} graders?

d) Can there be a tie?

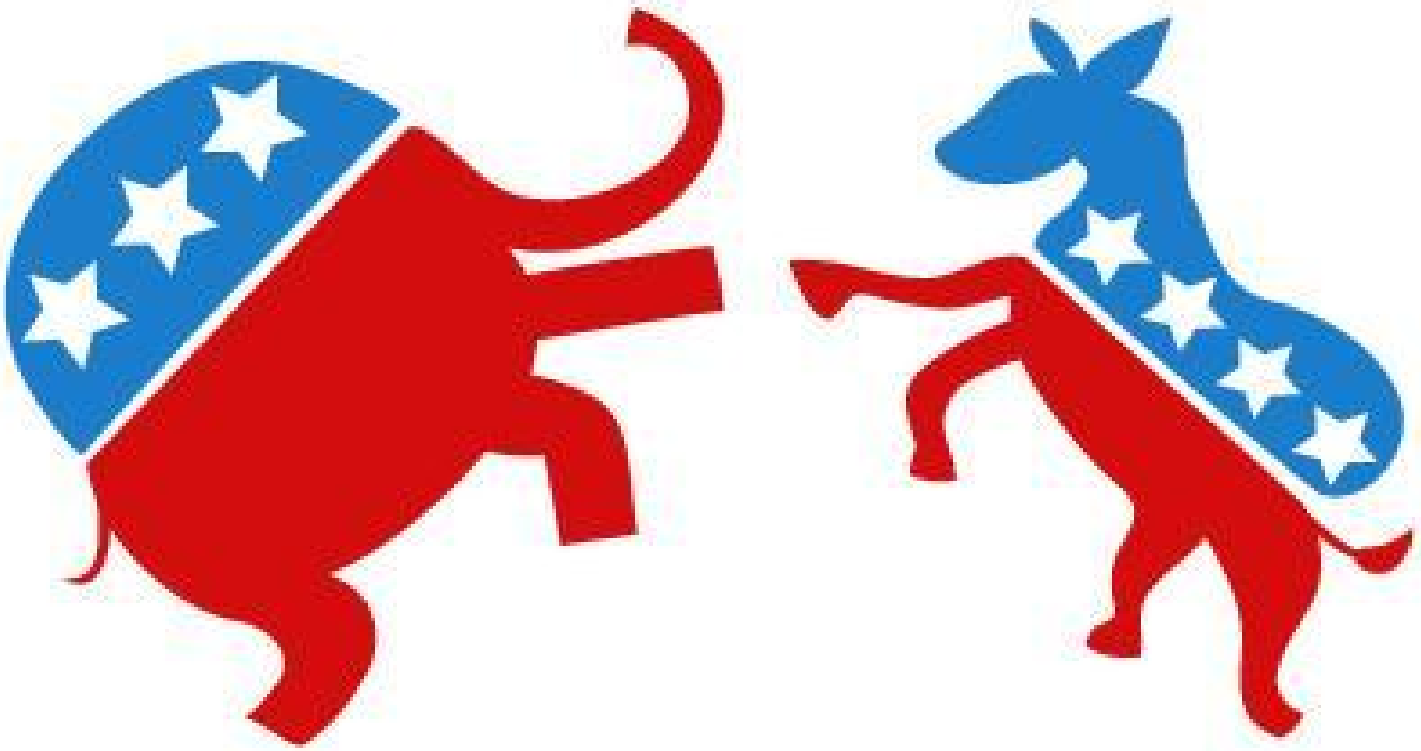
e) What happens when an entire school of 1^{st}-8^{th} graders vote?

f) Can there be a tie?

School Elections

g) A third candidate, Isabella, has entered the race. How many outcomes are there now for the 5^{th}-8^{th} graders?

h) Can there be a tie between the three candidates?



2 Election Season

In the real U.S. elections, the presidency is determined by the electoral college (EC). It's made up of representatives from all 50 states and D.C. To be president you need to **win the majority** of all the electoral votes.

States work on a winner-take-all system, meaning every college member chooses the same candidate to vote for. Example: A candidate who wins California, wins all 55 EC votes in that state.

Different political parties tend to win votes for certain states, so the political system can be very complicated!

We'll only look at six of the states today, and see the possibilities for winning between our two candidates: Mallory and Ronald.

State	EC Votes
CA	55
AZ	11
OR	7
WA	12
TX	38
NM	5

Electoral College Votes

a) How many EC votes are needed to win a majority within these six states?

b) Show **six** different combinations that allow you to reach the majority.

c) How many possibilities are there where Ronald loses California but still wins the a majority of EC votes?

Electoral College Votes

d) Mallory has lost both California and New Mexico. Is it still possible for her to win?

1) If so, how many ways are there?

e) Is it possible for there to be a tie between Mallory and Ronald?

f) If you win WA which percentage of EC Votes do you get?

Electoral College

Even though the Electoral College determines the president, people still cast their votes in the ballots for the candidate they want to win. That's because if a majority of popular votes go towards one candidate in a state, that candidate typically earns the entire electoral college votes from that state..

In this election, when you win a majority of the popular votes (more than 50%) in a state, you win all the EC votes.

a) Mallory has won CA but lost OR, AZ, TX, and NM. At least how many popular votes does she need from WA to win the electoral college vote?

State	EC Votes	Popular Votes
CA	55	14000
AZ	11	3000
OR	7	2000
WA	12	3200
TX	38	9900
NM	5	900

Is it possible for a candidate to lose the election even if they have 55% of the overall popular votes? Discuss with a partner why you think yes or no.

Electoral College

b) Find two different ways to win 12 **electoral votes.**

1) Do they require the same amount of popular votes?

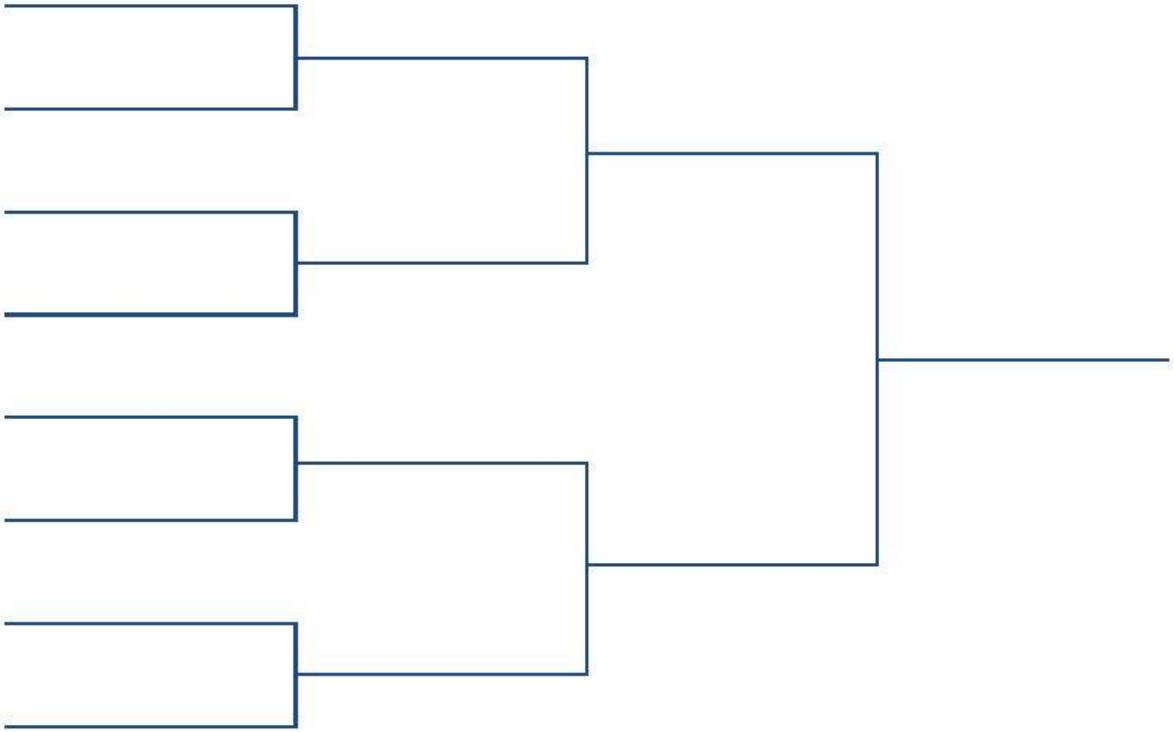
c) Is it harder to win CA or to win WA, TX, and NM?

d) Suppose Mallory won TX and Ronald won AZ, OR, WA, and NM; both won with the minimum number of popular votes needed. Who got the most popular votes?

State	EC Votes	Popular Votes
CA	55	14000
AZ	11	3000
OR	7	2000
WA	12	3200
TX	38	9900
NM	5	900

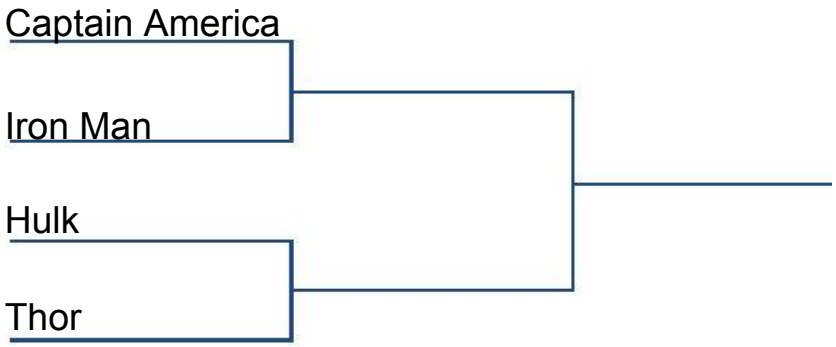
3 Battle Royale

In a tournament style kind of voting, all the options are paired off and everyone votes a person in each pairing. Winners get paired off and the tournament continues until there is only one winner. Try it with your group and see who the 'President' of your table will be.



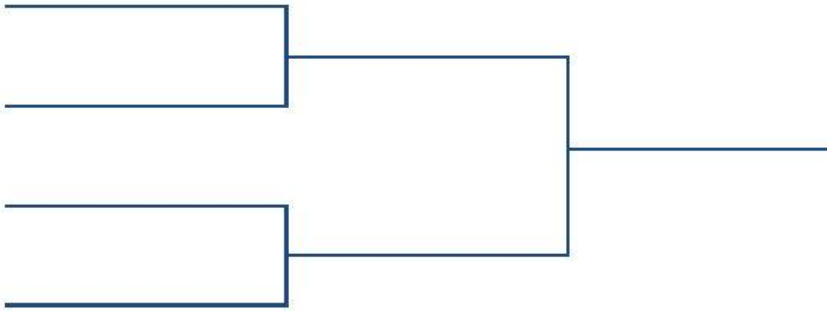
Avengers Assemble

We're going to have a tournament between some of the Avengers: Captain America vs. Iron Man and Hulk vs. Thor. Everyone will vote for the cooler of each pairing and then vote between the winners.



How many ways can you pair up the Avengers?

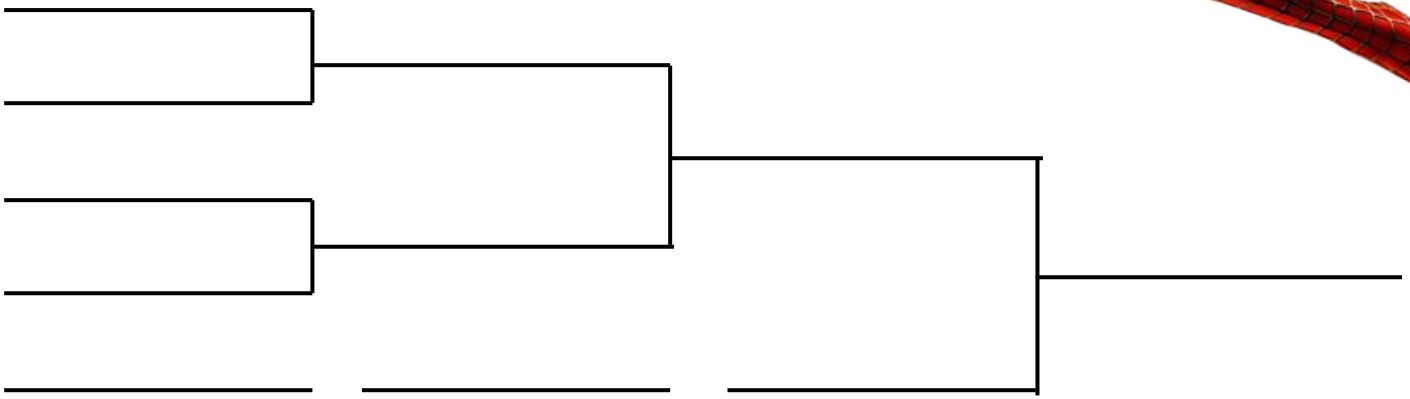
Would you get the same winner if the first pairings were different? Try a different line-up!



Avengers Assemble

Spider-Man has entered the tournament against the other Avengers. Now, we have an odd number of people which leads to something called a “bye”. One contestant will now be able to skip a round.

Cast a majority vote without doing a tournament. Then place the overall loser in the “bye” position. Is it possible for the loser to still make it to the finals?



What if we put the winner instead? Can the winner still win the finals in the tournament?