We’re moving on to weighted voting.

First, it’s not the kind of voting we just studied. This can be used in more ways than how I’ll discuss now, but let’s just focus on the basics. There is one motion to vote on. There is a binary choice to make on the bill. The vote is either yes or no.

Think about how the Senate works. After a long process, there’s a bill or a motion they’re voting on. If it was my bill, it would be “we never set the clock forward to fix daylight savings. Instead, we fall back 23 hours”. (I have a list of bills that I would put to congress the day I’m president. This is one of them.) They don’t vote on a list. They vote either for it or against it.

Unlike Congress, we are not assuming that everyone is equal. For instance, in a corporation, the number of votes you have is equal to the number of shares you have purchased.

For example: four people (A, B, C, and D) open a business and they each of them invests $1000 except for A, who invests $3000. They decide that each of them gets one vote for each $1000 they invest. So A gets 3 votes and the other 3 get 1 vote each. Suppose an important business decision comes up. (I dunno. How about “should we get some fireworks for a gender reveal party?”) The only thing we need to decided is what the quota is. Quota, in this context, is the number of votes required for a motion to pass. Let’s say the quota is 4.

We write the voting system is this fashion: [4: 3, 1, 1, 1]

The first number is the quota. Then, after the colon, you list all the number of votes of the players. I can tell there are 4 players since the list is 4 long. And the total number of votes is 6.

The book would list the players as P₁, P₂, P₃, and P₄. It’s better notation to use for math theory than using A, B, C, and D like I always do. That way you can write P₁, P₂, . . .Pₜ, to talk about N players. But it makes it harder to
do the work we’ll need to do later. So I always label the players as capitol letters sorted from most votes to least votes.

In the system [4: 3, 1, 1, 1] if players A and C vote yes then the motion passes, landing right on the quota. (If I say that A and C vote yes, I’m also implying that B and D voted no.)

There are two rules for the quota. It can’t be too big. And it can’t be too small. The too big is kinda obvious. [7: 3, 1, 1, 1] is pretty silly, right? Basically nothing can ever pass because the sum of the votes is 6 and the quota is 7. That largest the quota can be in this system is 6. Which would mean that all 4 players would have to approve.

The quota can never be more than the sum of all the votes. Duh.

But what happens if we set the quota to 3? Big problems. The motion to cancel all Thursdays because nothing good ever happens on Thursday is raised. A votes yes, everyone else votes no, and the motion passes. C-ya Thursdays, not gonna miss ya! B presents the motion to re-add Thursday to the week. A votes no, everyone else votes yes. Thursday is back in the week! See the problem?

A 50/50 tie means infinity war. The quota has to be at least one vote bigger than half.