# Guidance document for conducting elections to the Coordinating Committee

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## I. CHOICE OF VOTING SYSTEM

The Bylaw passed on 2/27/99 states that the voting system used depends on the number of candidates and the number of seats available. There are 3 possibilities:

Approval voting for a single candidate: If there is only one person nominated, approval voting is used, and the candidate requires approval by 2/3 of the voters to be elected. Each voting delegate indicates approval or disapproval (a vote of yes or no) on a secret paper ballot. The candidate is elected if s/he receives approval from at least two-thirds of the ballot cast. Abstentions count as no votes.

Instant Runoff Voting for 2 or more candidates vying for a single seat: When two or more candidates are running and there is only one seat open, Instant Runoff Voting is used with a "No Other Candidate" or NOC option. NOC is treated just like the other candidates on the ballot and in the ballot counting, except that if NOC wins the election, the seat remains open. Delegates vote by ranking as many or as few of the candidates and the NOC option as they like. On a piece of paper, voters write a number 1 next to their first choice, 2 next to their second and so on.

Choice Voting for 2 or more candidates running for 2 or more seats: When two or more candidates are running and there are two or more open seats, Choice Voting is used with a "No Other Candidate" or NOC option. Delegates vote by ranking as many or as few of the candidates and the NOC option as they like. NOC is treated just like the other candidates on the ballot and in the ballot counting, except that if NOC reaches the threshold for election, no more candidates can be seated. On a piece of paper, voters write a number 1 next to their first choice, 2 next to their second and so on.

## II. BALLOTING

The easiest way to make ballots is probably to have each delegate make her/his own. For approval voting, delegates simply write a yes, no or abstain, or approve, disapprove or abstain on the ballot. For IRV or Choice Voting, delegates write down all the options they wish to vote for and place a 1 next to their first choice, a 2 next to the second choice, and so on, up to the number of choices they wish to rank.

When collecting ballots, it is important to maintain ballot secrecy and ensure that people don't vote more than once. An easy way to do this is to record the delegate number from the delegate card when people turn in their ballots.

Alternatively, ballots can be printed in advance and distributed to delegates. In this case, it is not necessary to record who turns in ballots, since when you pass them out, you only give one to each delegate.

## III. BALLOT COUNTING

Remember to check your work every step of the way. Each time you count a pile of ballots, have someone else check it. When you divide ballots into piles, make sure that the sum of the piles is the total number you started with. When you transfer first choice votes, make sure that the sum of each candidates second choice votes is the original number of first choice votes, and so on.

The first step in ballot counting is to count the total number of ballots received.

Then you should examine each ballot to make sure that it is properly completed. If a ballot is unclear or improperly filled out, the people counting the ballots should attempt to ascertain the intent of the voter. If the ballot counters have reasonable confidence that they know the intent of the voter, then that intent should be honored. If this is not possible, then the ballot should be set aside and considered a spoiled ballot.

In the February 28, 1999 election, 3 candidates were vying for 2 seats, so voters were able to rank up to 4 options: 3 candidates plus NOC. We had to make 2 judgment calls on ballots. On one ballot, the voter wrote down 2 names without specifying which was first and which was second. Because the voter made a deliberate decision to list only 2 of the 4 possibilities, we judged that the voter intended her first choice to be the first candidate listed and the second to be the second. Another ballot had a number 1 next to one name and then listed NOC next, with no ranking next to it. We judged that the voter intended to give a number 2 ranking to NOC. These are the types of judgments that have to be made.

Once you've interpreted each ballot and separated any spoiled ballots, count the total number of valid ballots.

Approval voting: Calculate 2/3 of the total number of valid ballots. Count the number of approvals. If the number of approvals is greater than or equal to 2/3 of the total, the nominee is elected. Otherwise, the nominee is not elected. For example, if there are 65 ballots cast (including abstentions), 2/3 of 65 is 43.333. If 44 or more of the ballots are approvals, the nominee is elected. If 43 or fewer of the ballots are approvals, the nominee is rejected.

IRV: Follow these steps:

Compute the number of votes needed to win: the smallest integer greater than half the number of valid ballots. For example, with 84 votes cast, a candidate needs 43 votes, the smallest integer greater than 84/2 = 42 votes to win. With 67 votes cast, a candidate needs the smallest integer greater than 67/2 = 33.5 votes, so a candidate needs 34 votes to win.

Sort the ballots into piles by first choice votes, and count the number in each pile.

If any pile has enough votes to win, that candidate is elected.

If no one has enough votes to win, eliminate the candidate with the fewest first choice votes. In case of a tie between 2 or more candidates, eliminate whichever candidate had the fewest votes in the previous round. If 2 or more candidates had the same number of votes in each round, flip coins to determine whose votes to transfer first.

Go through each vote of the eliminated candidate and physically transfer it into the pile corresponding to the next choice on each ballot. Ballots not ranking another candidate go into an exhausted ballot pile.

After transferring all the votes of the eliminated candidate, check if any candidate has enough votes to win.

If not, repeat steps 4-6 until a candidate has enough votes to win or only one candidate remains and is declared the winner.

NOTE: NOC is treated just like any other candidate, except that if NOC wins, the seat remains vacant until the next plenary. Generally a candidate will be elected with a majority of the vote, but if enough voters choose not to rank multiple candidates, the process of eliminating candidates may continue until only one remains, who is then declared elected.

Choice Voting: Choice Voting requires calculation of a the threshold of election and then the successive transfers of surplus ballots and ballots from eliminated candidates until all seats are filled or NOC reaches the threshold, in which case no other candidate are seated and the ballot counting is completed.

## A. First, a few terms:

**Threshold**: The Bylaw specifies the use of the Hare threshold, which in percentage terms is: 1/N, where N is the number of seats availabe. For example, with 4 seats available, the threshold is
¼ = 25%. In terms of votes, the threshold is the total number of votes times the percentage.

[**NOTE**: The April 2001 Bylaws specify using the droop threshold: 1/(N+1) - J. Stauffer]

**Fractions and Rounding**: When the number of ballots is small, the way you round fractions can affect the outcome of the election. Thus, you need to be careful about rounding the threshold and transferring fractional surplus votes. For example, if the exact threshold for elections is 21.3 votes, you might get different results if you used a threshold of 21 or 22 compared to the exact 21.3. There are 2 chief ways of dealing with fractions and rounding: 1. Perform the calculations on a computer spreadsheet or with ballot counting software called PRMaster, and 2. Multiply each vote by 10 or 100; this essentially eliminates the problems of fractions and rounding and makes the calculations cleaner.

**Surplus**: The number or percentage of votes a candidate receives in excess of the threshold. For example, if a candidate receives 100 first choice votes and the threshold is 80, the surplus is 20 votes. Usually the numbers don't work out so cleanly. If a candidate receives 23 votes and the threshold is 21.5 votes, the surplus is 1.5 votes or 1.5/23 = .0652 or 6.52%.

**Transfer**: To transfer surplus votes from an elected candidate or all of the votes from an eliminated candidate to the next ranked choice on each ballot. The easiest way to do this is to physically move each ballot, keeping track that votes transferred from an elected candidate will only count for a fraction of a whole vote. Votes from an eliminated candidate transfer at full value.

**Exhausted ballot**: If a ballot is transferred and there is either no lower ranked candidate on the ballot or all of the lower ranked candidates have already been elected or eliminated, the ballot becomes "exhausted" and should be placed in a pile with other exhausted ballots. These ballots will not play any role in the rest of the ballot counting.

**Elected, eliminated and continuing candidates**: The first two are obvious. Continuing candidates are everyone who isn't elected or eliminated. Only continuing candidates can receive transfers.

## B. Some general guidance

Remember that we are using the 1/N threshold* (Hare) and fractional transfers. The basic process is to sort the ballots into first choice votes, and then transfer all the surplus votes of candidates crossing the threshold, in order of finish, starting with the highest vote receiver. Once all the surplus votes are transferred, you eliminate candidates starting with the last place finisher until a candidate crosses the threshold. Every time you transfer votes, you will be physically moving ballots from the elected or eliminated candidate to the other candidates. The key is to keep track of which ballots count as whole votes, which are fractions of ballots, which are fractions of fractions and so on.

*[**NOTE**: The April 2001 Bylaws specify using the droop threshold: 1/(N+1) - J. Stauffer]

You continue the process of transferring surplus votes and eliminating candidates until: all seats are filled, NOC crosses the threshold, or only one candidate remains, who is then declared elected.

Remember that if a candidate is elected or eliminated, she cannot receive any transfer votes. A ballot that would otherwise transfer to an elected or eliminated candidate transfers to the next candidate on the ballot. If no candidate remains on the ballot, the ballot is exhausted.

In case of ties between elected candidates or eliminated candidates, use the number of votes each candidate had in the previous round to determine who is elected first or eliminated first. If the candidates had the same number of votes back to the beginning round, flip a coin to determine.

## C. The actual counting process

I recommend having one person coordinating the effort and keeping track on paper, a couple people counting and double checking, and one person operating a spreadsheet to keep track of totals. Follow these steps and see the accompanying example:

Calculate the threshold.

Sort ballots into piles, count each pile and order the piles from largest to smallest. Check that the sum of the piles is the total number of valid ballots.

If any candidates has reached threshold, start with the candidate with the most votes, who is elected. Calculate the surplus as a percentage of that candidate's votes: surplus percentage = (Number of votes - threshold) / (Number of votes) expressed as a percentage.

Transfer each vote for the elected candidate to the second choice on the ballot at a value equal to the surplus percentage of the vote. If the surplus is 7%, then each transferred vote equal .07 votes. **You must keep track of which ballots are worth full value and which are worth a fraction of their value.** One way to do this is to write the value of surplus votes on the back of the ballot. Votes for the other candidates now consist of whole first choice votes plus fractions of second choice votes.

Compute the revised totals for each vote, and see if any candidates have crossed the threshold. If so, go back to step 3. Be careful at this step, because you could have fractions of fractions of votes.

Once you've complete transferring all surplus votes, determine which remaining candidate has the fewest votes. In cases of ties, flip a coin to determine who is eliminated first.

Eliminate this candidate and transfer all votes to the next ranked candidate on each ballot, keeping track that some ballots may be fractions, or fractions of fractions, and others whole. Ballots may exhaust at this stage. Simply move each of the ballots to a new pile and calculate the new totals. If any candidate has reached threshold, go to step 3. If not, go to step 6.

This process continues until all the seats are filled, only one candidate remains (and is elected) or NOC crosses threshold, in which case no more candidates can be elected.

## D. Guide to Computations

1. The surplus percentage for an elected candidate is:
   Surplus = (Number of votes - threshold) / (Number of votes)
2. Consider the following piles created in counting seats in Example C, where 5 candidates plus NOC were vying for 4 seats:

   Candidate 1: (23 ballots) 23 first choices
   Surplus = (23 - 10.75) / 23 = 53.26% = 0.5326

   Candidate 2: (22 ballots) 12 first choices and 10 seconds from Candidate 1 @ 53.26%.
   New total = 12 + 10 * .5326 = 17.33
   Surplus = (17.33 - 10.75) / 17.33 = 37.95% = 0.3795

   Candidate 4: (4 ballots) 1 first choice, 2 seconds from Candidate 2 @ 37.95%, and 1 third from candidate 1 and candidate 2 @ 53.26% * 37.95% (this is the fraction of a fraction).
   New total = 1 + 2 * 0.3795 + 1 * 0.5326 * 0.3795 = 1.98

   NOC: (17 ballots) 5 first choices, 8 seconds from Candidate 1, 1 second from Candidate 2, 2 thirds from Candidates 1 & 2, and 1 first from candidate 4.
   New total = 5 + 8 * 0.5326 + 1 * 0.3795 + 2 * 0.5326 * 0.3795 + 1 = 11.04

Simple, eh?