Voting Mechanism

- the specific form of the voters’ and judges’ inputs, the messages used to exert their wills, and
- the procedure by which the inputs or messages are amalgamated or transformed into a final decision, social choice, or output.
Grading

In many situations, people use measures or grades that are well defined **absolute common languages of evaluation** to define decision mechanisms:

- in figure skating (new system), diving and gymnastics competitions;
- in piano, ute and orchestra competitions;
- in classifying wines at wine competitions;
- in ranking university students;
- in classifying hotels and restaurants, e.g., the Michelin *
“Judges and voters have complex aims, ends, purposes, and wishes: their preferences or utilities. A judge’s or a voter’s preferences may depend on many factors, including his beliefs about what is right and wrong, about the common language, about the method that transforms input messages into decisions, about the other judges’ or voters’ acts and behaviors, in addition to his evaluations of the competitors or candidates. But the judges’ or voters’ input messages—the grades they give—are assuredly not their preferences: a judge may dislike a wine, a dive, or a part of a skater’s performance yet give it a high grade because of its merits; or a judge may like it yet give it a low grade because of its demerits.” (pg. 3)
Majority Grade

The *majority-grade* is the (assuming an odd number of judges) *median* grade (the grade that is in the middle of the list when the grades or ordered). If there is an even number of judges, then the majority grade is the lowest grade in the middle interval.
Majority Grade

The *majority-grade* is the (assuming an odd number of judges) median grade (the grade that is in the middle of the list when the grades or ordered). If there is an even number of judges, then the majority grade is the lowest grade in the middle interval.

Eg., Consider a common language of ten integers 
\{0, 3, 5, 6, \ldots, 11, 13\}
Majority Grade

The *majority-grade* is the (assuming an odd number of judges) *median* grade (the grade that is in the middle of the list when the grades or ordered). If there is an even number of judges, then the majority grade is the lowest grade in the middle interval.

Eg., Consider a common language of ten integers
{0, 3, 5, 6, ..., 11, 13}

{7, 7, 8, 8, 8, 9, 10, 11, 11}: The majority grade is 8.
Majority Grade

The *majority-grade* is the (assuming an odd number of judges) *median* grade (the grade that is in the middle of the list when the grades or ordered). If there is an even number of judges, then the majority grade is the lowest grade in the middle interval.

Eg., Consider a common language of ten integers
\{0, 3, 5, 6, \ldots, 11, 13\}

\{7, 7, 8, 8, 8, 9, 10, 11, 11\}: The majority grade is 8.

\{7, 7, 8, 8, 11, 11, 11, 13\}: The majority interval is \{8, 9, 10, 11\}, so the majority grade is 8.
Majority Grade

The *majority-grade* is the (assuming an odd number of judges) *median* grade (the grade that is in the middle of the list when the grades or ordered). If there is an even number of judges, then the majority grade is the lowest grade in the middle interval.

Eg., Consider a common language of ten integers
\{0, 3, 5, 6, \ldots, 11, 13\}

\{7, 7, 8, 8, 8, 9, 10, 11, 11\}: The majority grade is 8.

\{7, 7, 8, 8, 11, 11, 11, 13\}: The majority interval is \{8, 9, 10, 11\}, so the majority grade is 8.

Suppose A’s grades are \{7, 7, 8, 8, 11, 11, 11, 13\}
Suppose B’s grades are \{9, 9, 9, 9, 9, 10, 10, 10\}

*B should be ranked higher than A*
Dealing with ties

When two competitors have different majority-grades, the competitor with the higher grade is naturally ranked higher.
Dealing with ties

When two competitors have different majority-grades, the competitor with the higher grade is naturally ranked higher.

A's grades: \{7, 9, 9, 11, 11\}
B's grades: \{8, 9, 9, 10, 11\}

So, A is ranked above B.
Dealing with ties

When two competitors have different majority-grades, the competitor with the higher grade is naturally ranked higher.

A's grades: \{7, 9, 9, 11, 11\}
B's grades: \{8, 9, 9, 10, 11\}

The second majority grade is found:
A's grades: \{7, 9, 9, 11, 11\}
B's grades: \{8, 9, 9, 10, 11\}
Dealing with ties

When two competitors have different majority-grades, the competitor with the higher grade is naturally ranked higher.

A’s grades: \{7, 9, 9, 11, 11\}
B’s grades: \{8, 9, 9, 10, 11\}

The second majority grade is found:
A’s grades: \{7, 9, 9, 11, 11\}
B’s grades: \{8, 9, 9, 10, 11\}

The third majority grade is found:
A’s grades: \{7, 9, 9, 11, 11\}
B’s grades: \{8, 9, 9, 10, 11\}

So, A is ranked above B.
Dealing with ties

When two competitors have different majority-grades, the competitor with the higher grade is naturally ranked higher.

A’s grades: \{7, 9, 9, 11, 11\}
B’s grades: \{8, 9, 9, 10, 11\}

The second majority grade is found:
A’s grades: \{7, 9, 9, 11, 11\}
B’s grades: \{8, 9, 9, 10, 11\}

The third majority grade is found:
A’s grades: \{7, 9, 9, 11, 11\}
B’s grades: \{8, 9, 9, 10, 11\}

So, A is ranked above B.
The Model

A common language $\Lambda$: a set of strictly ordered grades: $\alpha, \beta, \gamma, \ldots$;

A finite set of $m$ competitors (alternatives, candidates, performances, competing goods) $C = \{A, B, \ldots, I, \ldots, Z\}$; and

A finite set of $n$ judges $J = \{1, \ldots, j, \ldots, n\}$.

A problem is specified by a profile $\Phi = \Phi(C, J)$: $m \times n$ matrix of grades assigned to the competitors (rows) by the judges (columns).
Example

Suppose that there are five voters, 1, . . . , 5 and three candidates I, II, and III. The grades that the voters may assign are A, B, C, D, or F (from best to worst).
Example

Suppose that there are five voters, 1, . . . , 5 and three candidates I, II, and III. The grades that the voters may assign are A, B, C, D, or F (from best to worst).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>II</td>
<td>B</td>
<td>B</td>
<td>F</td>
<td>B</td>
<td>F</td>
</tr>
<tr>
<td>III</td>
<td>D</td>
<td>C</td>
<td>B</td>
<td>A</td>
<td>D</td>
</tr>
</tbody>
</table>
Example

Suppose that there are five voters, 1, . . . , 5 and three candidates I, II, and III. The grades that the voters may assign are A, B, C, D, or F (from best to worst).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>II</td>
<td>B</td>
<td>B</td>
<td>F</td>
<td>B</td>
<td>F</td>
</tr>
<tr>
<td>III</td>
<td>D</td>
<td>C</td>
<td>B</td>
<td>A</td>
<td>D</td>
</tr>
</tbody>
</table>

Candidates I, II, and III receive *majority grades* (median grades) C, B and C, respectively. Thus Candidate II would be declared the winner.
Example

Suppose that there are five voters, 1, \ldots, 5 and three candidates I, II, and III. The grades that the voters may assign are A, B, C, D, or F (from best to worst).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>II</td>
<td>B</td>
<td>B</td>
<td>F</td>
<td>B</td>
<td>F</td>
</tr>
<tr>
<td>III</td>
<td>D</td>
<td>C</td>
<td>B</td>
<td>A</td>
<td>D</td>
</tr>
</tbody>
</table>

Candidate II is ranked above candidate I: Is this reasonable? *If asked their preference, then candidate I is preferred to II by 4 judges.*
The Thesis

1. The traditional model is a bad model, in theory and in practice
2. The majority judgement is a better alternative to all other known methods, in theory and in practice
Electing vs. Ranking: Condorcet’s Ranking

Condorcet-ranking (also known as Kemeny’s rule) associates a score to each possible rank ordering:

- A voter contributes $k$ Condorcet-points to a rank-ordering if his input agrees in $k$ pair-by-pair comparisons.
- The Condorcet-score of a rank-ordering is the sum of its Condorcet-points over all voters.
- The Condorcet-ranking is the ranking that maximizes the Condorcet-score.
Electing vs. Ranking

Is Bordas method good for designating a winner, or a ranking, or both?

Is Condorcets method good for designating a winner, or a ranking, or both?
Electing vs. Ranking

Is Bordas method good for designating a winner, or a ranking, or both?

Is Condorcets method good for designating a winner, or a ranking, or both?

- Given a method of ranking, the first-placed candidate is the winner.
- Given a method of designating a winner (or loser), he is the first-ranked (or last-ranked); the second-ranked is the winner among the remaining candidates, and so on.
Are ranking and designating winners two sides of one coin?

\[
\begin{array}{cccc}
333 & 333 & 333 & 1 \\
A & B & C & A \\
B & C & A & C \\
C & A & B & B \\
\end{array}
\]

According to Borda: A is the winner, B is the loser. Thus, society's order is A ≻ C ≻ B.

According to Condorcet: A ≻ B ≻ C and C ≻ A ≻ B are tied for first.

▶ No reasonable ranking function must choose A ≻ C ≻ B.

▶ Any reasonable choice function must choose A ≻ C ≻ B.

There is a fundamental incompatibility between electing and ranking.
Are ranking and designating winners two sides of one coin?

According to Borda: $A$ is the winner, $B$ is the loser. Thus, society’s order is $A \succ C \succ B$
Are ranking and designating winners two sides of one coin?

\[
\begin{array}{cccc}
333 & 333 & 333 & 1 \\
A & B & C & A \\
B & C & A & C \\
C & A & B & B \\
\end{array}
\]

According to Borda: \( A \) is the winner, \( B \) is the loser. Thus, society’s order is \( A \succ C \succ B \)

According to Condorcet: \( A \succ B \succ C \) and \( C \succ A \succ B \) are tied for first.
Are ranking and designating winners two sides of one coin?

According to Borda: A is the winner, B is the loser. Thus, society’s order is \( A \succ C \succ B \)

According to Condorcet: \( A \succ B \succ C \) and \( C \succ A \succ B \) are tied for first.

- No reasonable **ranking function** must choose \( A \succ C \succ B \)
- Any reasonable **choice function** must choose \( A \succ C \succ B \)

There is a fundamental incompatibility between electing and ranking.
Conclusion: The traditional model’s inputs are inadequate messages and must be reformulated.


Grades: Excellent, Very Good, Good, Acceptable, Poor and Reject

Situation I
▶ Median: A's grade is reject, B's grade is poor
▶ Mean: A's grade is \(\frac{6+1+1+1+1}{5} = 2\), B's grade is \(\frac{1+2+2+2+2}{5} = 1.8\).

Situation II
▶ Median: A's grade is acceptable, B's grade is good
▶ Mean: A's grade is \(\frac{6+6+3+2+2}{5} = 3.8\), B's grade is \(\frac{5+5+4+1+1}{5} = 2.2\).
Grades: Excellent, Very Good, Good, Acceptable, Poor and Reject

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>reject</td>
</tr>
<tr>
<td>2</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>3</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>4</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>reject</td>
<td>poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>acceptable</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
</tbody>
</table>

Situation I

Median: A's grade is reject, B's grade is poor.

Mean: A's grade is \( \frac{6+1+1+1+1}{5} = 2 \), B's grade is \( \frac{1+2+2+2+2}{5} = \frac{10}{5} = 2 \).

Situation II

Median: A's grade is acceptable, B's grade is good.

Mean: A's grade is \( \frac{6+6+3+2+2}{5} = \frac{20}{5} = 4 \), B's grade is \( \frac{5+5+4+1+1}{5} = \frac{16}{5} = 3.2 \).
Grades: Excellent, Very Good, Good, Acceptable, Poor and Reject

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>reject</td>
</tr>
<tr>
<td>2</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>3</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>4</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>reject</td>
<td>poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>acceptable</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
</tbody>
</table>

**Situation I**

- **Median:** A’s grade is reject, B’s grade is poor
- **Mean:** A’s grade is \( \frac{6+1+1+1+1}{5} = 2 \), B’s grade is \( \frac{1+2+2+2+2}{5} = 1.8 \)
Grades: Excellent, Very Good, Good, Acceptable, Poor and Reject

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>reject</td>
</tr>
<tr>
<td>2</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>3</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>4</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>reject</td>
<td>poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>acceptable</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
</tbody>
</table>

**Situation I**

- Median: A’s grade is **reject**, B’s grade is **poor**
- Mean: A’s grade is \(\frac{6+1+1+1+1}{5} = 2\), B’s grade is \(\frac{1+2+2+2+2}{5} = 1.8\)

**Situation II**

- Median: A’s grade is **acceptable**, B’s grade is **good**
- Mean: A’s grade is \(\frac{6+6+3+2+2}{5} = 3.8\), B’s grade is \(\frac{5+5+4+1+1}{5} = 20.2\)
Grades: Approve, Not Approve
Grades: Approve, Not Approve

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>reject</td>
</tr>
<tr>
<td>2</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>3</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>4</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>reject</td>
<td>poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>acceptable</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
</tbody>
</table>

Situation I

- Approval Winner: \( B \)
Grades: Approve, Not Approve

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>reject</td>
</tr>
<tr>
<td>2</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>3</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>4</td>
<td>reject</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>reject</td>
<td>poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>acceptable</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
</tbody>
</table>

Situation I
▶ Approval Winner: B

Situation II
▶ Approval Winner: A
Strategic Grading

The *median grade* encourages sincere grading.
Strategic Grading

The *median grade* encourages sincere grading.

Suppose a student submits a paper to a panel of examiners.
Strategic Grading

The *median grade* encourages sincere grading.

Suppose a student submits a paper to a panel of examiners.

If an examiner were informed of the grades awarded by the other examiners, she would have no incentive to change her grade.

Similarly, if the examiner's grade turns out to be higher than the median grade.
Strategic Grading

The *median grade* encourages sincere grading.

Suppose a student submits a paper to a panel of examiners.

If an examiner were informed of the grades awarded by the other examiners, she would have no incentive to change her grade.

If the examiner’s grade coincides with the median, there is no incentive to change
Strategic Grading

The *median grade* encourages sincere grading.

Suppose a student submits a paper to a panel of examiners.

If an examiner were informed of the grades awarded by the other examiners, she would have no incentive to change her grade.

If the examiner’s grade coincides with the median, there is no incentive to change.

If the examiner’s grade turns out to be lower than the median, there is no incentive to change: lowering the grade would not change the result, raising the grade may result in a *higher* median grade.
Strategic Grading

The *median grade* encourages sincere grading.

Suppose a student submits a paper to a panel of examiners.

If an examiner were informed of the grades awarded by the other examiners, she would have no incentive to change her grade.

If the examiner’s grade coincides with the median, there is no incentive to change.

If the examiner’s grade turns out to be lower than the median, there is no incentive to change: lowering the grade would not change the result, raising the grade may result in a *higher* median grade.

Similarly, if the examiner’s grade turns out to be higher than the median grade.
If the judges act sincerely, then $z$ is the winner. Both 1 and 2 would prefer that $x$ wins. 1 can down grade $z$ to $D$, then $x$ will win. 2 can upgrade $x$ from $C$ to $A$, then $x$ will win. 3 cannot do anything about this.
If the judges act sincerely, then $z$ is the winner.
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>y</td>
<td>D</td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>z</td>
<td>B</td>
<td>D</td>
<td>A</td>
</tr>
</tbody>
</table>

- If the judges act sincerely, then $z$ is the winner
- Both 1 and 2 would prefer that $x$ wins
If the judges act sincerely, then \( z \) is the winner

Both 1 and 2 would prefer that \( x \) wins

1 can down grade \( z \) to \( D \), then \( x \) will win
If the judges act sincerely, then \( z \) is the winner

- Both 1 and 2 would prefer that \( x \) wins
- 1 can downgrade \( z \) to \( D \), then \( x \) will win
- 2 can upgrade \( x \) from \( C \) to \( A \), then \( x \) will win
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>y</td>
<td>D</td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>z</td>
<td>B</td>
<td>D</td>
<td>A</td>
</tr>
</tbody>
</table>

- If the judges act sincerely, then $z$ is the winner.
- Both 1 and 2 would prefer that $x$ wins.
- 1 can down grade $z$ to $D$, then $x$ will win.
- 2 can upgrade $x$ from $C$ to $A$, then $x$ will win.
- 3 cannot do anything about this.
If the judges act sincerely, then $z$ is the winner.

Both 1 and 2 would prefer that $x$ wins.

1 can down grade $z$ to $D$, then $x$ will win.

2 can upgrade $x$ from $C$ to $A$, then $x$ will win.

3 cannot do anything about this.
Region I

\[
\begin{array}{cccc}
  x & 21 & A & 31 \\
  y & 40 & A & 11 \\
\end{array}
\]

\[
\begin{array}{cccc}
  & B & 48 & C \\
  & B & 48 & C \\
\end{array}
\]

Winner: \( y \)
Region I
\[ x \quad 21 \text{ A} \quad 31 \text{ B} \quad 48 \text{ C} \quad 1 \text{ D} \]
\[ y \quad 40 \text{ A} \quad 11 \text{ B} \quad 48 \text{ C} \quad 2 \text{ D} \]
Winner: \( y \)

Region II
\[ x \quad 1 \text{ A} \quad 46 \text{ B} \quad 14 \text{ C} \quad 40 \text{ D} \]
\[ y \quad 1 \text{ A} \quad 45 \text{ B} \quad 33 \text{ C} \quad 22 \text{ D} \]
Winner: \( y \)
### Region I

<table>
<thead>
<tr>
<th></th>
<th>21 A</th>
<th>31 B</th>
<th>48 C</th>
<th>1   D</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y</td>
<td>40 A</td>
<td>11 B</td>
<td>48 C</td>
<td>2 D</td>
</tr>
</tbody>
</table>

**Winner:** y

### Region II

<table>
<thead>
<tr>
<th></th>
<th>1   A</th>
<th>46 B</th>
<th>14   C</th>
<th>40   D</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y</td>
<td>1   A</td>
<td>45 B</td>
<td>33 C</td>
<td>22 D</td>
</tr>
</tbody>
</table>

**Winner:** y

### Region III

<table>
<thead>
<tr>
<th></th>
<th>40 B</th>
<th>20 C</th>
<th>41   D</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y</td>
<td>48 B</td>
<td>3   C</td>
<td>50 D</td>
</tr>
</tbody>
</table>

**Winner:** y
Region I

\[
\begin{array}{cccc}
 x & 21 & A & 31 \\
y & 40 & A & 11
\end{array}
\begin{array}{cc}
 B & 48 \\
 C & 1 \ D
\end{array}
\]

Winner: \( y \)

Region II

\[
\begin{array}{cccc}
 x & 1 & A & 46 \\
y & 1 & A & 45
\end{array}
\begin{array}{cc}
 B & 14 \\
 C & 33 \ D
\end{array}
\]

Winner: \( y \)

Region III

\[
\begin{array}{cccc}
 x & 40 & B & 20 \\
y & 48 & B & 3 \ C
\end{array}
\begin{array}{cc}
 41 \ D
\end{array}
\]

Winner: \( y \)

Merged

\[
\begin{array}{cccc}
 x & 22 & A & 117 \\
y & 41 & A & 104
\end{array}
\begin{array}{cc}
 17 & B \\
 82 & C
\end{array}
\begin{array}{cc}
 82 \ D
\end{array}
\]

Winner: \( x \)
Voters who are indifferent between all candidates may decide to abstain from voting, or to express their indifference actively.
Voters who are indifferent between all candidates may decide to abstain from voting, or to express their indifference actively.

\[
\begin{array}{c|ccc}
\hline
x & 3 & 4 & 4 \\
y & 2 & 5 & 5 \\
\hline
\end{array}
\]

Winner: \( y \)
Voters who are indifferent between all candidates may decide to abstain from voting, or to express their indifference actively.

\[
\begin{array}{cccc}
  x & 3 & 4 & 4 \\
  y & 2 & 5 & 5 \\
\end{array}
\]

Winner: \( y \)

\[
\begin{array}{cccc}
  x & 1 & 1 & 3 & 4 & 4 \\
  y & 1 & 1 & 2 & 5 & 5 \\
\end{array}
\]

Winner: \( x \)
No-Show Paradox, continued

Grades: Excellent, Very Good, Good, Acceptable, Poor and Reject

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>good</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>good</td>
<td>acceptable</td>
</tr>
<tr>
<td>4</td>
<td>acceptable</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
</tbody>
</table>

A is the winner under Majority Judgement (good), Highest Mean (3.8), Approval Voting
No-Show Paradox, continued

Grades: Excellent, Very Good, Good, Acceptable, Poor and Reject

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>good</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>good</td>
<td>acceptable</td>
</tr>
<tr>
<td>4</td>
<td>acceptable</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>6</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>7</td>
<td>excellent</td>
<td>very good</td>
</tr>
</tbody>
</table>

A is the winner under Majority Judgement (good) and Approval Voting

B is the winner under Majority Judgement (very good), but A is the winner under Approval Voting
Balinski’s Response

- voters have more on their minds than merely comparing candidates, or approving of some and disapproving of others, and wish to express it,
Balinski’s Response

- voters have more on their minds than merely comparing candidates, or approving of some and disapproving of others, and wish to express it,

- voters care about all the results of an election (the distributions of the votes, who is in second, third, down to last place, the spreads between candidates, and so on) and not merely who is the winner, and
Balinski’s Response

- voters have more on their minds than merely comparing candidates, or approving of some and disapproving of others, and wish to express it,

- voters care about all the results of an election (the distributions of the votes, who is in second, third, down to last place, the spreads between candidates, and so on) and not merely who is the winner, and

- voters are dissatisfied with election results that do not reflect their true opinions.
No-Show, revisited

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>good</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>good</td>
<td>acceptable</td>
</tr>
<tr>
<td>4</td>
<td>acceptable</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>6</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>7</td>
<td>excellent</td>
<td>very good</td>
</tr>
</tbody>
</table>

▷ Only the winner matters: Without that assumption, there cannot be a no-show paradox (the two new voters help to increase Bs Majority Grade from Acceptable to Very Good, exactly what they believe it should be).
No-Show, revisited

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>2</td>
<td>good</td>
<td>very good</td>
</tr>
<tr>
<td>3</td>
<td>good</td>
<td>acceptable</td>
</tr>
<tr>
<td>4</td>
<td>acceptable</td>
<td>poor</td>
</tr>
<tr>
<td>5</td>
<td>poor</td>
<td>reject</td>
</tr>
<tr>
<td>6</td>
<td>excellent</td>
<td>very good</td>
</tr>
<tr>
<td>7</td>
<td>excellent</td>
<td>very good</td>
</tr>
</tbody>
</table>

If “Approve” means a grade of very good or above, then a thousand voters who judge A to be Excellent and B to be Very Good could be adjoined to the five, yet B would remain the AV-winner with a score of 1002 to As 1001. *With MJ a higher grade necessarily always helps.*
The no-show phenomenon cannot occur with AV or MJ when the voter sees a real difference between the candidates (for example, when the two give Very Good to A and Poor to B); it can occur only when the voter sees little difference between the candidates (Excellent and Very Good in the example).
“...all the systems based on voters ranking candidates give results that are meaningless because voters’ opinions are inadequately expressed:
“...all the systems based on voters ranking candidates give results that are meaningless because voters’ opinions are inadequately expressed: Voters’ ticks carry widely divergent meanings (strong vs. weak support, strategic vs. honest choice, comparison vs. evaluation, as polls and experiments have shown)
“...all the systems based on voters ranking candidates give results that are meaningless because voters’ opinions are inadequately expressed: Voters’ ticks carry widely divergent meanings (strong vs. weak support, strategic vs. honest choice, comparison vs. evaluation, as polls and experiments have shown) as do voters’ rankings (for example, one voter’s 2nd-ranked candidate may be highly regarded, another’s 2nd-ranked lowly regarded).
“...all the systems based on voters ranking candidates give results that are meaningless because voters’ opinions are inadequately expressed: Voters’ ticks carry widely divergent meanings (strong vs. weak support, strategic vs. honest choice, comparison vs. evaluation, as polls and experiments have shown) as do voters’ rankings (for example, one voter’s 2nd-ranked candidate may be highly regarded, another’s 2nd-ranked lowly regarded). These systems all make affirmations tantamount to: 1 inch + 1 foot + 1 yard + 1 mile = 4.”