

A **spoiler** is a candidate that loses, but whose inclusion changes the winner. I like to restrict it to a majority loser – nobody likes them, but their mere presence changes the group's mind on who wins.

The entrance quiz gave an example of a majority loser that changed the result of a Plurality election from K-Lair (45 to 55) to Ovid's (45 to 35 to 20).

This problem makes some people (K-Lair!) think that Subway "spoiled" the election, and that nobody should be allowed to vote for Subway. Unfortunately, until we vote on Subway, we don't know whether it is a majority loser.

The voting method Plurality With Elimination was designed to allow both people to be happy – we can vote and see that Subway loses, but then the people who voted for Subway are allowed to change their vote to something more reasonable.

However, Plurality with Elimination still has spoilers!

	45	35	20
1st	Ovid's	Subway	K-Lair
2nd	K-Lair	K-Lair	Ovid's
3rd	Subway	Ovid's	Subway

- (a) How many first place votes does each restaurant get? $\begin{matrix} O & 45 \\ K & 20 \\ S & 35 \end{matrix}$
- (b) Who is eliminated first in Plurality With Elimination? $K-Lair$
- (c) Who wins (with how many votes) after the restaurant from (b) is elimination? $\begin{matrix} O & 45+20 \\ K & Elim \\ S & 35 \end{matrix}$
Ovid's, 65 to 35
- (d) How many last place votes does each restaurant get? $\begin{matrix} O & 35 \\ K & 0 \\ S & 65 \end{matrix}$
- (e) Does any restaurant have a majority of last place votes? $Subway$
- (f) Who wins (with how many votes) after the restaurant from (e) is eliminated? $\begin{matrix} O & 45 \\ K & 35+20 \\ S & Elim \end{matrix}$
 $K-Lair, 55 to 45$
- (g) What does this say about Subway in this election with Plurality With Elimination?

It is a majority loser and a spoiler

IIA is the fairness criterion that says a voting method must not have spoilers. If a new candidate is added, either that candidate becomes the winner (they are better than all the old candidates), or the old winner still wins (not better than the best).

- (h) Does Plurality satisfy IIA? Does Plurality With Elimination satisfy IIA?

No (Quiz), No (g)

- (i) Puzzle! Does Borda Count satisfy IIA? Can you make a spoiler?

	4	4	3	2
1st	Ovid's	K-Lair	Subway	Ovid's
2nd	K-Lair	Ovid's	K-Lair	Subway
3rd	Subway	Subway	Ovid's	K-Lair

	1st	2nd	3rd	Total	
O	6	4	3	$18+8+3$	29
K	4	7	2	$12+14+2$	28
S	3	2	8	$9+6+8$	23

If Subway is eliminated then K-Lair Wins ($14+6$ to $12+7$), so Subway is a spoiler and a majority loser.