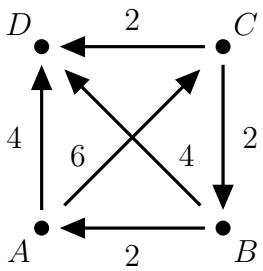
Quiz 6 Solutions

1. Consider the following example for questions (a)–(e).

2	3	2	1	2
A	D	A	B	C
C	B	C	A	B
B	A	B	D	A
D	C	D	C	D



(a) (1 pt) What is the Smith set? $S = \{A, B, C\}$

(b) (1 pt each) Fill in the winner set for:

- Runoff: $W_R = \{ A \}$
- Plurality: $W_P = \{ A \}$
- Pairwise comparison: $W_{PC} = \{ A, B, C \}$
- a priori Smith fair Runoff: $W_R^S = \{ B \}$
- a priori Smith fair plurality: $W_P^S = \{ A, B \}$
- a priori Smith fair pairwise comparison: $W_{PC}^S = \{ A, B, C \}$

(c) Which winner selection methods can we conclude are NOT a priori Smith fair from this example? Circle all that apply (1 pt):

runoff plurality pairwise comparison

(d) List all beatpaths between A and C, with strengths. You may use shorthand notation from class. Does one of A or C lose by the beatpath method? (1 pt)

- $A \to C$ has strength 6, only beatpath A to C.
- $C \to B \to A$ has strength 2, only beatpath C to A.

Since the strongest beatpath A to C is stronger than the strongest beatpath C to C, we conclude that C is a loser by the beatpath method.

(e) List all beatpaths between A and B, with strengths. You may use shorthand notation from class. Does one of A or B lose by the beatpath method? (1 pt)

- $B \to A$ has strength 2, only beatpath B to A.
- $A \overset{6}{\to} C \overset{2}{\to} B$ has strength 2, only beatpath A to B.

Since no beatpath is stronger than another, neither A nor B are marked as losers by the beatpath method.