

## Coursework #2

**Deadline: Monday, 19 March 2007, 3:15pm****Question 1** (10 marks)

Prove the following statements by giving suitable examples:

- (a) Plurality with run-off does not satisfy the Condorcet principle.
- (b) The Copeland rule suffers from the no-show paradox.
- (c) The Copeland and the Dodgson rules may elect different winners.

**Question 2** (10 marks)

A voting rule is called *single-winner manipulable* if it admits a situation where truthful voting would produce a single winner (no ties) and one of the voters could force a different and preferred single winner by not voting truthfully. Show that the Borda rule is not single-winner manipulable in the case of three candidates.

(Adapted from A.D. Taylor, *Social Choice and the Mathem. of Manipulation*, CUP, 2005.)

**Question 3** (10 marks)

Prove that the Copeland rule is easy to manipulate. This is in fact a corollary to a more general result by Bartholdi, Tovey and Trick (1989). Do not refer to their general result in your answer, but rather give a direct proof for the Copeland rule only.

(See J.J. Bartholdi III, C.A. Tovey, and M.A. Trick. The Computational Difficulty of Manipulating an Election. *Social Choice and Welfare*, 6(3):227–241, 1989.)