Homework #2

$$\boxed{\text{Deadline: Monday, 11 November 2013, 11:00}}$$

Question 1 (10 marks)

Show that it is possible to compute the Borda winner(s) of an election when we are only given the weighted majority graph. Is the same possible when we are only given the (unweighted) majority graph? Justify your answer.

Question 2 (10 marks)

The voting rule known as *Baldwin's rule* works like STV, except that the alternative eliminated in each round is the Borda loser rather than the plurality loser. Show that Baldwin's rule is a Condorcet extension and that STV is not.

Remark: Our definitions of STV and of Baldwin's rule are a bit sloppy in that they do not specify what to do in case there is more than one plurality or Borda loser in a given round. Fix any particular way of dealing with this matter that you find convenient for the purposes of presenting your answer.

Question 3 (10 marks)

Under the *antiplurality rule*, also known as the *veto rule*, the voters rank the alternatives, and the alternative(s) ranked last the least often win(s). The purpose of this question is to find a number of different characterisations of this rule.

(a) Find a consensus criterion such that the antiplurality rule is characterised by that criterion and the *discrete distance*.

(b) Find a way of measuring distances such that the antiplurality rule is characterised by the *unanimous winner* consensus criterion and that distance.

(c) Find a noise model such that the corresponding maximum likelihood estimator is equivalent to the antiplurality rule.