Homework #5

Deadline: Wednesday, 23 November 2011, 11:00

Question 1 (10 marks)

Recall the framework for representing utility functions over subsets of a set of propositional symbols PS by means of weighted propositional formulas. Let $n = |PS|$. A *complete cube* is a conjunction of literals of length n that includes exactly one of p and $\neg p$ for every $p \in PS$. Establish the relative succinctness of $\mathcal{L}(pcubes, \mathbb{R})$, the language of positive cubes, and $\mathcal{L}(ccubes, \mathbb{R})$, the language of complete cubes.

Question 2 (10 marks)

A *weak Condorcet winner* is a candidate that will win or draw against any other candidate in a pairwise majority contest. Show that a weak Condorcet winner always exists when voters express their preferences using the *language of single goals* introduced in the lecture on voting in combinatorial domains.