Combinatorics Homework

Homework Due on February 19, 2015

1. Find the Shapley-Shubik power index of Quebec in making amendments to the Canadian constitution. Extra credit for doing more. Remember that in order for the Canadian constitution to be amended it must be approved by 7 provinces adding up to more than 50% of the population (for our purposes assume that you need 51% although that is unclear depending on rounding error). We use the following numbers for the population:

Prince Edward Island	0%
Newfoundland	2%
New Brunswick	2%
Nova Scotia	3%
Saskatchewan	3%
Manitoba	4%
Alberta	11%
British Columbia	13%
Quebec	23%
Ontario	39%

2. Find a WVG with 5 players where each player has a different value of the Shapley-Shubik power index.

3. Let A be the set of all subsets of the set $\{1, 2, \ldots, n-1\}$ and B be the set of all subsets of $\{1, 2, \ldots, n-1, n\}$ of odd size. Find (with proof) a bijection between A and B.