AGENT-BASED SYSTEMS LAB #5

PAOLO TURRINI

1. Stability and Fairness

1) Prove that the Shapley value satisfies efficiency, symmetry, dummy and addivitiy.

2) Revisit the proof that the Shapley value is the unique function satisfying the above axioms. Work out the details, until you convince yourself that it is indeed true.

3) Ann has a left shoe, Bob and Charles have a right shoe. A coalition is winning if it has a member with a left shoe and one with a right shoe.

- Model this scenario as a coalitional game.
- Calculate the core of the game.

2. Matching

4) Consider the following agents' preferences in a stable marriage problem (from top to bottom):

$w_1 : (m_2, m_3, m_1)$
$w_2 : (m_3, m_2, m_1)$
$w_3 : (m_1, m_3, m_2)$

$m_1 : (w_2, w_3, w_1)$
$m_2 : (w_2, w_3, w_1)$
$m_3 : (w_1, w_3, w_2)$

4a) Calculate the outcome of the deferred acceptance algorithm.

5b) Which agents would be better off by misrepresenting their preferences?