Homework 2

Anthony Weems

September 22, 2015

1. **Truthfulness in Stable Marriage**

   A preference list exists such that a woman can lie and acheive a better outcome. Such a list is as follows:

m_1:	(w_a, w_b, w_c)	w_a:	(m_2, m_1, m_3)
m_2:	(w_b, w_a, w_c)	w_b:	(m_1, m_2, m_3)
m_3:	(w_a, w_b, w_c)	w_c:	(m_1, m_2, m_3)

   Normally, this would result in the set:

   $$\{(m_1, w_a), (m_2, w_b), (m_3, w_3)\} \tag{0.1}$$

   However, w_a can claim (m_2, m_3, m_1), resulting in the set:

   $$\{(m_1, w_b), (m_2, w_a), (m_3, w_c)\} \tag{0.2}$$

   The set of stable marriages contains the pair (m_2, w_a), which is w_a first choice of partner.

2. **Running Times**

   With 10^{12} ops / sec, we can run $\gamma = 3.6 * 10^{15}$ ops / hour.

   (a) $n = \sqrt{\gamma} = 6 * 10^7$

   (b) $n = \sqrt[6]{\gamma} = 391$

   (c) $n = \sqrt{\gamma/5555} = 10801$

   (d) $n = 60855$

   (e) $n = \log_2 \gamma = 51$

3. **Efficiency**

   (a) A_1
   (b) A_2
   (c) A_1
   (d) A_2
   (e) A_1