CS 260 - Fundamentals of the Design and Analysis of Algorithms **Fall 2016**

HomeWork 1b

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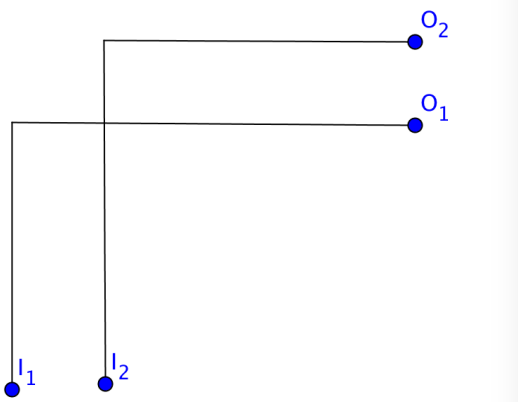
1. (Problem 6)

   A ship preference list is a list of port order by ship's chronological visit. A port preference list is a list of ship order by reverse chronological visiting time of ships. If we consider ship as man and port as women, then it becomes a stable marriage problem. Simply apply G-S algorithm in this problem, solution always exist.

2. (Problem 7)

   Let's define that a conflict occur if two data streams pass through the same junction box. A output wire preference list is a list of input wire's id by the ordered of intersection point(from output wire's **downstream** to its **upstream**). A input wire preference list is a list of output wire's id by the ordered of intersection point (from input wire's **upstream** to its **downstream**).



   According to the picture, when a conflict occur, between two pairs (I_1,O_1), (I_2,O_2), O_1 rank higher than O_2 in I_2's preference list. I_2 rank higher I_1 in O_1's preference list. It indicate that this problem is same as stable marriage problem. So the perfect match always exist.

3. (Problem 8)

   The answer is yes, a woman may give a fake preference list to get a better partner. For example, there are 3 women(w_1, w_2, w_3) and 3 men(m_1, m_2, m_3) and their true preference list is

name	preference list
w_1	m_2, m_1, m_3
w_2	m_1, m_2, m_3
w_3	m_1, m_2, m_3
m_1	w_1, w_3, w_2
m_2	w_3, w_1, w_2
m_3	w_1, w_3, w_2

After G-S algorithm terminating, the result is matching (w_1, m_1),(w_2, m_3),(w_3, m_2).

However, if w_1 gives a fake preference list which is (m_2, m_3, m_1). Then the result is (w_1, m_2),(w_2, m_3),(w_3, m_1).
Thus, w_1 gets her best partner m_2 rather than m_1.