Introduction to Multi-Agent-Programming

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Exercise Sheet 8

Due: December 21st, 2010

This exercise should be submitted during the lecture on Tuesday (Dec. 21st), the exercise session on Dec. 23rd 2010 is moved to Jan. 13th, 2011

Exercise 8.1 (Hungarian Method)

Three robots $\{a, b, c\}$ need to finish three tasks $\{t_1, t_2, t_3\}$ in the following grid world. It takes 1 day for a robot to move from one cell to one of its 4 neighbors.

4	t_3				t_1
3				**b**	
2	**c**				
1				t_2	
0	**a**				
	0	1	2	3	4

In the following table, we list the days that each robot can finish each task alone. The tasks need to be finished as soon as possible.

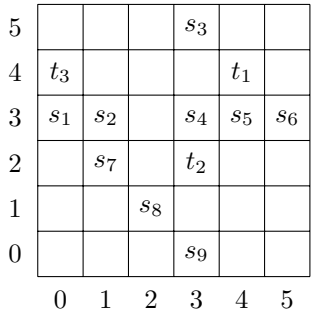
	t_1	t_2	t_3
a	10	20	15
b	30	30	20
c	15	10	10

(a) **Solve the assignment problem by Hungarian Method, please show the process (2pts)**

Exercise 8.2 (Distributed Pseudo-tree Optimization)

A sensor field (the following grid) is composed of 9 sensors: $S = \{s_1, s_2, ..., s_9\}$. There are 3 targets $T = \{t_1, t_2, t_3\}$. Each of them must be tracked by 3 different

sensors. One sensor can track only a single target. Each sensor can cover a target within a radius of 3 cells (Manhattan distance). The sensor can communicate with the other sensors within the area.



(a) **Solve the assignment problem by Distributed Pseudo-tree Optimization, please show the process briefly(3pts)**