Problems for Tutorial 7

1 Conflict Graphs

Consider a collection of tasks $T_1, ..., T_n$, where each T_i has a set of resource requirements S_i. (Each S_i is a subset of some universal set of resources R.) Each task needs exclusive access to its resources when it executes and each task requires unit time to be executed.

(a) In terms of the T_i's and the S_i's, define a conflict graph describing which tasks cannot execute at the same time.

(b) If each task is supposed to execute once, describe in terms of your conflict graph, a minimum-time schedule for all of them to execute. How long does it take for all the tasks to be executed?

2 Conflict Graphs and Precedence

Consider again a set of tasks $T_1, \ldots, T_n$, where each has a set of resource requirements S_i. As before, each task needs exclusive access to its resources, and each task requires unit time, but in addition, there is a precedence relation between the tasks – some tasks are required to precede other tasks.

Develop a good method for scheduling all the tasks, each exactly once. Try to minimize the total schedule time.