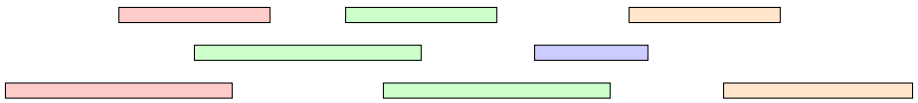
Coincidence

This is a **regular task**. You must submit a PDF, which can be produced using the LaTeX template on Moodle, exported from a word processor, hand-written or any other method.

Let S be a set of n activities, the ith of which is given by (s_i, f_i), the starting and finishing times, respectively. We say two activities i, j *overlap* if there exists a point t such that $s_i \leq t \leq f_i$ and $s_j \leq t \leq f_j$. We say a subset $S' \subseteq S$ of activities is *conflicting* if every pair of distinct activities $x, y \in S'$ overlaps.

Design and analyse an $O(n \log n)$ algorithm that returns the sets $S_1, \ldots, S_k$ such that each activity belongs to exactly one S_i, each S_i is conflicting, and k is minimised.



The minimum number of conflicting sets is four.

Advice.

You should store all the information you need to query and assign the next interval efficiently.

Your proof should be a rigorous argument for why your algorithm answers the problem statement correctly. You may find the techniques in lectures useful.

Expected Length: About a page.