# Homework Assignment #8
## Due: November 14, 3:30 p.m.

**1.** Jaan is scheduling volunteers to work at an information booth. Each volunteer sends Jaan a time interval that he or she is willing to work. The interval is specified by a starting time and a finishing time. For example, one volunteer might say that he is willing to work at the information booth from 10:13 a.m. until 11:42 a.m. Then Jaan must choose a set of volunteers so that there is at least one person at the information booth at all times between 8:00 a.m. and 10:00 p.m. Jaan wants to use the smallest possible number of volunteers to achieve this.

   **(a)** One possible greedy algorithm for this problem would be to sort the volunteers so that the lengths of their intervals are in non-increasing order, and then go through them one-by-one, scheduling anyone who is willing to work at some time that is not already covered by other scheduled volunteers. Show that this strategy does not always yield an optimal solution.

   **(b)** Design a simple and efficient greedy algorithm that does always yield an optimal solution. Prove your answer is correct.

   **(c)** What is the running time of your algorithm in part (b), assuming you have $n$ volunteers to choose from? Make sure that you describe your algorithm in enough detail to make it clear why your running time is correct.