# CPSC 413: Exercise Set 3

For each of the following problems:

- give a greedy algorithm that solves the problem;

- show an example of how the algorithm runs on two non-trivial inputs;

- prove that it gives an optimal solution using either a "stays ahead" or an "exchange" argument;

- determine its worse-case running time.

1. A company is having a picnic for its many thousands (say, n) employees. At the picnic, each employee first lines up to get food and put condiments on the food, then sits down to eat. From previous picnics, the company can estimate (a) how long each employee takes to get food and condiments, and (b) how long they take to eat. Now, only one employee can get food at a time, but, of course, they can all be eating at the same time. What order should employees get their food so as to minimize the time when all employees are done eating?

2. This is a variation of the cell phone tower problem in the previous exercise set. Imagine now that the cellphone company already has existing towers setup, with each covering a certain section $[s_i, f_i]$ of road. Which cellphone towers should the company activate so as to cover all houses on the road, while using the minimal total number of towers?