Discussion 1

1. Describe an algorithm (using English and / or pseudocode) for finding the smallest integer in a finite sequence of positive integers.

2. Use mathematical induction to prove that if $n$ people stand in a line, where $n$ is a positive integer, and if the first person in the line is right-handed and the last person in line is left-handed, then somewhere in the line, there is a right-handed person directly in front of a left-handed person.

3. Show that if $n$ is a positive integer, then

$$1 + 2 + \cdots + n = \frac{n(n + 1)}{2}.$$

4. Here’s an additional exercise that is sometimes covered in CSE21 discussions. We didn’t discuss it in either the A00 or B00 discussions, but it’s good practice!

Use bubble sort, insertion sort and selection sort to sort 6, 2, 3, 1, 5, 4 showing the lists obtained at each step. What is the run time complexity in each case?