

Algorithm Design and Analysis

CS 376, Spring 2023

Smaller Assignment 7

Due **BY THE BEGINNING OF CLASS** Wednesday, April 5

- For this Smaller Assignment, the standard conventions apply: Please submit your typewritten answers in a PDF file named

CS376_SA6_<userid>.pdf

where <userid> is replaced by your Colby userid. **Please be sure to give your full userid, including the numbers representing your class year.**

To submit this assignment, place the properly named file in your **Private** directory in your CS376 filespace on **filer**. **Please make sure all Problem Set and Smaller Assignment submissions are to your Private folders!**

- *A general note for CS376:* When writing up your homework, **explain your answers clearly and thoroughly**, giving all details needed to make your answers easy to understand. Clear communication *is* the point, on every assignment.

Unless explicitly specified otherwise, answers in CS376 should be accompanied by explanations; as part of this, in general, when you present an algorithm, give an accompanying correctness argument. Answers without convincing explanations that show command of the relevant concepts may not receive full credit. Please feel free to ask me any questions about explanations that might come up!

Exercises

1. A pair of rabbits, one male and one female, is placed in a large sealed enclosure. How many pairs of rabbits will be there in a year if the initial pair are newborn and all rabbit pairs are not fertile during their first month of life but thereafter give birth to one new male / female pair at the end of every month?

As always, please explain your answer; here, a short explanation (3–4 sentences or so) could suffice, as long as it contains the ideas underlying the solution.

2. Find the number of different ways to climb an n -stair staircase if each step is either one or two stairs. (For example, a 3-stair staircase can be climbed three ways: 1-1-1, 1-2, or 2-1.)

As always, be sure to include a short explanation (a few sentences) of your answer.