CS41 Homework 1

This homework is due at 11:59PM on Sunday, September 10. This is a 10-point homework. Write your solution using LaTeX. Submit this homework using **github**. This is an individual homework. It's ok to discuss approaches at a high level. In fact, you are encouraged to discuss general strategies. However, you should not reveal specific details of a solution, nor should you show your written solution to anyone else. Please ask Lila if you have any questions about the academic integrity policy.

The main **learning goals** of this lab are to (i) familiarize you with writing in LaTeX, and (ii) to begin to formalize and analyze algorithms.

1. **Github.** Set up your `git`. This is how you will write up and submit your solutions — see the instructions at https://www.cs.swarthmore.edu/ fontes/cs41/23f/git.php.

2. **EdStem.** Log onto the course forum on EdStem, and either ask a question, or respond to an existing post. Don't feel like your question/post has to be about computer science! The goal is just to make sure you're comfortable using the forum.

3. **Algorithm Design.** Choose a problem you encounter in everyday life (not a computing problem, and not the example "solve a Rubik's cube" we discussed in lecture) and describe an algorithm for solving that problem.

   Be as specific and descriptive as you can.

4. **Algorithm Analysis.** Consider the following algorithm for the Hiking Problem.

   HIKING()
   1 $k = 1$.
   2 **while** you haven't arrived at your friend:
   3 hike k miles north
   4 return to start
   5 hike k miles south
   6 return to start
   7 $k = 6k$.

   Describe the distance traveled in HIKING as a function of the initial distance from your friend in the worst case. Express your answer in big-O notation. How does this algorithm compare to the algorithms we saw in class?

5. **(extra challenge problem)** In lecture, we discussed why m is a lower bound for the Hiking problem. Show that $3m$ is a lower bound for the Hiking Problem.

Once you have completed your write-up *in this file*, double check this list:

- Please don't include your name in your submission. (Grading happens anonymously to minimize bias.)
- Make sure all your write-up details are in this `.tex file`. Make sure this `.tex` file is pushed to your github repository.

- Make sure this `.tex` file compiles on the CS lab computers. It is your responsibility to submit a file which compiles without errors.
- Don't submit a pdf! I will pull and compile the LaTeX. pushed all updates to the `.tex` file to your github repo (please don't submit a pdf)
- Once everything is done, fill out the post-homework survey.