Assignment #2

Due: October 11, 2018

Problem 1

a) Solve the checkerboard problem in the puzzle box on page 24 of the reader.

b) In a few sentences, discuss problems that students may encounter when presented with this problem, and methods you as an instructor can use to nudge them toward effective solutions.

Problem 2

Scratch is a visual programming language developed through the MIT Media Lab, intended to introduce young students to programming. Although the interface is designed to be appealing to elementary schoolers, Scratch can be used to teach relatively complex concepts.

a) Load the sample Scratch program here:

https://scratch.mit.edu/projects/250424761/

Add additional Scratch code to the program to sort the list generated by this program, using whatever sorting algorithm you prefer (bubble sort is fine, as are other naïve sorts).

Note: You will have to create an account

b) Greek mathematicians took a special interest in numbers that are equal to the sum of their proper divisors, which is simply any divisor less than the number itself. They called such numbers perfect numbers. For example, 6 is a perfect number because it is the sum of 1, 2, and 3, which are the integers less than 6 that divide evenly into 6. Similarly, 28 is a perfect number because it is the sum of 1, 2, 4, 7, and 14.

Create a new Scratch project that calculates all perfect numbers in the range 1 to 9999. When a perfect number is found your program should add that number to a list.

c) You are designing an introduction to programming class for incoming undergraduates with no programming experience whatsoever.

Based on your experience with Karel and Scratch, either choose one of them to use in the first two weeks and justify your choice in a paragraph or two, or argue why you think a different system would be better than using either Karel or Scratch.