1 Introduction to Computational Thinking

Computational Thinking is thinking about what problems computers can solve and how they can solve them. In the syllabus, we describe computational thinking as how we can describe and solve problems using a computer.

Computer scientists do this in many ways:

- Think about how to solve specific problems. For example, I once worked as a software engineer where it was my job to figure out how a user to could use a mouse to manipulate 3D NMR data.

- Think about the limits of computing. Theory is an important part of computer science. Some problems that on the surface seem trivial are actually impossible to solve.

- Think about how quickly problems can be solved.

- Think about how to store and manipulate lots and lots of data.

- Think about how to make computers communicate with each other. Networks of computers display wonderfully complex behavior and it is important to understand what works and what can go wrong. Think about the economic implications of the Internet going down!

- Think about how to make computers safe from cyber attacks.
• Think about how computers and humans interact.

• Think about how to make computers simulate physical systems. For example, weather prediction algorithms or mathematical models of biological systems. This is near and dear to my heart. My research is to study the circadian clock in plants and animals by developing techniques that allow a computer to do much of the analysis for me.

2 What Computers Mean to You

Let’s take a break and get to know each other a little more. There is much more that can be added to this list and I would like to give you a chance to let us all know what computers mean to you. We are each going to take about 30 seconds to answer 3 questions:

1. What is your name? This is so I can learn how to pronounce your names and so that I can learn them. I will do my best to pronounce it correctly. But I need you to be willing to correct me if I am wrong. My name is Stephanie Taylor. You can call me Stephanie or Dr Taylor or Professor Taylor or whatever you want, provided it is appropriate... But don’t call me “Mrs.”.

2. What is your favorite food? I am a foodie and I like to talk about food. In general, I love CHEESE and Japanese food.

3. Tell us something about your experience with computers. Do you like them? Do you hate them? Can you remember when you first used a computer? Or maybe tell us why you are taking this class.

My first computer was an Apple ][ and it looked something like this...

[show picture of Apple ][]

I used it for word processing - I wrote most of my high school papers on it. But, I wrote only one paper at a time. Why? because I didn’t know how to open and close files. Yes, I didn’t know how. The word processing software looked something like this...
And it had two commands related to files.

Load

and Save

And I couldn’t figure out what the difference was between them. I knew “Save” meant “Save to disk”, and I thought “Load” meant “Load onto the disk”. I learned years later in college that “Load” meant “Open”. But that didn’t do me much good. So what it meant was that I would create a document and leave it open with the computer on until I was ready to print it and turn it in! The documentation was no help because I didn’t know what “Load” meant.

Before we move on, let me tell you the moral of this story. Even stupid questions are good questions.

Now it’s your turn. In order to finish before class ends, let’s limit our stories to about 30 seconds each.

3 Going over the Syllabus

We will use the course website heavily. We will talk more about it on Friday, but go to www.cs.colby.edu and follow the link for cs151 lectures to read the syllabus.

The information is mostly self-explanatory, so I won’t rewrite it here.

However, I should note that Bruce Maxwell, the lab prof, will be in his office (or in the lab) Monday nights. He comes after orchestra rehearsal to do some work and to help CS 151 students. And he asked me to be sure to tell you all that today.