In Chapter 1 your textbook talks about mental representations, e.g. the concept of an apple being represented by the word “apple” (or the sign language gesture for apple?). Much of what we “know” is a result of our constructing mental models of things. Consider, for instance, your ability to drive a car. Your ability to drive essentially any car is a result of having internalized a mental model of the way cars work, from a driver’s perspective. Of course, some elements of the mental model are variable and can, as a result, be problematic. For instance, if you’ve only ever driven cars with an automatic transmission, your ability to drive a car with a manual transmission is greatly impaired. However, aside from that one factor, once you’ve learned to drive a car, you are able to drive almost any other car regardless of make or model. This is only possible if you have somehow built an internal mental model of the process of driving a car, and of how the physical car functions.

We have limited understanding of the way humans literally represent information internally, but we do know something about such representational systems because we have in fact created a system that is entirely dependent on such abstract representations: the computer. It is safe to say that computer science majors must build up their own mental model of the way computers work in order to be successful as computing professionals. It is probable that those who are not CS majors, however, do not have as deep of understanding of how computers do what they do. The purpose of this assignment is to attempt to transfer at least some of the knowledge – in the form of a mental model – about computers from the CS majors to the non-CS majors of the class.

Task: each CS student of a team will attempt to transfer their internal mental model to a partner.

Details: the following must be covered

1. The components of a typical computer system (both general and specific) and how they function together.
2. The internal representation of all information using binary formats, particularly integers, characters, and floating point numbers. How is something like sound (an analog entity) represented using a digital format (i.e. how does a CD really work)?
3. How are programming instructions represented in, for example, Java? How are these “high level” instructions processed into the required binary form of internal storage? Teach your partner a few simple programming skills (simple types, variables, assignment, expressions, output).

Provide a brief summary of the knowledge you attempted to transfer.

One of the hard parts of this task is to determine when you have succeeded. Provide a list of a few ways you might use to determine success or failure.

On Monday, I will use some method to determine whether or not you were at all successful in transferring any of your mental models.