Institut for Matematik og Datalogi
Syddansk Universitet

August 27, 2004
JFB

Introduction to Computer Science
E04 – Lecture 1

Textbooks

Computer Science: An Overview, 8th Edition, by J. Glenn Brookshear, 2005. The textbook will be supplemented with notes.

Format

Lectures will be on Mondays, 8:15–10. The first three will be in U29 and the remainder in U9. The discussion sections and labs will be on Tuesdays, 8:15–10 in U14, though some will take place in the terminal room. Your "instruktor" is Frederik Juul Christiani.

The course will be graded on a Pass/Fail basis, and satisfactory completion of 8 assignments is required to pass. "Satisfactory completion" means that the answers are correct, with only minor errors, and that they have been turned in on time. You are not allowed to retry on assignments which were not approved. These assignments count as the exam in the course, so cheating on these assignments is viewed as cheating on an exam. You are allowed to talk about course material with your fellow students, but working together on assignments is cheating.

The weekly notes and other information about the course are available through the Worldwide Web. Use the URL:

http://www.imada.sdu.dk/Courses/DM35/

Please read the appropriate sections in the textbook or notes before coming to class and bring your textbook with you.

I have office hours on Tuesdays and Wednesdays from 10:45 to 11:30.

Lecture, September 6

We begin with an introduction to the course, covering chapter 0 in the textbook, but skipping section 0.2, which is more relevant to your History of Computing course. We will also begin on chapter 1.

Lecture, September 13

We will cover the remainder of chapter 1 in the textbook.

Discussion section: week 37

Discussion in groups:

1. Divide into groups of three people (or four). One person will choose five cards to give to the first "performer", the first performer will give four of them to the second "performer", one at a time, and the second performer will announce what the fifth card is. Each person should practice each "performer" part at least three times.

2. Discuss (in your groups) various methods for improving the magic trick. For example, if the first card determines the suit, after seeing the trick repeated several times, the audience might find it easier to guess how it is done. Define an algorithm for a modification of the trick which makes this harder to see.

3. Discuss how to do a magic trick, where one performer is thinking of a number between 1 and 24, tells the audience the number, gets some cards from the audience, and passes some cards to the second performer, who announces the number.

4. Discuss how to extend this to larger numbers than 24. When might it be better to only use the color on the card (whether it is red or black, but also consider using the four different suits), rather than some permutation (ordering) of the cards?

5. Find a "bad" pair of integers for the greatest common divisor algorithm, where a pair is bad if the algorithms must perform a lot of steps relative to how large the numbers are. (One expects more steps for larger numbers.)

Getting to know our computer system (if there is time):

Bring your computer account information in case there is time to use the computers.

Try the following:

1. Login to the computer.

2. Open a `Local Xterm`. Use `mkdir` to create a directory for this course.

3. Open the browser Mozilla. Find the homepage for this course. Get the first weekly note (.ps file) and save it in the directory you just created.

4. Enter your new directory using `cd ``directoryname''`. Check the contents of your directory and permissions of the files using `ls -al`. Change the permission so only you can read it, using

   `chmod 600 ``filename''.`

   Check the permissions again. (Note that you should always protect your own course work using these permissions, since if someone copies your work, you are still responsible for cheating!) Try checking your neighbor's file (preferably both before and after it is protected). You can try reading your neighbors file using

   `gv ~''username2''/''directoryname2''/''filename2''.`

   To change the permissions so others can read your file again, you can use `chmod 644 ``filename''`. Get back to your top directory using `cd`.

5. Open the symbolic computation package Maple, using `xmaple`. Get a prompt by choosing `New` from the `File` menu. Try computing 4! by typing `4!;`. Try computing other factorials. Try computing 2 raised the 4th power by typing `2^4;`. Try computing other powers of two. Close Maple.

6. Logout.

Assignment due 8:15, September 14

Late assignments will not be accepted. Working together is not allowed. (You may write this either in English or Danish, but write clearly if you do it by hand.)

1. Write down the algorithm for the "magic trick" described in class, where one performer passes four of five playing cards to the other, so that the other can tell what the fifth card is. Write this as an algorithm, so that all steps are clearly specified, without ambiguity.

2. Design a circuit containing only AND, OR and NOT gates which takes four bits as input and outputs a 1 if the input is 0101 or 1100, and a 0 otherwise. (In the student resources for the course textbook, under the activities for Chapter 1, there is a simulator for logic circuits which you could use to check your circuit. It is time consuming to use, though.)