Institut for Matematik og Datalogi
Syddansk Universitet

September 6, 2010
JFB

# Introduction to Computer Science
# E10 – Lecture 3

## Lectures, September 1, 10:15–14

We began with an introduction to the course, covering chapter 0 in the textbook, but skipping section 0.2.

There was brief introduction to LaTeX.

We covered up through most of section 1.7 of chapter 1 in the textbook, but did not get as far as discussing truncation in section 1.7.

## Lecture, September 6, 8:15–10, U37

We will finish chapters 1 and begin on chapter 2.

## Lecture, September 9, 14:15–16, U28

We will finish chapter 2 of the textbook and begin on chapter 3.

## Laboratory: September 13, 14:15–16, Terminal Room

Discussion in groups (only two, or possibly three, people per group, since you will sit at a computer for the first part):

Two simulators are available from the course's homepage
http://www.imada.sdu.dk/∼joan/intro/index.html.
(there is some variation in quality and ease of use).

Download a simulator in Java from the homepage. Create a directory for this course and save the file as `Simulator.jar` or `BrookshearMachine.jar`. Run the simulators using `java -jar Simulator.jar` or `java -jar Brookshear.jar`.

Clicking on `Help` will tell you how to set the contents of some memory cells.

1. Do problem 1 on page 116 of the textbook. To input the data and program, type `[00] 14 02 34 17 C0 00` in the white field at the top of the window. Click on `Load Data`.

   In the BrookshearMachine you can just enter the data directly into the fields. Note that when in `Memory List view` you need to specify two bytes at a time, i.e., the first memory cell denoted 00 gets 14 02, the second memory cell denoted 02 gets 34 17, etc.

   Use Appendix C, starting on page 619 of the textbook, to figure out what should happen. Then, `Single Step` through the execution to see that it does happen.

2. Do problem 2 on page 116. To load the value `B0` into the program counter, type `[PC] B0` in the `Data Input Window` and click on `Load Data`. For the BrookshearMachine enter B0B0 at address 00 to jump to B0. Why does register 3 get the values it does when you step through the program?

3. Do problem 3 on page 117. Note that the operation `B` is usually referred to as a *conditional* branch, and there is usually also an *unconditional* branch instruction, which always causes the program counter to get the specified value (without checking the values of any registers). How is the conditional branch instruction used here to get the effect of an unconditional branch?

4. Do problem 4 on page 117. This is strange in that it is an example of how a program can modify itself when there is no distinction between program and data. Discuss the security implications of this.

Discuss the following problems from the textbook in groups of three or four:

Page 55: Problem 4.

Page 62: Problems 1, 2 (see the appendix on page 615).

## Assignment due 12:15, September 15

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.) Submit a PDF file through the Blackboard system.

Write a document in LaTeX. Turn in both the LaTeX code (which could be included in a section or appendix of your document) and the output you get from it. Include at least 6 of the 7 things listed below:

1. Normal text, including Danish letters.
2. Formatted text (italics or bold face, for example)
3. Cover page
4. Sections and subsections
5. Table of contents
6. At least two types of mathematical formulas (use both $...$ and the equation environment)
7. Pictures and/or figures with captions

If you lack ideas as to which text to use, you can look in Wikipedia, for example http://en.wiki pedia.org/wiki/Carmichael_number or http://en.wikipedia.org/ wiki/Euclidean_algorithm.