

# Introduction to Computer Science E03 – Lecture 1

## Textbooks

*Computer Science: An Overview*, 7th Edition, by J. Glenn Brookshear, 2003.  
Information about this textbook is available at:  
[http://wps.aw.com/aw\\_brookshear\\_compsci\\_7/0,6157,268287-,00.html](http://wps.aw.com/aw_brookshear_compsci_7/0,6157,268287-,00.html)  
The textbook will be supplemented with notes.

## Format

Lectures will be on Mondays, 8:15–10 in U14, and discussion sections and labs on Tuesdays, 8:15–10 in U49B. Your “instruktor” is Frederik Juul Christiani. The course will be graded on a Pass/Fail basis, and satisfactory completion of all assignments is required to pass.

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 1

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 8

We will cover the remainder of chapter 1 in the textbook, but much will skip sections 1.5, 1.6, and 1.7 until September 15, when Edmund Christiansen will be lecturing. We will also cover the first three sections of chapter 2.

## Discussion section: week 36

Discussion in groups:

1. Divide into groups of three people (in one case 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 9

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” 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 0011 or 1100, and a 0 otherwise.