

Computer Science 210 s1c
Computer Systems 1
2008 Semester 1
Lecture Notes

An Introduction to Computer Systems

James Goodman



Who Am I?

- Prof. James Goodman
- Computer Science Department
- Science Centre 303-591, 38 Princes St., City
- Office Hours: No scheduled time: drop by my office or make appointment
- E-mail: goodman@cs.auckland.ac.nz

4-Mar-08

CS210

2

Recommended Readings

- Chapter 1 of Introduction to *Computing Systems: from bits & gates to C and beyond*, by Yale Patt and Sanjay Patel, 2nd Edition (2004), McGraw-Hill
<http://www.cs.auckland.ac.nz/compsci210s1t/resources>
- These notes (only after the lecture):
<http://www.cs.auckland.ac.nz/compsci210s1t/lectures>
- Dr. Bruce Hutton's lecture notes:
<http://www.cs.auckland.ac.nz/compsci210s1t/resources>

4-Mar-08

CS210

3

Preparation

- COMPSCI 101 and COMPSCI 105 (A Year 13 knowledge of Mathematics and Physics is assumed). Students who have an A grade or better in COMPSCI 101 may apply for a concession to enrol in COMPSCI 210 concurrently with COMPSCI 105.
- It is best to enrol in COMPSCI 210 before or concurrently with COMPSCI 215. Students interested in computer organisation are advised to enrol in PHYSICS 140, in preparation for COMPSCI 313.)

4-Mar-08

CS210

4

People

Instructors

- **Prof. James Goodman, City:303.591**
goodman@cs.auckland.ac.nz
- **Dr. Patrice Delmas (Supervisor), Tamaki: 731.342**
patrice@cs.auckland.ac.nz
- **Ms. Angela Chang, Tamaki: 731.308**
angela@cs.auckland.ac.nz

Tutors

- *To be announced*

Class Representative

- *To be selected*

Assessment

- **Assignments (5): 20%**
- **Test: 20% (date to be announced)**
- **Exam: 60%**

Communication

- Lectures are important!
- Check university E-mail at least once per week
- Check the forum regularly
- Attend tutorials for examples and explanations

Cheating

- We're not kidding....
- We have a lot of experience detecting cheating
- You are responsible for preventing others from stealing your material
- For CS policy, see
<http://www.cs.auckland.ac.nz/CheatingPolicy.php>

What is this paper all about?

- What computers do
- How they work
- How they are organized internally
- What are the design tradeoffs
- How design affects programming and applications

This Paper is NOT about...

- How build a cheap computer yourself
- How build a fast computer yourself
- How to fix your computer
- Which one to buy
- Differentiating among the different versions of the processors built by Intel, AMD, Apple, IBM, etc.

Introduction to Computer Systems

Computer: is it electronic genius?

- NO! **Electronic idiot!**
- Does exactly what we tell it to, nothing more.

Goal of the course:

You will be able to write programs in C and understand what's going on underneath.

Approach: Build understanding from the bottom up.

Bits (Gates) Processor Instructions C Programming

Two Recurring Themes

- **Abstraction**
 - Productivity enhancer – don't need to worry about details...
 - Can drive a car without knowing how the internal combustion engine works.
 - ...until something goes wrong!
 - Where's the dipstick? What's a spark plug?
 - Important to understand the components and how they work together.
- **Hardware vs. Software**
 - It's not either/or – both are components of a computer system.
 - Even if you specialize in one, you should understand capabilities and limitations of both.