

Syllabus for CSC-365

Computer Architecture

Fall 2005

Instructor Information:

- Dr. Michael Farmer
- Office Hours: Tue. 1:00-4:00
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Course Information:

- This course is designed to introduce computer science students to the basics of computer architecture. The course will have only a slight focus on programming, with the majority of the class being analytical work related to understanding the architecture of a computer.

Course Objectives:

- The goal of the class is to help you understand the internal workings of a computer system. Up to date you have developed an understanding of the constructs of various computer languages, but have not been introduced to how the computer system actually reacts to your code. By understanding the way the computer represents and executes your code you can become much stronger and effective programmers.

Class Format:

- The course will have weekly homework assignments.
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- There will be **only a minimal amount of code written** in this class. Most of the work may involve compiling small segments of C code and analyzing the Assembly Language outputs, rather than actually writing lengthy Assembly programs. By analyzing the outputs of the compiler you will gain a better understanding of the processor internal representation and execution of your code. As a minimum we must learn a subset of the X86 assembly language to understand the examples in the text and to understand how the processor orders instructions for execution.

Prerequisites:

- CSC-275

Book:

- *Computer Systems: A Programmer's Perspective*, by Randal Bryant and David O'Hallaron.

Other Good Reference Books:

- *Computer Architecture: A Quantitative Approach*, by Hennessy and Patterson

Tools:

- *Gcc compiler*. There are many ways to get this. Four ways I know are:
 - Install Linux as a dual boot (most effort)
 - Install Cygwin on top of Windows (large effort)
 - Install MinGW on top of windows (modest effort)
 - Install DJGPP from <http://www.delorie.com/djgpp/getting.html> (least effort)

Grading:

- Homework (30%), Mid-term (30%), Final (40%)
- Class participation is an expected portion of the course work
- Scale:

A's	B's	C's	D's
97-100: A+	87-89: B+	75-79: C+	65-69.9: D+
92-96.9: A	82-86.9: B	72-74.9: C	62-64.9: D
90-91.9: A-	80-81.9: B-	70-71.9: C-	60-61.9: D-
			0-59: E

Attendance:

- Regular class attendance is essential. The discussions will evolve from week to week and you will have trouble participating effectively without regular attendance.

Late Homework Policy:

- Having worked for 20 years to schedules devised by others, I know things happen that sometimes prevent on-time delivery. I will not take-off points for late assignments, but please note that ***once the answers are provided I can no longer accept papers***. I will post solutions by the **next** class after the assignments are due. Please ***No emailed homeworks assignments will be accepted***. Please turn all homework assignments directly into me in class or at my office.

Academic Misconduct:

- Copying others work, plagiarizing external references without giving due credit, and cheating in exams are strictly forbidden. Please take pride in your own work, and feel free to ask me if you need help or assistance to maximize your learning.

Proposed Schedule: (Note this schedule is subject to change)

Week	Monday	Wednesday
Week 1 (8/29)		Overview & Introduction to Computer Architecture Ch. 1
Week 2 (9/5)	<i>Labor Day</i>	Representing and Manipulating Information Ch. 2.1 (thru 2.1.6) and 2.2
Week3 (9/12)	Representing and Manipulating Information Ch. 2.3	Representing and Manipulating Information Ch. 2.4
Week 4 (9/19)	Machine-level representation Ch 3.4 & 3.5	Machine-level representation Ch. 3.6 & 3.7 (thru 3.7.4)
Week 5 (9/26)	Machine-level representation Ch 3.8 & 3.9 (thru 3.9.1) & 3.10	Processor Architecture Ch. 4.1 (especially Asides on RISC-CISC)
Week 6 (10/3)	Processor Architecture Ch. 4.3 – 4.3.1	Processor Architecture – 4.3.2, 4.3.3, & 4.3.5
Week 7 (10/10)	Processor Architecture 4.4	Processor Architecture 4.5.1-4.5.3
Week 8 (10/17)	Processor Architecture 4.5.4-4.5.7	Mid-term review
Week 9 (10/24)	Mid-term	Optimizing Program Performance Ch. 5.1, 5.2, 5.4, & 5.5
Week 10 (10/31)	Optimizing Program Performance 5.7	Optimizing Program Performance 5.8 & 5.10
Week 11 (11/7)	Optimizing Program Performance 5.12-5.14	The Memory Hierarchy 6.1
Week 12 (11/14)	The Memory Hierarchy 6.2 & 6.3	The Memory Hierarchy 6.4
Week 13 (11/21)	The Memory Hierarchy 6.5-6.7	<i>Thanksgiving</i>
Week 14 (11/28)	Virtual Memory 10.1-10.5	Virtual Memory 10.6&10.7
Week 15 (12/5)	Parallel Processors I	Parallel Processors II
Week 16 (12/12)	Future Trends	Final exam review