

Introduction to Computer Architecture

Dr. Mark C. Lewis
1-17-2003

Opening Discussion

- At the beginning of every class we will do a brief discussion of some questions I provide and any questions you might have. Typically mine cover the previous lecture and the reading for the current one.
- There was no previous one so I'm interested in just getting to know a little about each of you and your background. Also, what do you know about Java/OOP?

Basic Information

- Try to log onto the machines and bring up a browser.
- Course web page:
<http://www.cs.trinity.edu/~mlewis/CSCI2321-S03>
- Office: HAS 201K
- Phone: 999-7022
- e-mail: mlewis@trinity.edu
- Office hours: 3:00-5:00 M, 9:30-11:00 W, 2:30-5:30 R or by appointment

Text and References

- "Computer Organization and Design" by Patterson and Hennessy. This is a very good book and unless you decide you want to persue hardware design significantly further it is probably all you will need. They do have a more advanced text if it interests you.
- Web sites are good supplemental reading to keep you up on what is happening today. Se the Links page.

Course Description

- This course is intended to give you knowledge of what happens in a computer at a lower level than the programming languages you typically use. This includes two main components: machine/assembly language and computer architecture/hardware.
- In particular we will be looking the the MIPS processor and the low level languages for it.

Assignments and XSPIM

- Your assignments are basically going to come from the textbook. Some of them will involve programming at the assembly level. As mentioned, this will be done with MIPS assembly. We do have some MIPS machines in the department (the SGIs in 200), but I'm not certainly you can get on them. It will generally be easier and nicer to use xspim on these machines. It is a MIPS emulator.

Grades

- Your grade in this class is determined by a combination of 4 parts.

Assignments (8)	50%
Tests (2)	30%
Quizzes (6 drop 1)	10%
Class Participation	10%

Lectures/Schedule

- The web page also has a schedule for the entire semester. It includes not only the topics, but also readings and due dates for everything that receives a grade.
- On this page I will also provide links to the notes I put on in PDF format. I do this at least the night before class. I do this because you should never feel like you have to write down what is on the slides. Focus on listening so you can "grok" the material and take notes on interesting points not in the slide text.

Think More - Work Less

- For those of you who don't know this yet, my overriding objective in this class is to get you to think. During the course of the semester several lights should come on in your head as different ideas start to make sense.
- Unlike the intro sequence courses, there isn't that much coding in here. Those lights will probably come on when you are just thinking, not typing.

Complex Yet Simple

- Computers are some of the more complex devices ever created by humans, yet in many ways they are quite simple. The part of a computer that does most of the work, the CPU, is built of pieces that are all nearly identical: transistors etched into silicon. It just happens to be built from a very large number of them. (100 million for the newest generation of chips).

From C to Execution

- So how does the code that you type in go from text to executing on the computer processor doing your bidding?
- You know a bit about the first step, compiling, where the program is translated to a different form that the computer understands. We will look more at the language it gets translated to.
- The question then becomes, how does a piece of silicon turn the instructions of that language into a dynamic computation?

Elementary my dear Watson

- To carry out your instructions, the computer uses one thing: logic. A processor is basically a device that can perform logic on electronic signals.
- Our job this semester is to see how this is done and to give you some vague idea of how a computer can be built to do computations.

Warning!!!

- As with all people, I have biases. In the area of microprocessors, my bias is typically against Intel. I will try not to let that cloud what I teach and you shouldn't let it cloud what you learn.

Minute Essay

- At the end of every class I will have you write me a "minute essay". This is a few sentences that shouldn't take you much more than a minute. I will typically ask some type of question for you to answer. You can also provide any form of feedback on anything from the class you want to. Make sure your names are always on these as I use them for attendance and feedback.
- What are your thoughts on the class description? What do you want to get from this course?
