

CSCI 250  
Introduction to Computer Organization and Assembly Language Programming  
Spring 2011

Description

An introduction to an assembly language and its implementation in hardware. Topics include the binary and hexadecimal numbering systems, the fetch-execute cycle, the components of the central processing unit, floating point processing, memory, the assembler, and the linker. Programming exercises are developed in the assembly language of a commonly available processor. Prerequisites: CSCI 220 and CSCI 222. Prerequisite or co-requisite: MATH 207.

Instructor

Anthony Leclerc, Ph.D.  
J. C. Long Building Room 208  
<http://groups.google.com/group/csci250spring2011>

Office Hours

9:30 a.m. – 12:00 p.m., 1:30 p.m. – 3:00 p.m. TR, other times by appointment

Classroom and Meeting Time

JC Long 221, 3:05 – 4:20 pm TR

Required Texts

*Computer Organization and Design, 4th Edition*; Patterson and Hennessy; Morgan-Kaufmann, 2009.

Grading Procedure and Scale

		Percentage	Grade
		93-100	A
		90-92	A-
		87-89	B+
		83-86	B
		80-82	B-
		77-79	C+
		73-76	C
		70-72	C-
		65-69	D
		0-64	F

Assignments	25%
Quizzes	10%
Exams (2)	40%
Final	25%

Topics with Textbook Readings

1. **Data Representation** — Character and string representations, unsigned integers, signed integers, floating point numbers. Text: Chapter 2 and 3
2. **Machine and Assembly Language** — MIPS machine and assembly language, addressing methods, instruction sets, procedures, implementing assembly language - assembly, linking, loading. Text: Chapter 2, and Appendix B.
3. **Assessing and Understanding Performance** — Factors determining performance, performance metrics, benchmarking. Text: Chapter 1.

4. **Implementing Arithmetic** — Basics of digital logic circuits, implementing a basic ALU, carry lookahead addition, Booths algorithm for multiplication. Text: Chapter 3 and Appendix C.
5. **Datapath and Control** — Processor datapath and control, building a single cycle implementation of a MIPS subset, pipelining, multiple issue. Text: Chapters 4 and Appendix C.
6. **Memory** — Temporal and spatial locality, memory hierarchies, caches, virtual memory. Text: Chapter 5.
7. **I/O** — Selected Topics from I/O devices, buses, I/O programming, and Parallel Computing. Text: Chapter 6 and 7.

### Course Policies

- **Attendance:** You are expected to attend every class. Attendance is critical to your success in this course. While most information will be available either on-line or in the textbook, some information may only be presented during class discussion. You are responsible for all information and announcements (including test times, assignment due dates, etc.) given in class.
- **Noisy portable electronic devices:** Before entering class, turn off all cellphones, pagers, and other electronic devices that may interrupt the class with noise.
- **Lateness:** An assignment must be submitted electronically *at or prior to the beginning of class* on the due date scheduled by the instructor. Late submissions will be penalized 50%. After one week late, work will not be accepted.
- **Makeup:** No makeup tests will be given. If a student presents a written excuse from the Undergraduate Dean's Office for a missed exam, then the following test (possibly final exam) score will count additionally for this missed exam.
- **Academic Honesty:** On all assignments, you are expected to **do your own work!** If you are found cheating, you will be charged with such according to the CofC student handbook. *This is a serious offense and will affect the remainder of your academic career!*
- **Contact:** Please post general questions to the Google group (<http://groups.google.com/group/csci250spring2011>). If you send me an e-mail inquiry, please expect a reasonable 1-day turnaround time (2-days if sent just prior to or on the weekend).  
  
Often times students e-mail me questions concerning "bugs" in their program. It is important to note that it can be *very difficult* to debug a program using e-mail (turnaround times are too slow and interaction possibilities are limited). Don't be disappointed or surprised if we ultimately need to meet face-to-face to figure things out.
- **Special Needs** Any student who, because of a disability, may require special arrangements in order to meet course requirements should contact me as soon as possible to make necessary arrangements. The instructor will require a Professor Notification Letter (PNL).

### Development Environment

We will be using a UNIX environment for submissions of your programming assignments. You may choose to develop in the UNIX environment or in the Windows environment (NOTE: We will be using the SPIM simulator). Ultimately you will need to transfer (using a secure copy) your programming assignments onto the department's UNIX server, "stono". You will be given accounts on stono as well as some simple instructions on "how to get around" in a UNIX environment.