Computer Organization (CS 1410) Spring 2014

Time and Place: 8:00-9:15 AM Tuesday and Thursday in ITT 322

Web-site: www.cs.uni.edu/~fienup/cs1410s14/

Class Email List: Send messages to CS-1410-01-SPRING@uni.edu from your UNI account

Instructor: Mark Fienup (fienup@cs.uni.edu)
Office: ITTC 313
Phone: 273-5918 (Home 266-5379)
Office Hours: M 10:00-11:45, 1:10-2:30; T 2-3; W 8:00-9:45, 1:10-2:30; Th 2-3; F 9-11:45

Pre- or Co-requisite: Intro. to Computing (CS 1510) or any programming course

Goals: After this course, you should understand: (1) simple combinational and memory circuits used to build computer components, (2) how these circuits are organized to build a computer, (3) how data is represented and manipulated on the computer, (4) how to program in assembly language, (5) how high-level language programming languages are implemented with respect to the run-time stack and built-in data structures such as arrays and records, and (5) general concepts of hardware support necessary for an operating system.

Required Text: *Essentials of Computer Organization and Architecture*, 3rd edition, by Linda Null and Julia Lobur. Jones and Bartlett Learning, 2010. ISBN-13: 978-1449600068.

Assignments: Assignments will be both "pencil-and-paper" exercises and assembly-language programming.

Pedagogic Approach: In class, I'll tend to break up the lecture with active and group learning exercises to aid learning. While this is not formally graded, part (5%) of your grade will be based on your participation in these in-class activities. Students benefit by (1) increased depth of understanding, (2) increased comfort and confidence, (3) increased motivation, and (4) being better prepared to work in groups on the job. This might sound great, but it will require you (and me) to work differently to prepare for class. Before the class, you must read the assigned reading, thought about what I've asked you to think about, etc.; otherwise you won't be able to effectively participate in your group during class.

Grading policy: There will be three tests (including the final). I'll announce tests at least one week in advance to allow you time to prepare. Tentative weighting of course components is:

In-class Work:	5 %	
Assignments:	25 %	
In-class Test 1:	23 %	(about Feb. 20)
In-class Test 2:	23 %	(about April 3)
Final:	24 %	(Tuesday, May 6 from 8:00 - 9:50 AM in ITT 322)

Grades will be assigned based on straight percentages off the top student score. If the top student's score is 92%, then the grading scale will be, i.e., 100-82 A, 81.9-72 B, 71.9-62 C, 61.9-52 D, and below 52 F. Plus and minus grades will be assigned for students near cutoff points.

Scholastic Conduct: You are responsible for being familiar with the University' Academic Ethics Policies (http://www.uni.edu/pres/policies/301.shtml). Copying from other students is expressly forbidden. Doing so on exams or assignments will be penalized every time it is discovered. The penalty can vary from zero credit for the copied items (first offense) up to a failing grade for the course. If an assignment makes you realize you don't understand the material, ask questions designed to improve your understanding, *not* ones designed to discover how another student solved the assignment. The solutions to assignments should be **individual, original** work unless otherwise specified. Remember: discussing assignments is good. Copying code or test-question answers is cheating.

Any substantive contribution to your assignment solution by another person or taken from a publication (**or the web**) should be properly acknowledged in writing. Failure to do so is plagiarism and will necessitate disciplinary

action. In addition to the activities we can all agree are cheating (plagiarism, bringing notes to a closed book exam, etc), assisting or collaborating on cheating is cheating. Cheating can result in failing the course and/or more severe disciplinary actions.

Special Notices:

- In compliance with the University of Northern Iowa policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so arrangements can be made. Students are encouraged to register with Student Disability Services, 103 Student Health Center, to verify their eligibility for appropriate accommodations.

- I encourage you to utilize the Academic Learning Center's free assistance with writing, math, science, reading, and learning strategies. UNI's Academic Learning Center is located in 008 ITTC. Visit the website at http://www.uni.edu/unialc/ or phone 319-273-2361 for more information.

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Lect #	Tuesday		Thursday	
1	1/14	Sect 1.1-1.8: Introduction, Terminology, and Computer History	1/16	Sect 2.1-2.3: Unsigned integer numbers; Converting between base 10, 2, and 16
3	1/21	Sect 2.4: Signed integers: two's complement	1/23	Sect 2.5: Floating Point Representation
5	1/28	Sect 2.6-2.7: Character representation and Error Detection and Correction	1/30	Sect 3.1-3.3: Boolean logic and Gates
7	2/4	Sect 3.4-3.5: Digital Components: decoders, multiplexers, adders	2/6	Sect 3.6: One-bit memories: SR-latch, timing diagrams, D-latch, D-flip flop
9	2/11	Sect 3.6: Register file	2/13	Register file vs. Square-Memory RAM
11	2/18	Review for Test 1	2/20	**Test 1**
13	2/25	Sect 4.1-4.7: CPU, Bus, Clock, I/O, Memory Interrupts	2/27	Sect 4.8-4.9: MARIE Computer Components and MARIE assembly language
15	3/4	Sect 4.10-4.13: MARIE Hardwired Control Unit	3/6	MARIE Microprogrammed Control Unit
17	3/11	Sect 4.14: MIPS Architecture and Assembly Language Control structures	3/13	Sect 4.14: MIPS Assembly Language Example
Spring Break				
19	3/25	Practice MIPS; Walking pointers in an array and 2-D arrays	3/27	Run-time stack in High-level Language
21	4/1	Review for Test 2	4/3	**Test 2**
23	4/8	CalculatePowers MIPS calling convention example	4/10	Insertion Sort MIPS calling convention example; PCSpim I/O
25	4/15	MIPS Logical and shift instruction	4/17	Sect 8.1-8.2: Hardware support for the OS: CPU timer, privileged instrs, dual-mode CPU, memory protection
27	4/22	Sect 7.1-7.4: Hardware Support for OS: I/O modules and methods (programmed-I/O, interrupt-driven I/O, DMA I/O)	4/24	Sect 9.1-9.4: Memory-mapped vs. I/O instructions CISC vs. RISC; Instruction Pipelining
29	4/29	Ch 6. Memory Hierarchy	5/1	Review for Final
Final: Tuesday, May 6 from 8:00 to 9:50 AM in ITT 322				