CIS 253 Computer Org & Assembly Language

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PREREQS: CIS 202, 244 INSTRUCTOR: Joseph Wyatt PLACE: 142 Becker Hall TIME: mwf 10:00 TERM: Fall, 2017

OBJECTIVE:

This course has two goals: 1. Familiarize the student with basic computer organization.
2. Provide an introduction to computer programming at the assembly language level.

The two goals are closely related in that to learn about the low-level details of the computer, it is necessary to understand assembly language. Likewise, to learn to program at an assembly level requires an understanding of basic computer organization. I will present material, set goals and evaluate achievement. I will recognize and attempt to match extra effort, but will not shoulder the responsibility for lack of effort. **You** are responsible for your performance.

OUTCOMES :

The successful student will:

understand the difference between data and information;
understand how unsigned & signed integers are stored internally within a computer;
understand how floating point numbers are stored internally within a computer;
understand how characters are stored internally within a computer;
understand how instructions are stored internally within a computer;
understand in detail how programs are executed;
understand the basic architecture of a computer;
understand the syntax of an assembly language such as Intel x86 ;
create assembly language programs;
demonstrate the ability to input data into an assembly language program;
demonstrate the ability to output information from an assembly language program;
demonstrate the ability to repeat statements in a loop within an assembly language program;
demonstrate the ability to make decisions within an assembly language program;
demonstrate the ability to create separate functions or methods within an assembly language program;
understand and demonstrate the integration of assembly language with a HOL such as C++;
understand and demonstrate how to find and correct errors within a program using a debugger.

All competencies will be assessed through a series of assignments and exams.

TEXT and MATERIALS (http://jbwyatt.com/cis253.html)

"8086 Microprocessor Emulator - see Wyatt for free software and license
"Code: The Hidden language of Computer Hardware and Software" by C Petzold, Microsoft Press, 2000.

Development will use the emu8086 emulator and the Visual C/C++ compiler. Both can be downloaded for free. A USB flash drive is HIGHLY recommended.

Finally, *you will need much persistence and careful attention to detail - this is not an easy course…*

CONTACT INFORMATION: (http://jbwyatt.com/contact.html)

My E-mail address is: wyatt@clarion.edu or **wyattwyatt@gmail.com (preferred)**
My Web URL is **http://jbwyatt.com/**
My office is in **141** Becker Hall. My office telephone is (814) 393-**2643**.
Come see me! Office hours are as posted, but other hours can be arranged.

Please defer personal conversations and small-talk until after class as it annoys other students and bugs the heck out of me.

TOPICS / SCHEDULE (42 classes) (`http://jbwyatt.com/cis253.html`) Topics and coverage is somewhat dynamic and is updated often on the class website. The 42 class semester is divided into halves. A snapshot of the page provides an outline:

Part I	Part II
a. HW and Program Execution	l. Pointers and Arrays
b. Using emu8086	m. Maze Intro
c. Number Bases: Unsigned Numbers in Base 2,8,10, 16	n. Looping thru an Array of Bytes and Printing: Maze
d. Signed Integers and IEEE 754 Floating Point	o. Interrupts to Read and Write
e. Character Data: ASCII, Unicode and UTF	p. DIV, MUL Use Multiple Registers | Magic?
f. Instruction Codes, List Files	q. Mixed Code Intro
g. Organization of CPU Registers and Memory	r. Mixed Code: C++ and ASM
h. Assembly Language Intro: basic instructions, flags	s. Mixed C with ASM
i. Addressing Modes	t. emu8086 MicroController: Devices
j. Flags, Compares, Jumps and Loops: Flow Control / Overflow!	u. MicroControllers & Microsim
k. Procedure Calls, Stack and Macros	v. Architecture I, II, III
∴ Test1 - Mid Term Exam: M() & W()	∴ Test 2 - Final Exam: W(12/10) 8am

GRADES: (`http://jbwyatt.com/grades.html`) ***Approximately*** **1,000 total points**

Grades are determined by your % score: 90+ = A ; 80 – 89 = B ; 70 – 79 = C ; 60 – 69 = D ; below 60 = E.

Grades are determined as follows:

~60%: Tests & Quizzes (~600 points)

Two tests (make-up **only** with prior notice and excuse). 250-270 points each

Various quizzes (no make-up).

In class, announced and unannounced: 5-10 points each

Quiz point in lieu of points on the next test.

EX: Five 10 point quizzes before Test 1 means Test 1 will have 50 fewer points.

~40%: Assignments (~400 points)

5 to 7 programs - programs are worth between 25 and 100 points. Late penalties.

While in class you are expected to be attentive and to participate and to take notes. Participation means constructive and informed (by way of doing the assignments and reading) discussion about the subject material.

SPECIAL NEEDS and CONSIDERATIONS:

Any special circumstances that may affect your performance in the class should be brought to my attention. Any student requiring accommodations for taking notes or tests should make arrangements to discuss their needs with me after the first class. Anything that's bothering you may affect your performance in class - please approach me and I'll try to help.

Copying code is cheating. Allowing others to copy your code is cheating.

You must protect your intellectual property as you protect your personal property - with all reasonable measures.