

CIS 253 Computer Org & Assembly Language

<http://jbwyatt.com>

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PREREQS: CIS 202, 244 INSTRUCTOR: Joseph Wyatt PLACE: 142 Becker Hall TIME: mwf 10:00, 11:00 TERM: Fall, 2016

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 flash drive can also be very useful. 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 - feel free to leave a message.

Come see me! Office hours are as posted, but other hours can be arranged.

Please defer personal conversations and smalltalk 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

a. HW and Program Execution
b. Using emu8086
c. Number Bases: Unsigned Numbers in Base 2,8,10, 16
d. Signed Integers and IEEE 754 Floating Point
e. Character Data: ASCII, Unicode and UTF
f. Instruction Codes, List Files
g. Organization of CPU Registers and Memory
h. Assembly Language Intro: basic instructions, flags
i. Flags, Compares, Jumps and Loops: Flow Control / Overflow!
j. Procedure Calls, Stack and Macros
k. Addressing Modes
∴ Test1 - Mid Term Exam: M() & W()

Part II

l. Pointers and Arrays
m. Maze Intro
n. Looping thru an Array of Bytes and Printing: Maze
o. Interrupts to Read and Write
p. DIV, MUL Use Multiple Registers Magic?
q. Mixed Code Intro
r. Mixed Code: C++ and ASM
s. Mixed C with ASM
t. emu8086 MicroController: Devices
u. MicroControllers & Microsim
v. Architecture I, II, III
∴ Test 2 - Final Exam: W(12/10) 8am

GRADES: (<http://jbwyatt.com/grades.html>) 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%: TQ (tests and quizzes) (~600 points)
 - Three tests (make-up **only** with prior notice and excuse).
 - Various 5-10 point quizzes. Some will be online.
- ~40%: AS (assignments) (~400 points)
 - 6 to 7 programs - programs are worth between 25 and 100 points

While in class you are expected to be attentive and to participate and to take notes. Participation means constructive and 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.