Computer Organization and Assembly Language

CPSC 240-09 Spring 2019

Syllabus

Description & Objectives

Digital logic and architecture of a computer system, machine level representation of data, memory system organization, structure of low-level computer languages, Machine, assembly, and macro language programming. Principles of assembler operation, input-output programming, interrupt/execution handling. Combinatorial and sequential logic components. Laboratory programming assignments.

Prerequisites

CPSC 131 and either Mathematics 270A or Mathematics 280

Instructor

Lecturer:	John Overton
Phone:	949-400-0670 (Please leave message if I can't pick up)
Email:	joverton@fullerton.edu
Office:	TBD
Office Hours:	TBD

Meeting Information

Room: CS 101

Time: Tuesday & Thursday 11:30-1:20

Important Dates

CSUF's Academic Calendar is posted online at «3http://apps.fullerton.edu/AcademicCalendar/». The Academic Calendar contains all the campus closures and holidays you should be aware of. CSUF's Admissions Calendar is posted online at http://www.fullerton.edu/admissions/Resources/Calendars.asp. The Admissions Calendar contains all the major dates with respect to adding, dropping, and withdrawing from your classes.

Textbooks

Assembly Language Programming with Ubuntu. Ed Jorgensen.
http://www.egr.unlv.edu/~ed/assembly64.pdf

Optional: Assembly Language for x86 Processors, 7th edition. Kip Irvine

Course Outline

- Learn how computer systems represent data internally: number systems, base conversions, representing negative numbers, arithmetic operations at base 2, 8, 10, and 16
- General overview of computer components and a general introduction to processor architecture
- x86-64 (Intel and AMD) processor architecture – 8/16/32/64 bit registers and the stack
- x86-64 assembly language overview and tool chains – compiling, linking and running/debugging
- x86-64 general instructions – mov, add, sub, inc, dec, mul, imul, div, idiv, etc.
- Using services of the Linux operating system. Pushing and popping values using the stack.
- x86-64 Comparing, branching, procedures and stack frames
- x86-64 Bit operations – logic, rotate, and arithmetic shift instructions, and, or, xor, not, testing bits, etc.
- A short introduction to arrays and floating point operations in Assembly
- Boolean Algebra and Logic Design
- Simplification of Boolean Functions using K-maps
- Combinatorial Circuits (decoders and multiplexors)
- Sequential Circuits (Flip-Flops, latches)

Technical Proficiency

Students are expected to be able to program in the C or C++ programming language. Specifically, knowledge and experience with C pointers and parameter passing is essential for understanding some of the concepts in this class. Knowledge is not necessarily essential – lectures will primarily reference, and use a Linux platform for some examples (my plan is to use the CSUF Tuffix distribution.) I encourage students to use a Linux distribution (such as Tuffix) for developing the homework assignments. However alternatively, assignments can be done on Windows (and perhaps on MacOS with some patience and research by the student.)

Grading

Worksheets	10%
Quizzes/Attendance	10%
Projects	20%
Midterm	30%
Final Exam	30%

90-100%=A; 80-89%=B; 70-79%=C; 60-69%=D; 0-59%=F. Plus and minus grading will be used when determining final grades. Approximately the upper third of each grade bracket will be assigned a plus and the lower third a minus.

Assignments

Certain weeks will have worksheets to be filled out by the students (generally on Tuesdays.) If there is time in class to work on the worksheets, then I will request that the worksheets be finished and turned in at the end of class. Otherwise, the worksheets will be due the following class day (generally, Thursdays.)

Occasionally (usually on Thursdays,) we will have pop quizzes related to the material we have discussed on the previous class day (usually the previous Tuesday.)

We will have 2 projects.

We will have a mid-term and a final.

Coding style must conform to professional norms. At a minimum, code must be commented, have descriptive names for identifiers, and contain a header with pertinent information such as the group member's name, project numbers, due date, and class meeting time.

Here's the thing… I want you to succeed! I don't want to create busy work for you (or for me either!) Worksheets, quizzes, assignments, mid-terms and finals are all tools to see if I am teaching you the material and if you are learning the material. And I want to do the best thing possible to make you successful! So, please feel free to talk to me. (Sending me an email is a good way to communicate your thoughts. And there are other ways of communicating to me, as well.) I'm just a part-time teacher. I have a regular job where I work in a professional setting with other software engineers, just as you will as a software engineer. In that setting, we collaborate and work together as a team so that we are all successful both individually and as a team. I believe discussion is an important factor in learning as well as in a professional setting. That's how our class should be. That does not mean that students should be giving answers to worksheets, questions, assignments, etc. to other students. But, what IS allowed (and encouraged) is discussing techniques, tips, ideas, methods, so that our fellow team members (fellow students) can arrive at the answer for themselves!

Attendance

Attending class is mandatory. Missing class is not allowed unless it is excused by the instructor. Missing class as part of a documented accommodation is guaranteed to be excused. The ADA accommodated student must make a reasonable effort to coordinate any absences with the instructor. You are responsible for all announcements made in class whether you are in class or not. Exams and quizzes will concentrate on materials discussed in class. Please do not let yourself fall behind. If you do, you will find yourself in trouble very quickly.

Make Up Policy

Exams and quizzes cannot be taken after they have been given in class. Due to an act of nature, personal medical emergency, a family crisis, an act of terrorism, severe civil unrest, etc. students have 10 calendar days to petition the instructor to retake any exam/quiz or submit an assignment without late penalty. Exceptions will be made on a case by case basis, provided there is time to evaluate the merits of such an application.

Participation

In the context of this course, participation is defined as the following:

- Arriving to class prepared and on time.
- Taking notes.
- Actively listening to the lecture and asking questions when appropriate.
- When needed/desired, seeking assistance to complete assignments.
- Not distracting oneself or others with smartphones, games, online diversions, etc.
- Respecting and treating the instructor and the student's peers civilly.

Academic Dishonesty

Students are encouraged to assist one another and discuss the course materials with your peers. It is your responsibility to be aware of and follow the spirit of CSU Fullerton's academic honesty policy which can be found at «http://www.fullerton.edu/senate/documents/PDF/300/UPS300-021.pdf». Academic dishonesty will not be tolerated. The University Catalog and the Class Schedule provide a detailed description of Academic Dishonesty under *University Regulations*.

By submitting work for evaluation, you acknowledge that you have adhered to the spirit of the university's academic honesty policy and that your submission is an original work by you unless otherwise directed to work in groups. Failure to follow the spirit of the academic honesty policy will result in a severely negative evaluation of the work in question and may result in involving the Department Chair and the Judicial Affairs office to seek a disciplinary remedy.

ADA Accommodations

Any student who, because of a disability, may require special arrangements in order to meet course requirements must register with the Office of Disability Support Services within the first week of classes. The Office of Disability Support Services' website is «http://www.fullerton.edu/DSS/». They can be reached by phone at 657-278-3117 or TDD at 657-278-2786. Their email address is «dsservices@fullerton.edu». Their office is located in University Hall, room 101. The instructor may request verification of need from the Dean of Students Office. Students requesting accommodations shall inform their instructors during the first week of classes about any disability or special needs that may require specific arrangements/accommodations related to attending class sessions, completing course assignments, writing papers or quizzes, tests or examinations.

Emergency Procedures

For your own safety and the safety of others, each student is expected to read and understand the guidelines published at «http://prepare.fullerton.edu/campuspreparedness/». Should an emergency occur, follow the instructions given to you by faculty, staff, and public safety officials. An emergency information recording is available by calling the Campus Operation and Emergency Closure line at 657-278-4444.

Instructional Continuity

Due to an event such as an epidemic or a natural disaster that disrupts normal campus operations, students must monitor their campus email address for any instructions and assignments that the instructor announces.

Extra Credit

There are some opportunities for extra credit.

Recording & Transcription of Class Content

Recording class content is governed by UPS 330.230, http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20330.230.pdf

Course Rules & Classroom Management

- Attendance at all regularly scheduled lecture and discussion section is mandatory.
- Do not eat or drink while you are in class.
- If it makes noise, silence it.
- Portable computer use is not allowed in lecture except for taking notes.
- The student is responsible to be aware of any course announcements including changes to due dates and requirements.
- Homework, programming assignments, etc. may not be submitted late.