Instructor: Ayman Hajja | E-mail: hajjaa@cofc.edu | Office: HWEA 304

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Required Text: Patterson and Hennessy- Computer Organization and Design 5 ed. (Morgan Kaufman ISBN-13: 978-0-12-407726-3)
Required Software: MARS MIPS Simulator; C/C++ (Recommended IDE: Code::Blocks for Windows, Xcode for MAC)

Class Meeting Times:
        Section 1: TR 11:20 a.m. — 12:35 p.m. Harbor Walk East 334
        Section 2: TR 09:55 a.m. — 11:10 a.m. Harbor Walk East 300

Office Hours:
        Monday/Tuesday/Wednesday/Thursday: 1:00 to 3:00 p.m.

Course Description - Prerequisite and Co-requisite:
An introduction to an assembly language and its implementation in hardware. Topics include the binary and hexadecimal numeration 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.

Pre-requisites: CSCI 220 and 220L
Co-requisite: Math 207

Course Goals:
- Be familiar with the von Neumann model of a computer system, and understand the basic operation and terminology associated with various components (the CPU, memory organization, disk drives, and various IO devices).

- Be familiar with the basic architecture of modern processors, and to make objective comparisons of different types of architectures such as RISC and CISC based on performance measures (for example cpu cycles per instruction and cycle times).

- Express numbers in the decimal, binary, and hexadecimal number systems and convert numbers between those systems. The student should also be able to describe the implementation of two's complement number representation on typical machines.

- Understand typical methods used to implement standard data types (integer data, logical data, character and string data, floating-point data) at the machine level.

- Demonstrate methods of accessing information in machine memory using direct or indirect addressing schemes, and describe various memory management schemes such as virtual memory.

- Understand basic IO techniques including memory-mapped IO vs special IO instructions, and interrupt- driven IO vs polling.

- Write correct assembly-language programs (in MIPS assembly language) for simple tasks.

- Understand the mapping from basic high-level source code features such as arithmetic expressions, array references, while loops, and if statements to assembly language.

- Understand a subroutine calling convention and the role of a stack frame in this convention. Implement such a convention in a two-level calling sequence (that is, main calls sub1 calls sub2).

- Understand the compilation, assembly, and linking processes.

Course Policies:
- Attendance: I strongly encourage you to attend all classes. Regardless of actual attendance, you are responsible for announcements made in class, assignment due dates, etc. There will be two in-class tests and a comprehensive final exam, attendance at which is mandatory.
- How to report an absence: Students should…Go to 67 George Street (white house next to Stern Center) to discuss absences and fill out the appropriate forms. Any questions should go directly to either Constance Nelson or get forms online at: http://www.cofc.edu/studentaffairs/general_info/absence. Forms can be faxed to the College at 953-2290. Students will need documentation for health, personal or emergency situations. Students on athletic teams or school-sponsored trips are responsible for reporting their activity to me.
- Disability Accommodation: Any student who feels that he or she may need an accommodation due to a disability should speak to me individually to discuss your specific needs. For additional help please contact the College of Charleston Center for Disability services at http://www.cofc.edu/~cds/ .
- Assignments: 5 (coding & non-coding) assignments will be assigned. You may discuss the problem and how to solve it with your classmates, but you may not look at, copy, or use any solution that was written by anyone other than

yourself. Students are expected to abide by the Honor System of the College of Charleston and the Student Code of Conduct (www.cofc.edu/student-life/ handbook/), especially sections on Cheating, Plagiarism (pp. 10-11), and Computer Use (p. 13).   If I have evidence that students have shared program code or obtained solutions from other sources, their grade will be zero. Offenders may be taken before the Honor Board. Note that the Honor Board may give a grade of XF (Fail because of an honor violation) that will remain on your permanent record.

- Assignment Due Dates: Each assignment is due by the date and time that will be stated on the assignment. Assignments will be accepted only via OAKS. No assignments will be accepted late. Do NOT submit assignments to me for grading via email. If you have questions about your code, you may email me.
- Additional Help: Please visit my office for help with assignments.
- Electronics Devices: Be respectful about unnecessary distractions to you and to others seated around you.
- Quizzes: ~13 in-class quizzes (total of 20%). Quizzes are held beginning of class (first 15 to 20 minutes) every Tuesday except the first day of classes, and when we have an exam.

Grade Calculation:

Test and Program Average: Tests will be averaged: Tests 1 and 2, 20% each; Final Exam, 30%; Quizzes, 20%

Final Grade Computation:

Weighted average of Test 1, Test 2, Quizzes and Final Exam…………… 90%
Assignments average…………………………………………………… 10%

Scale: A: 93—100; A-: 90—92; B+: 87—89; B: 83—86; B-: 80—82; C+: 77—79; C: 73—76; C-: 70—72; D: 60—69; F: below 60

Important Dates:

Wednesday, September 20: Last day to drop with grade of "W"
Monday, October 16 & Tuesday, October 17: Fall Break
Wednesday, November 22 to Sunday, November 26: Thanksgiving Holiday
Monday, December 4: Last day of classes
Final Exam:
        Section 1: Tuesday, December 12 from 8:00am to 11:00am
        Section 2: Thursday, December 7 from 8:00am to 11:00am