CSE 220: SYSTEMS FUNDAMENTALS I

Prerequisites: CSE 260 or 214 and CSE major

Semester: Fall 2023
Instructor: Amos Omondi
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Website: *Brightspace*
If you are registered for the class, you will automatically be enrolled at the website. Otherwise, you will need to ask to be enrolled.

Office Hours: Monday, Tuesday, and Thursday, 2:00 PM to 4:00 PM. These are times when I will definitely be in the office and available to discuss anything about the course. At other times, you may either make an appointment (by email) or just walk in (if I am in the office and not otherwise occupied). Arrangements, to be communicated later, will also me made for online office hours.

Course description:
Introduces systems-level programming concepts using the C language and assembly language and explores the correspondence of programming constructs in these languages. Topics include internal data representation, basic instructions and control structures, bitwise operations, arithmetic operations, memory management, pointers, function calls and parameter passing, linking, and loading. Included is an overview of computer architecture and organization topics, including von Neumann architecture, the memory hierarchy, and basics of pipelining.

Major Topics:
- Basics of computer architecture and organization
- Machine-level representations of data
- Basics of C programming
- Low-level programming in C
- C functions and program structure
- C I/O; Linking and loading
- C pointers and arrays
- Fundamental data structures in C
- MIPS architecture and assembly language basics
- MIPS assembly memory management
- MIPS assembly functions
- C/MIPS correspondence and cross-compilation
- Modern computer architectures

Course Learning Outcomes:
- An ability to determine the machine-level representations of primitive and structured data types.
- An ability to determine the correspondence of program constructs written in C and in assembly language.
- An ability to implement non-trivial algorithms, and both static and dynamic data structures, in the C programming language.

Textbooks:
Required:

- *C Programming: A Modern Approach*, 2nd ed. by K. N. King. W. W. Norton & Company, 2008. 978-0393979503.

References:

- *C Programming Language*, 2nd ed. by Brian W. Kernighan and Dennis M. Ritchie. Pearson, 1998. 978-0131103627.
- *Digital Design and Computer Architecture*, 2nd ed. by David Harris and Sarah Harris. Morgan Kaufmann, 2013. ISBN-13: 978-0-12-394424-5.

Flipped Learning: We will adopt the idea of flipped learning, by using the class as the place to discuss and solve problems making use of the concepts that you learned from pre-lecture reading, video viewing, and the regular lectures. So, your active participation in the class will be important in your learning.

Grading Scheme:

- Assignments (8*6.25%): 50%
- Midterm Exam: 20%
- Final Exam: 30%

Attendance of at least 80% is required to pass the course.

Policy on Lateness, Absence and Extensions: Late assignments will generally not be accepted. Only in exceptional circumstances will requests for extensions for assignment deadlines be considered. Any such request must be presented to the course instructor, with all supporting documentation, as soon as possible.

Policy on Collaboration: You are expected to work on assignment problems on your own and present your solutions. You may use the textbooks, notes, lectures, instructors, and classmates to help you find general strategies to solve the problems. You may discuss the strategies to solve these problems with your fellow students, but you should present the solutions in your own way. Using other people's work or solutions, whether cited or not, is considered plagiarism and carries severe academic penalties. If you are unsure whether an activity may constitute plagiarism or undue collaboration, consult the instructor immediately.

If you cheat, you will be referred to the appropriate office at the university, and the consequences may be severe. If you have any questions about what constitutes cheating, ask.

Disability: If you have a physical, psychological, medical or learning disability that may impact your course work, please let the instructor know. Reasonable accommodation will be provided if necessary and appropriate. All information and documentation are confidential.

Critical Incident Management: The University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.