

CS 251: Computer Architecture & Assembly Language

Fall 2023

Instructor: Michael P. Rogers
Office: Halsey 214
Office Hours: MW 3-4 PM, TR 2-3 PM, F 3-3:30 PM, or by appointment
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Class Times: MWF 9:10-10:10AM (MW: Halsey 202; F: Halsey 101A - Linux Lab)
Credits: 3

Prerequisites: A grade of C or better in CS 221.

Description: An introduction to RISC-based instruction set architecture. Topics include: data representation, assembly language programming, run-time storage management, pointers and references as exemplified in the C++ programming language, and introduction to system software.

Course Website: if it happens in this course, it will be posted on UWO's [Canvas](#) site. [Set up notifications](#) to be alerted when announcements are posted, new assignments, quizzes, or notes are posted and graded, etc.

Required Textbook:

ZyBooks

Subscription Instructions:

1. Sign in or create an account at learn.zybooks.com
Use your uwosh.edu email and 7 digit student ID preceded by OSH, e.g., OSH0348251
2. Enter zyBook code: UWOSHCOMPSCI251RogersFall2023
3. Subscribe

Course Outcomes :

Upon successful completion of the course, students will be able to:

1. Express characters and integers in binary, hexadecimal, signed and unsigned representations.
2. Determine whether overflows occur in signed or unsigned additions and subtractions of integers.
3. Write normalized and denormalized floating point numbers in single and double precision using the IEEE 754 Floating Point Standard.
4. Analyze the IEEE 754 Floating Point Standard and determine what integers cannot be represented exactly by the Floating Point Standard.
5. Organize the memory layout of global integers and characters assuming the Little-Endian and Big-Endian notations.
6. Edit an assembly language program, assemble the program and print output on console using Linux.
7. Design assembly language program given high-level source code.
8. Implement assembly language programs that read in integers from console, process the input and print results on the console.
9. Implement high-level language control structures in assembly language.

10. Implement one and two-dimensional arrays and control structures in assembly language (do-while, if-else, and for loop).
11. Write nested function calls using stack frames and local variables.
12. Write an assembly language program to call recursive functions.
13. Implement C/C++ pointers and references.
14. Implement pass-by-value and pass-by-reference parameter passing.
15. Describe a buffer overflow and why it is a potential security problem.

Grading Criteria:

Category	%
Exams (3)	45
Labs	15
Quizzes	15
ZyBook - Participation Activities & Attendance	15
ZyBooks - Challenge Activities	10

Grade Scale:

%	≥ 92	90-92	88-90	82-88	80-82	78-80	72-78	70-72	68-70	62-68	60-62	< 60
Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

Exam Dates:

Exam 1 - Wednesday, October 11

Exam 2 - Wednesday, November 8

Exam 3 - Wednesday, December 13; Friday December 15

Late Policies: Late submissions will not be accepted -- exceptions will be made for medical / personal issues (with a note from a doctor or from the Dean of Students Office).

Absences: It has been scientifically proven that the most significant factor for predicting student success is attendance (although whether this is truly causation or merely correlation is another question). Students should attend each and every class, and notify the instructor ahead of time if you will be absent.

Academic Integrity: You may discuss problems with other students, but the work you turn in for labs and your project, and answers to quizzes, will be your own. For code snippets that you use for your team project, the source of those must be clearly labeled in the comments. Failure to adhere to these guidelines will result in a 0 for the lab/project/quiz in question. For detailed information on what constitutes academic misconduct, please see the discussion of [UWS Chapter 14, Student Academic Disciplinary Procedures](#).

ChatGPT Policies: ChatGPT is good at explaining (some) CS topics, and, unlike your instructor, is available 24x7. So if you are unsure about a topic discussed in class, consider asking ChatGPT -- just remember that ChatGPT does not always get things right, so look at its answers with a skeptical eye. Also, to help with studying, consider using ChatGPT to generate

practice problems (with solutions). What you may *not* use ChatGPT for is to complete your assignments: that is plagiarism (see above).

Workload: The workload for this class is substantial, but so are the rewards -- you will become adept at using Linux, study two programming languages, and be able to impress your friends by your ability to do count to 1024 on your fingers.

Accessibility: Your instructor is committed to ensuring a fair playing field. If you have a disability and need assistance (e.g., a note taker, certain seating, extra time to take tests, adaptive technology, etc.), please register with the Accessibility Center, and we work hard to accommodate your needs.

Non-discrimination and Anti-harassment: Your instructor is committed to maintaining a harassment-free, welcoming classroom, and will not tolerate discrimination on the basis of race, religion, creed, color, sex, gender, identity/expression, ancestry, national origin, age, marital status, relationship to other employees, sexual orientation, disability, veteran's status, membership in the military, arrest/conviction record, political affiliation, or any other protected status.



**HATE HAS
NO HOME
HERE.**

Class Participation and Feedback: Your instructor relishes class participation and feedback. If you are lost, please, please ask, during class. You do not need to worry about slowing down the class, and your fellow students, who probably were thinking the same thing but were afraid to ask, will silently or possibly aloud applaud your efforts, as will I.

Consumer Information: Students are advised to see the following URL for disclosures about essential consumer protection items required by the Students Right to Know Act of 1990: <https://uwosh.edu/financialaid/consumer-information/>