Section 1: Monday/Wednesday, 11:00 a.m.-12:15 p.m., McGraw 115

Section 2: Tuesday/Thursday, 12:30-1:45 p.m., McGraw 115

Instructor   Dr. Zachary Oster

Email: osterz@uww.edu   Website: http://cs.uww.edu/~osterz/

Office: McGraw 108   Office phone: (262) 472-5006

Office hours: Mon, Tue, Wed 2:00-3:30 p.m. (Tuesday until 4:00 p.m.) or email me to set up an appointment

Resources   **Textbook (required):** *MIPS Assembly Language Programming*, by Robert L. Britton. Pearson/Prentice Hall, 2004. ISBN: 0-13-142044-5 (available to rent from University Bookstore)

Software: QtSpim, available in McGraw 115 and General Access labs; free download from http://sourceforge.net/projects/spimsimulator/files/ (versions available for Windows, Mac OS, and Linux).

Desire2Learn (D2L): You will submit your homework and you can access previous lecture notes on this course's D2L site. Go to https://d2l.uww.edu and log in with your Net-ID and password.

Prerequisites   COMPSCI 172 or COMPSCI 174
A student may not register for any course which is a prerequisite for another course in which credit has been earned unless prior departmental approval is obtained.

Description   This course covers the use of an assembly language based on the RISC processor architecture including writing, linking, and executing a program. Also covered are number systems, instructions for arithmetic and logical operations, memory access, loops, declaring variables, interrupts, machine language, segments, stacks, procedure writing, and file handling.

Learning Objectives

- Understand the role of assembly language and other intermediate languages in the software development process
- Know the basic architecture of microprocessors, especially the MIPS family, and how instructions are executed on these processors
- Perform basic computations involving binary and hexadecimal numbers
- Translate high-level algorithms into assembly-language code
- Implement function calls and parameter passing using the stack
- Understand how different low-level implementations of the same algorithm can vary in time- and space-efficiency

Tentative Schedule

Week 1   MIPS processor architecture overview

Week 2   Arithmetic using binary and hexadecimal numbers

Week 3   Data definitions, basic MIPS assembly instructions, QtSpim emulator

Week 4   Implementing decision and repetition structures (If-Then, loops)

Week 5   Writing and calling subprograms, basic parameter passing

Week 6   Logical, shift, and rotate instructions; more advanced input and output

Week 7   *Midterm exam (tentative): March 4-5 in class*

Week 8   The stack and how to use it

Week 9   Parameter passing using the stack

          Spring Break: no class March 23-27

Week 10   Practice translating high-level code into assembly

Week 11   Re-entrant functions and recursion

Week 12   Exception handling

Week 13   Floating-point numbers and arithmetic

Week 14   More floating-point arithmetic

Week 15   Pipelining instructions for improved performance, review for final exam

Final Exam   *All exams in McGraw 115. You must attend your section's exam time:*
             Section 1 (M/W):   Wednesday, May 13, 10:00 a.m.-12:00 p.m.
             Section 2 (Tu/Th):   Tuesday, May 12, 12:15-2:15 p.m.

Grading   *Note: Policies are tentative and may change during the course.*

Components   Homework   35%
               Labs & Quizzes   20%
               Midterm Exam   20%
               Final Exam   25%

Scale   A   93-100%   B-   80-83%   D+   67-70%
               A- 90-93%   C+   77-80%   D   63-67%
               B+ 87-90%   C   73-77%   D-   60-63%
               B   83-87%   C-   70-73%   F   < 60%

Letter grade breakpoints may be adjusted down (but not up) based on the class's performance. I consider attendance, participation, effort, etc. when making decisions about borderline letter grades.

Other Policies

Attendance and Excused Absences

- You should attend every class meeting. New concepts in this class always build on older concepts. If you miss too many classes now, you may struggle later.
- If you miss class, check D2L for announcements, assignments, and lecture slides. You are responsible for material covered in class whether you attend or not.

Absences for the following reasons will be excused:

- Attending a university-sponsored event. Advance notice is appreciated.
- Sincerely held religious beliefs, as required by Board of Regents policy. Please contact me within the first three weeks of the course to tell me which dates you need to miss for religious observances.
- Extraordinary reasons beyond your control (e.g., illness, death in family).

Homework and Labs

- Homework is due at 11:59 p.m. (Central time) on the due date. Late homework is accepted for up to 2 weeks after the due date, with a penalty of 20% per week (starting the day after the due date). Exceptions are given for excused absences.
- Lab exercises are designed to be completed in class. If you need to miss a lab for any reason, or if you cannot complete a lab during class time, you are expected to submit the lab exercise over D2L before the start of the next class (with no late penalty) unless your absence is excused.
- All homework and labs must be submitted on D2L unless otherwise announced. If (and only if) D2L is down, email to osterz@uww.edu.
- Programs written for homework and labs *must* follow the coding style rules for this course (posted on D2L). You will lose points if you do not follow these rules.

- If a submitted program has serious problems that prevent it from running, it will not be graded. Instead, you will be given one week to "Fix and Resubmit" it for 60% credit. If you do not, you will receive no credit for that program.

Quizzes and Exams

- Unannounced quizzes may be given to test knowledge and to check attendance.
- Tentative exam dates are given in the schedule above. Any changes in exam dates will be announced at least one week in advance.
- Exams and quizzes cannot be "made up" unless your absence is excused. *If you need to miss an exam, contact me before the exam* to schedule a make-up time.

Academic Misconduct

- *You must design and write your own code for all assignments,* unless otherwise announced by the instructor in class or on D2L. You may discuss ideas with and show your code to the instructor, tutors, and other students, but do not use others' code in your work and do not write code for anyone else.
- Presenting any part of someone else's work as your own is academic misconduct, and allowing another student to present any of your work as their own is also academic misconduct. Both result in penalties as described in UWS chapter 14.
- Be aware that *students who submit copied or substantially identical assignments will, at a minimum, receive a grade of zero on the assignment and be reported to the Dean of Students Office*. There will be no exceptions to this rule.
- *Tip:* Do not email entire code files or completed assignments to other students. Once you send others your work, you have no control over what they do with it.

Students with Disabilities

I aim to give every student an equal chance to succeed, regardless of physical ability. If you have a disability and need accommodations to succeed in this course, please meet with me during office hours or email me (osterz@uww.edu) as soon as possible.

Required Syllabus Statement

The University of Wisconsin-Whitewater is dedicated to a safe, supportive, and non-discriminatory learning environment. It is the responsibility of all undergraduate and graduate students to familiarize themselves with University policies regarding Special Accommodations, Misconduct, Religious Beliefs Accommodation, Discrimination, and Absence for University Sponsored Events. For details please refer to the Undergraduate and Graduate Timetables; the "Rights and Responsibilities" section of the Undergraduate Bulletin; the Academic Requirements and Policies and the Facilities and Services sections of the Graduate Bulletin; the "Student Academic Disciplinary Procedures" (UWS Chapter 14); and the "Student Nonacademic Disciplinary Procedures" (UWS Chapter 17).