Mathematics and Computer Science Department

CS 140: Assembly Language and Computer Organization
Fall Semester 2017
http://www.cs.clarku.edu/~jmagee/cs140/

Class Meetings @ BP 326/310
Mon, Wed 12:00 pm – 1:15pm
John Magee, Instructor
jmagee@clarku.edu
Always include “CS140” in the subject.
Office hours @ BP 332:
To be posted on the course website.
and by appointment

Lab Meetings @ BP 310:
Thurs 12:00 pm – 1:15pm
Teaching Assistants
Samantha Hughson, David Muckle
Tutoring hours held at CS lab, BP 310, TBA
The CS lab will generally be open Sunday – Thursday nights.

Course Description
Covers fundamentals of assembly language programming such as data representation, the instruction set, addressing mode, macros, procedures, input and output facilities, assembler and linker, introduction to logic circuits and the basic machine organization of conventional computers. The goal is to understand how a computer performs various tasks that are completely hidden from the user in a high-level language. For the laboratory component, students will write and analyze several programs in C and assembly language.

Teaching/Learning Method
We will incorporate some aspects of “Flipped Classroom” and “Peer Learning” in this course. The flipped classroom approach requires students to prepare for class by reading the book and reviewing videos or other materials online. This “information transfer” will take the place of some of the traditional lectures.

The peer learning approach will involve using clickers in the classroom. You will be asked to answer questions during class and respond with the clicker device. You will then “turn and talk” to your neighbors to work through a problem or gain further understanding of the topic before voting again with the clicker. The clickers will give you immediate feedback on your understanding of the material. Explaining concepts to your peers helps solidify your own understanding: the best way to learn something is to teach it!

This course will follow a rigorous schedule of assignments. Each assignment corresponds to a section of the course content and textbook. Failure to keep up with the assignments will likely result in you failing the course. Each session builds on the prior session and is a required building block for the following session. It is very difficult for you to be successful in the course if you miss class sessions or assignments. Due to the rigorous schedule, no homework extensions will be permitted.

Be forewarned: The workload for this course will be heavy.
LEEP Learning Outcomes
The goal of this course includes advanced level mastery of LEEP Learning Outcomes as follows.

1. **Knowledge of the Natural World and Human Cultures and Societies.**
   Demonstrated through understanding of technical fundamental knowledge areas of computer science, applications of computer science to nearly every aspect of modern life, interaction of computing with many different fields, and the ability to communicate and learn from experts in other fields.

2. **Intellectual and Practical skills**
   Demonstrated through the ability to design and improve systems using quantitative and qualitative assessments of their functionality, usability, and performance; practice and improvement of communication skills and the ability to communicate effectively to a range of audiences about technical problems and their solutions; the ability to think at multiple levels of detail and abstraction, and apply that to construct and analyze systems; and a recognition of the context of the function of computer systems, including interactions with people and the physical world.

3. **Personal and Social Responsibility**
   Demonstrated through the recognition of the social, legal, ethical, and cultural issues inherent in the discipline of computing; an understanding individual and collective responsibility and the possible consequences of failure on real people or the world; a commitment to life-long learning, recognizing that the field of computing advances at a rapid pace; and the ability to manage one’s own learning and development, including managing time, priorities, and progress.

4. **Ability to Integrate Knowledge and Skills**
   Demonstrated through the recognition of recurring themes and general principles that have broad applications in computing beyond the domains in which they are introduced; an understanding of the fundamental interplay between theory and practice in computing; the ability to solve problems by constructing complex systems, which are analyzed on multiple levels of detail and abstraction; and an appreciation for interdisciplinary aspects of computer science and the application of knowledge toward solving cross-disciplinary problems.

5. **Capacities of Effective Practice**
   Demonstrated through the application of students' knowledge toward solving real problems across a variety of domains; the pursuit of an integrative large-scale project that applies knowledge across the curriculum; the effective presentation of projects, ideas, technical problems, and solutions to a variety of audiences; the ability to work effectively in a team and enhance interpersonal skills through collaborative efforts; and the ability to recognize how to apply foundational knowledge to learn and adapt skills throughout a career, as specific technologies change over time.

**Books**

*The Elements of Computing Systems: Building a Modern Computer from First Principles*
*by Noam Nisan, Shimon Schocken*
*The MIT Press*

*Computer Systems: A Programmer's Perspective (3rd Edition)*
*By Randal E. Bryant, David R. O'Hallaron*
*Addison-Wesley*

Optional:
*Code: The Hidden Language of Computer Hardware and Software*
*By Charles Petzold*
*Microsoft Press*

*C Programming Language (2nd Edition)*
*By Brian W. Kernighan, Dennis M. Ritchie*
*Prentice Hall*

iClicker 2 – Response Device needed for in-class questions.

Other online readings and tutorials will be posted to the schedule page.
Software

For the applied parts of the course, we will be using the following software. All of these are available in the CS computer lab (BP 310):

- Nand2Tetris software suite.
- Linux/Unix compiler tools
- Web-based logic simulators

Grading

The following percentages are tentative and may be changed at my discretion at any time:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance, participation, professionalism, 1+ visit to Prof. and TA hours*</td>
<td>15%</td>
</tr>
<tr>
<td>Homework/Lab Assignments</td>
<td>45%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
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</tbody>
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*this portion of your grade includes clicker questions and asking/answering questions on Piazza.

Withdrawing from the Course

If you feel that you want to drop or withdraw from the class, please come talk to me about it as early as possible; I want to help you succeed, but you need to ask for help.

Add/Drop period ends Wednesday September 6th at 11:59pm.

The last date to withdraw and receive a “W” grade is Friday, November 3rd.

Policies and Miscellaneous

The official administrative business of this class will be conducted by email. Grade questions/disputes, explanation of absence, etc. will be processed via email so that we both have a written record of what was agreed. Feel free to discuss in person but an email follow-up is required for the official record.

Attendance and discussion/asking questions are expected and will be reflected in your grade. If you must be absent, please email your instructor in advance to let them know why you won’t be in class, and to let them know what you will do to keep up with the assignments.

Lab attendance and submission of the lab work is required. Please attend your scheduled lab section. Be on time and do not leave early!

Computer Use Policy

Computers and cell phones should be put away unless you are actively using them for class purposes with my permission. Do not use class time to work on other homework, play games, check email, check Facebook, or surf the web. Such activities can be distracting to other students.
Assignments are due on the date stated on the homework assignment (to be posted on web).

- Assignments received within 24 hours of the deadline will be accepted with a 10% penalty.
- Assignments received within 24-48 hours of the deadline will be accepted with a 25% penalty.
- Assignments received more than 48 hours past the deadline will not be accepted or graded.

Plan your work accordingly, and work on all assignments as soon as they are given so you can ask questions in class and get assistance in the labs and tutoring hours. **There will be no homework extensions except for medical or family emergencies.**

Students are responsible for ensuring that assignments are correctly submitted. If you have a question or problem, seek help from CS140 staff immediately.

No special make-up work will be accepted after the end of the semester. Don’t even ask.

In the event of a documented major medical problem, a grade of Incomplete will be given pending the submission of complete work. However, make up work “to improve one’s grade” will not be accepted.

It is the student’s responsibility to retain all papers, quizzes, and exams that have been graded and returned. Should these original documents not be available in the event of a grade dispute, we will need to defer to our own records.

Grades are not negotiable. Don’t even ask – just do the work and you’ll get the grade you deserve. Of course, please bring any clerical grading errors to our attention by email and we will gladly fix them.

Time Commitment. This is a 4-credit course. A minimum of 180 hours of engaged academic time is expected. The workload will vary week-to-week, but you should expect some homework assignments to take 10+ hours in addition to regular studying, reading, and preparation.

Students with Disabilities. Clark University is committed to providing students with documented disabilities equal access to all university programs and facilities. If you have or think you have a disability and require academic accommodations, you must register Student Accessibility Services (SAS), which is located in room 430 on the fourth floor of the Goddard Library. If you have questions about the process, please contact The Director of Accessibility Services. If you are registered with SAS, and qualify for accommodations that you would like to utilize in this course, please request those accommodations through SAS in a timely manner.

Welcoming Class Atmosphere. I strive to make my classroom welcoming and productive for all students. Please let me know what name or pronoun you prefer to use. Please bring to my attention any issues or concerns you have about the classroom atmosphere.

Notice to students: Faculty Members are “Responsible Employees”
As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a responsible employee. I am required to share information regarding sexual misconduct or information about a crime that may have occurred at Clark. Students may speak to someone confidentially by contacting the Center for Counseling and Personal Growth at (508) 793-7678 or our faculty confidential sources: Kathleen Palm Reed, James Cordova, Sasha Adkins, and Andrew Stewart.
Plagiarism, Collaboration, and Collusion

Unless otherwise specified, all CS140 homework assignments and projects are independent work.

It is the student’s responsibility to know and understand the Clark University Academic Integrity policy, which is within the Academic Advising Handbook (The Blue Book) available at the Academic Advising Center.

In addition to the definition of plagiarism in the handbook, with respect to CS140, plagiarism is specifically defined to include (but is not limited to) the following:

- collaboration on the solutions/code you write
- copying any part of someone else’s assignment/program, even if you have permission and/or have modified the code
- sharing or giving your assignment/code or even a subset of your assignment/code to another student to review
- reviewing another student’s solution (including from past semesters)
- reviewing solutions on the internet

It is my policy to use automatic plagiarism detection software, and suspicious similarities will be uncovered. The University takes acts of cheating and plagiarism very seriously; violators may be suspended or fail the course.

What is acceptable cooperation?
Cooperation is recommended in understanding programming concepts and system features. You are encouraged to discuss the labs, the homework problem statements and expected output, and to seek and receive help with the software tools, programming language syntax, etc.

However, each student must write his or her own solution/code and other deliverables independently.

Why do students cheat?
Many students have told me they did not start assignments early enough and panicked near the deadline, so they decided to take a shortcut. The best way to avoid this is to start assignments early so that you can ask questions.

Retraction Provision
Students may come forward to retract an assignment within 72 hours of submission. A retracted assignment will be treated as though it was never submitted, and no further penalty or record of an infraction will be recorded.