

Syllabus

Software Development – COMP/CENG 170
9:00 am daily, Science 213
Spring 2018

Instructor: Dr. Frank McCown
Contact: 501-279-4826, HU Box 10764, fmccown@harding.edu
Home Page: <http://www.harding.edu/fmccown/classes/comp170-s18/>
Office Hours: Science 208: 2-3 pm MW, 2-5 pm TRF, or by appointment

Course Description

Fundamental concepts of problem solving and computational algorithms. Using the C++ programming language, a study will be made of language syntax, program control flow, algorithm implementation, modular program design, arrays, file input and output, and classes. No prior programming experience is required. No textbook is required although a CodeLab subscription is.

Student Learning Outcomes

The student will be able to...

1. Formulate algorithmic solutions to problems in a structured flowchart.
2. Identify and eliminate syntax and logic errors in a program.
3. Use functions to build modular programs.
4. Design and develop programs that make use of single-dimensional arrays, multi-dimensional arrays, strings, file I/O, and classes.
5. Test and verify that a program satisfies specific requirements.

Attendance

Those who attend class regularly will usually do much better than those who miss frequently, so you are expected to be in class *every day*. You may have four “free skips,” but each unexcused absence after that will result in **0.5%** being subtracted from your final grade. Absences that are excused (illness, school sponsored trips, etc.) will not be held against you. After missing a class, it is **your responsibility** to determine what you missed and what homework might be due the following day. Normally you will want to watch the class video on Echo360 and check Easel.

Attendance will be taken daily at the beginning of class. If you are late, you must check with me to be sure I recorded your late attendance. Three late arrivals is equivalent to one unexcused absence.

Exams

Four hour long exams will be given along with a cumulative final exam. If you are unable to take an exam as scheduled due to a serious illness or some other emergency, it is *your responsibility* to call me and leave a message *before* the exam or as soon as you are physically able. If an official school function takes you out of class on an exam date, it is your responsibility to make arrangements *one week prior* to the exam as to when you will take the exam. Usually it will be given early, not late. Makeup exams for excused absences will be given, but a penalty of up to 75% will apply for unexcused absences, at the teacher’s discretion. Phones must be turned off and put away.

Homework and Labs

There will be multiple homework assignments and in-class labs each week. The homework is to be completed *individually*. We will be using CodeLabs for some of the homework assignments. CodeLabs is an online system which requires you to pay a fee of \$25. More information about registering on CodeLabs will be given later in the semester.

Most in-class labs are to be completed in *pairs* (2 people). Pair programming has been shown to have a number of benefits including increased personal satisfaction and fewer errors¹, and it helps most students who are learning to program. When working in pairs, both students must work together on a *single* computer, and both must write *approximately half* of the code. **No code should be written without the other partner present and watching.** Both of you should understand completely what is being written. If it is not possible for a pair to find time to work together outside of class, each person can finish the lab independently.

Programming Projects

Approximately five large programming projects will be assigned, and you will have one to two weeks to complete each project. These are major assignments which will require dedicated effort and time to complete. You will use Microsoft Visual Studio 2015 to write the programs; it is installed on all machines in the classroom and 201 lab. To obtain a free copy of VS to install on your own computer, click the link on the class website to *Visual Studio Community*.

You may work independently on your projects or in pairs (with your lab partner or someone else). Just like the labs, both people must work together on a single computer, and both must write approximately half of the code. *No code can be written without their partner present and watching.* Both people should understand completely what is being written. When you submit a program that has been written in pairs, you must document at the top of the program the names of both individuals who worked on the program. Only one student should submit the program.

Extra Credit

A maximum of 2% extra credit can be earned and applied to your final grade.

1. **Computing Seminar:** You will receive **0.1%** points extra credit for each Computer Seminar that you attend. Seminar meets every Friday at 7:00 am in Science 113, beginning around the 4th week of the semester. There will be approximately 10 seminars, thus allowing you to increase your final grade by 1%. See <http://www.harding.edu/academics/colleges-departments/sciences/computer-science> for the complete schedule.
2. **Giving Blood:** Donating at the Red Cross blood drives will earn you **0.2%** added to your final grade each time you donate. Donate as many times as you'd like, and give me a signed note confirming your donation each time you donate.
3. **The McChallenge:** **1%** will be added to your final grade for the completion of a program which will be made available to you later in the semester. The program will be due the Friday before final exams. You can skip the program and still get the 1% added to your final grade if you beat me in a game of basketball, tennis, racquetball, Halo, chess, Trivia Pursuit, or any other sport/game that I know how to play. If you lose, you still may complete the program to get your 1%. Only one challenge per semester, and all challenges must be made *before* the final week of class. Come by my office to schedule a time to play.

Grades

Final grades are computed with the following weights: Letter grades: A = 90-100%, B = 80-89% C = 70-79%,
D = 60-69%, F = 0-59%

Exams:	40%
Projects:	25%
Homework and Labs:	20%
Final Exam:	15%

Late work: A maximum of 10% will be taken off each day a program or assignment is late, up to 50%. Every day is counted, including weekends. Nothing more than one week late will be accepted.

Final grades are not rounded unless the student has given significant effort which is evidenced by regular attendance, completion of nearly all homework assignments, working well with partners in completing labs, etc.

¹ See *All I Really Need to Know about Pair Programming I Learned in Kindergarten* (2000) for more information on effectively using pair programming at <http://citeseer.ist.psu.edu/williams00all.html>.

Miscellaneous

1. Notes are available to you on Easel. If you want to print them out, please do so *before class, not during class* so you don't disrupt others.
2. Tutoring is available in the Sci 201 Computer Lab on most evenings (check the schedule which is posted in the lab). Tutors are junior or senior computer science majors who have completed this course and more advanced programming courses.
3. To be successful in this course, the typical student will need to spend at least **two hours outside of class** for every hour in class studying, completing homework, working on projects, and preparing for exams. This works out to about 15 hours per week. If you do not have this much time to dedicate to the course, you should take it some other semester when you can make that commitment.
4. You must **check** Canvas and Easel **regularly** for announcements, class discussions, and assignments. Canvas is where you can ask questions and give help to others on homework, labs, and projects and where class recordings can be accessed.
5. Everyone is expected to hold the **highest standard** of personal conduct and **integrity**. Cheating in all its forms is inconsistent with Christian faith and practice and will result in sanctions up to and including dismissal from the class with a failing grade. Homework should be completed *individually* (not in teams or pairs), and it should be *your* work, not the work of someone else. Projects should also be completed individually although they may be completed using pair programming. One thing that you should *never do* is give someone your source code to look at as this often leads to cheating. Come by during office hours (or we'll arrange a time) for assistance on programs. Also take advantage of the tutor who will be available several times a week.
6. Please adhere to the **dress code** as spelled out in the Student Handbook. This includes men removing caps while in class. Please wear shoes to class (flip flops are OK).
7. **No food or drink** is allowed in the lab. However, I will allow you to bring in a drink with a lid until we have a spill.
8. Lab computers may be used during class to **take notes and write programs** when specifically allowed by the instructor. Until the instructor gives you permission, your monitor is to remain **off**. Students who use lab computers for other purposes will not be allowed to use the lab computers.
9. Silence your phones, and **put them away**. It is very distracting to me and those around you when you text in class.

Computer science is one of the most fascinating fields you can study and currently has the **most stable** and **satisfying** job markets. It is, however, a science, and it cannot be mastered without **persistence** and **practice**. You should expect to struggle with some of the difficult concepts in this course, but by working diligently, it is possible to master the material. Those who do the best in this course attend class regularly, turn in homework and assignments on time (because they didn't procrastinate), and seek help from the tutor or myself when in a rut. Remember that I am here to help you.

Assessment

Harding University, since its charter in 1924, has been strongly committed to providing the best resources and environment for the teaching-learning process. The board, administration, faculty, and staff are wholeheartedly committed to full compliance with all criteria of the Higher Learning Commission of the North Central Association of Colleges and Schools. The university values continuous, rigorous assessment at every level for its potential to improve student learning and achievement and for its centrality in fulfilling the stated mission of Harding. Thus, a comprehensive assessment program has been developed that includes both the Academic units and the Administrative and Educational Support (AES) units. Specifically, all academic units will be assessed in reference to the following Expanded Statement of Institutional Purpose: **The University provides programs that enable students to acquire essential knowledge, skills, and dispositions in their academic disciplines for successful careers, advanced studies, and servant leadership.** Assessment of the knowledge, skills, and dispositions of each student for the purpose of assigning a letter grade at the completion of this course will be based on the projects, homework assignments, and exams that were described previously in this syllabus.

Students with Disabilities

It is the policy for Harding University to accommodate students with disabilities, pursuant to federal and state law. Therefore, any student with a *documented disability* condition (e.g. physical, learning, and psychological) who needs to arrange reasonable accommodations must contact the instructor and the Disabilities Office at the *beginning* of each semester. (If the diagnosis of the disability occurs during the academic year, the student must self-identify with the Disabilities Director *as soon as possible* in order to get academic accommodations in place for the remainder of the semester.) The Disabilities Office is located in Room 205 of the Student Center, telephone, (501) 279-4019.

Schedule

The following schedule is subject to change but gives you an idea of how the class will progress:

Week 1 Jan 8	Introductions History of computing Hardware and software basics	Week 7 Jan 15	Intro to functions Functions that return values Lab 5 – Debugger Output parameters <i>No class Thu & Fri</i>	Week 13 Jan 22	Review Project 5 Intro to structs/classes Constructors and methods Lab 12 – Structs and files
Week 2 Jan 15	<i>Mon: No class on MLK Day</i> Algorithms and flowcharting Binary numbers C++ history and syntax intro	Week 8 Jan 22	Lab 6 – Functions Review Project 3 Intro to arrays	Week 14 Jan 29	Intro to pointers Dynamic memory allocation Slack
Week 3 Jan 22	Input, output, assignment Lab 1 - Compile and run Arithmetic expressions Exam 1	<i>Spring Break</i>	Week 9 Feb 5	Week 15 Feb 12	Binary files Bitmap manipulation Lab 13 - Bitmaps
Week 4 Jan 29	if and if-else statements while and do-while statements Lab 2 – Flowcharts to code	Week 9 Mar 12	Lab 7 – Arrays Sorting algorithms Lab 8 – Sorting arrays Exam 3	Week 16 Apr 30	Final Exam
Week 5 Feb 5	Review Project 1 Nested ifs and loops Chars and complex conditions Lab 3 – Nested ifs and chars	Week 10 Mar 19	2D arrays Lab 9 – 2D arrays Review Project 4 Intro to strings		"Whatever you do... do all to the glory of God." - 1 Corinthians 10:3
Week 6 Feb 12	Data validation Lab 4 – Ave, min, and max Review Project 2 for loops and switch statements Exam 2	Week 11 Mar 26	C string functions C++ string functions Lab 10 – Strings		
		Week 12 Apr 2	Intro to files The Web and HTML Lab 11 – File I/O Exam 4		