Syllabus

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

Instructor: Dr. Frank McCown
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Home Page: http://www.harding.edu/fmccown/classes/comp170-f18/
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.

Participation

Each class is a mixture of lecture, discussion, and trying things out on the computer. Your attendance is necessary to be successful. To encourage your engagement and to help the instructor gauge whether the class understands the material, you will often be asked multiple choice questions during class using Plickers. Your response is recorded, and the percentage of correct responses forms your participation score (5% of your overall grade).

You will be given a Plickers card on the second day of class. It is your responsibility to bring your Plickers card to class *every day*. If you forget your Plickers card, you will receive a 0 for your participation score that day.

You may have four "free skips" that do not count against your participation score. However, each unexcused absence after that will result in a 0 for that day's participation score. Excused absences (illness, school sponsored trips, etc.) do not count against your participation score. 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.

You are encouraged to be on time to class. Three late arrivals will result in a 0 for one day's participation score.

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 errors[1], 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 require dedicated effort and time to complete. You will use Microsoft Visual Studio 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.

Grades

Final grades are computed with the following weights:

Participation:	5%
Projects:	25%
Homework and Labs:	15%
Exams:	40%
Final Exam:	15%

Letter grades: A = 90-100%, B = 80-89% C = 70-79%, D = 60-69%, F = 0-59%

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.

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 4rd 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.

[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.

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.

Course Culture

1. Shortcuts don't exist.
   - You cannot learn without considerable effort. Be prepared to spend at least **two hours outside of class** for every hour in class (15 hours a week) studying, reading, completing homework and projects, and preparing for exams.
   - Keep up with your reading and homework. Start your homework and projects on time so you can get help from the instructor when needed.
   - Come by during office hours (or we'll arrange a time) for assistance on assignments. Visit the tutor in 201 who is available throughout the week in the evenings. Remember that I'm here to help you.

2. Be considerate of others.
   - Help create an environment where you and your classmates can effectively learn.
   - Be on time. Stay awake. Engage in class discussion. Ask questions.
   - Keep your phone put away.
   - Use your computer for coursework only so you do not distract yourself or those around you. Until the instructor gives you permission, your monitor is to remain **off**.

3. Glorify God in all you do.
   - "Whatever you do… do it all to the glory of God." – 1 Cor 10:31
   - God has given you this time to learn and develop a skill.
   - Everyone is expected to hold to 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. You are cheating when you submit work performed by anyone but yourself and your partner. Never allow someone to view your source code as this often leads to cheating.

4. Miscellaneous
   - Check Canvas and Easel **regularly** for announcements. Canvas is where you can ask questions and give help to others on homework, labs, and projects and where class recordings can be accessed.
   - Please adhere to the **dress code** as spelled out in the Student Handbook. Do not wear shorts to class. Men should remove caps while in class. Please wear shoes to class (flip flops are OK).
   - **No food** or drink is permitted in the lab. However, I will allow you to bring in a drink with a lid until we have a spill.

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 Introductions
Aug 20 History of computing
Hardware and software basics

Week 2 Algorithms and flowcharting
Binary numbers
C++ history and syntax intro

Week 3 Input, output, assignment
Sep 3 Lab 1 - Compile and run
Arithmetic expressions
Exam 1

Week 4 if and if-else statements
while and do-while statements
Lab 2 – Flowcharts to code

Week 5 Review Project 1
Nested ifs and loops
Chars and complex conditions
Lab 3 – Nested ifs and chars

Week 6 Data validation
Sep 24 Lab 4 – Ave, min, and max
Review Project 2
for loops and switch statements
Exam 2

Week 7 Intro to functions
Functions that return values
Lab 5 – Debugger
Output parameters

Week 8 Lab 6 – Functions
Review Project 3
Intro to arrays
Fall Break

Week 9 Lab 7 – Arrays
Oct 15 Sorting algorithms
Lab 8 – Sorting arrays
Exam 3

Week 10 2D arrays
Lab 9 – 2D arrays
Review Project 4
Intro to vectors
Lab 10 - vectors

Week 11 Intro to strings
C string functions
C++ string functions
Lab 11 – Strings

Week 12 Intro to files
Nov 5 The Web and HTML
Lab 12 – File I/O
Exam 4

Week 13 Review Project 5
Intro to structs/classes
Constructors and methods
Lab 13 – Structs and files

Thanksgiving Break

Week 14 Intro to pointers
Dynamic memory allocation
Slack

Week 15 Binary files
Bitmap manipulation
Lab 14 - Bitmaps

Week 16 **Final Exam**
Dec 10