CSE320 System Fundamentals II

Fall 2021

Course Description:
This course will introduce programming and essential concepts of operating systems, compilers, concurrency, and performance analysis, focused around several cross-cutting examples, such as memory management, error handling and threaded programming.

Class hours: TuTh 12:30pm ~ 1:50pm
Class room: TBD, Zoom (https://stonybrook.zoom.us/j/5078058515)
Office hours: TuTh 3:30pm ~ 4:30pm

Prerequisites: Completed CSE220 with a C or higher grade

Instructor:
YoungMin Kwon (youngmin.kwon at sunykorea dot ac dot kr)
Office: B420
TA: None

Textbook and References:
- Computer Systems, A Programmer's Perspective, 3rd Edition, Pearson, 2016, ISBN-10: 0-13-409266-x; Authors: Bryant and O'Hallaron
- The C Programming Language, 2nd Edition, Prentice-Hall, 1988, ISBN-10: 0-13-11-370-9; Authors: Kernighan and Ritchie
- C for Java Programmers: A Primer; Author: Charlie McDowell

Course Website:
http://www3.cs.stonybrook.edu/~youngkwon/cse320/

Grading:
1st midterm exam: 15%
2nd midterm exam: 15%
Final exam: 20%
Programming assignments: 45%
Attendance: 5% (missing more than 20% of the class will fail the course)

Major Topics Covered in the Course:

- C Programming
- Memory Hierarchy, Caches, Virtual Memory
- Operating System Processes and POSIX abstractions
- Operating System Scheduling and I/O
- Basic Networking and Socket Programming
- Multi-threading and Parallel Programming

Course Learning Outcomes:

- Develop an understanding of the layers of software that lie between an application program and the underlying hardware and how they inter-operate.
- Develop an ability to program with operating system APIs.
- Develop an ability to write and analyze multi-threaded programs.

Academic integrity:
In pursuing their academic goals, all students should be honest and be responsible for all submitted work. Representing others' work as yours is wrong and faculty is required to report to any suspected instance of academic dishonesty to the school. Regarding homework, you can discuss it with others, but you should write own code. For more details please refer to
http://www.stonybrook.edu/commcms/academic_integrity/index.html

Students with disabilities:
If you have a physical, psychological, medical or learning disability that may impact your course work, please let the instructor know. Reasonable accommodation will be provided if necessary and appropriate. All information and documentation are confidential.

Critical incident management:
The University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Covid-19: Classroom Mask Policy:

Everyone participating in this class during in-person sessions must wear a mask or face covering at all times or have the appropriate documentation for medical exemption. Any student not in compliance with this policy will be asked to leave the classroom. If students need to drink or eat, they should step out of the classroom to do so.

Tentative Course Schedule

Week	Topics	Readings
Week 1	Introduction & overview C programming and run-time env. (hello.c)	Ch1, C references
Week 2	C programming and run-time env. (variables, flow control)	
Week 3	C programming and run-time env. (function calls, runtime env.)	
Week 4	Dynamic memory allocation (pointers, structures)	Ch 9.9 – 9.11
	First midterm exam	
Week 5	System stack: interrupts and hardware & software exceptions	Ch 8
Week 6	System stack: signals	
Week 7	System stack: system APIs (pipes, fork, files, …)	Ch 10
Week 8	Concurrent programming: networks	Ch 11.1 – 11.4
Week 9	Concurrent programming: threads and locks	Ch 12.1 – 12.3
	Second midterm exam	
Week 10	Concurrent programming: shared resource, deadlock, race conditions	Ch 12.4 – 12.8
Week 11	Memory: cache	Ch 6
Week 12	Memory: virtual memory	Ch 9.1 – 9.8
Week 13	Memory: Memory mapping and linking	Ch 7