EE 306: Introduction to Computing

Ramesh Yerraballi

Fall 2016

Sections: 16170,16175,16180,16185, 16220,16225,16230,16235

General Information

Class Time (Classroom)	MW 12:00-1:30pm(CPE 2.218)	TTh 3:30-5:00pm (BUR 216)
Recitation Session	Check the room/time you have to go based on the session you signed up for.	
Office	POB 5.442	
Contact	ramesh@mail.utexas.edu	
Pre-requisites	Credit with a grade of at least C or registration for Mathematics 408C or 408K. No formal programming experience is expected.	
Office Hrs	M 2:00-4:00pm; W 2:00-4:00pm (AHG 102) TA Office Hours on Canvas	
Website	UT Canvas	
TAs	Alex **H**su, Ousama **K**anawati, Schuyler **C**hristiansen, Crystal **M**cDuffie, David **W**ang, Troy V **S**tidd, Danny P. **V**o, Kelsey **B**all.	

Course Overview

This is the first course in computing for students of computer engineering and electrical engineering. The objective is to provide a strong foundation that a serious student can build on in later courses across the spectrum of computer science and engineering. The idea is that a more complete understanding of the fundamentals will help a student acquire a deeper understanding of more advanced topics, whether that topic is in computer architecture, operating systems, data base, networks, algorithm design, software engineering, or whatever. The approach is "motivated" bottom-up. Starting with the transistor as a switch, we build logic gates, then more complex logic structures, then gated latches, culminating in an implementation of memory. From there, we study the computer's instruction cycle, and then a particular computer, the LC-3 (for Little Computer 3).

The LC-3 captures the important structures of a modern computer, while keeping it simple enough to allow full understanding. (From Yale Patt)

Text

Introduction to Computing Systems, 2nd edition by Yale Patt & Sanjay Patel ISBN: 0-07-246750-9 McGraw Hill, 2003

Recitation Session

The recitation sessions are intended to reinforce and expound on topics covered in class. The TAs conducting these sections are competent to answer any questions you have regarding the material covered in class. At times, they may present a topic in an alternate way that may be clearer to you. You are welcome to attend one, or more of the sessions. Attendance is not mandatory but strongly recommended.

Programming Assignments

The first programming assignment is in the machine language of the LC-3. From there, we move up to Assembly Language, and learn how an assembler works. The remaining programming assignments are in LC-3 Assembly Language. We cover good programming style and practice, and teach debugging from the get go. An LC-3 Simulator allows the student to debug his/her own programs. Input (via the keyboard) and output (via the monitor) both use the physical device registers. System service routines, written in LC-3 Assembly Language, are used to perform I/O functions. They are invoked by user programs by the TRAP instruction and corresponding trap vector. Subroutine calls and returns complete the LC-3 instruction set. (From Yale Patt)

Grading Criteria

Assignment	Percentage
Homeworks	20%
Exams: Two Mid-terms (15% each) and a Final Exam (20%)	50%

Assignment	Percentage
Programming Assignments (5 at 6% each)	30%

Exams

The mid-term exams will be held during regular class time. The syllabus for the mid-term exams will be posted on the class Blackboard site. The final exam will be held according to university schedule. The final is comprehensive and includes the entire 10 chapters though emphasis will be more on the later chapters.

Late Policy

Homeworks must be turned in on the due date (usually one week) in class at the beginning of class. Programming assignments are due midnight on the due date (one or two weeks). You are allowed a one-time exception to submit one (out of five) programming assignment late with a 10% deduction per day up to a maximum of 2 days.

Re-grading

Programming assignments 1, 2 and 3 may be submitted for re-grading no later than 2 days after receiving your graded work back. The score you receive will be half the improvement you make. For example, if you make 60 on the submission and your resubmission secures you a 100, your new score will be 60+(100-60)/2 = 80.

Honor Code

Programming assignments, examinations must be the product of work performed exclusively by you. You may discuss problem sets in a group but your submission must be your own work. Allegations of Scholastic Dishonesty will be dealt with according to the procedures outlined in Appendix C, Chapter 11, of the General Information Bulletin, http://www.utexas.edu/student/registrar/catalogs/

Tentative Lecture Schedule

Date	Topics	Chapter
8/24,25	Hardware vs. Software; Computers as Universal Computational Devices; The course journey - (Ch 1)	Ch 1
8/29,30	Bits, Integer representations, Bit Operations - (Ch 2)	Ch 2
8/31,9/1	Logical Operations, AND, OR, NOT; Other Data Types (Ch 2)	
9/5,6	Transistors, Gates - NOT, OR, NOR, AND, NAND; DeMorgans Law	Ch 3
9/7,8	*Combinatorial Logic Circuits* - Full ADDER, MUX, DECODER, PLAs	
9/12,13	Storage Elements - RS, D Latch, Register, Basic concept of Memory	
9/14,15	*Sequential Logic Circuits* - Finite State Machines	
9/19,20	Von Neumann Model of Computation: Fetch-Decode-Execute-Store	Ch 4
9/21,22	ISA - Introduction to Little Computer 3 (LC-3), ISA, Problem Solving and Online Debugging	Ch5
9/25,27	Exam 1 Review	
9/28,29	**First Mid-term Exam (Syllabus - Chapters 1,2,3,4)** **Friday 9/30 (7:00-8:15pm Location: WEL 2.224)**	Ch5
10/3,4	Problem Solving and Online Debugging	Ch 6
10/5,6	A Stored Program in LC-3 ISA **Program 1 Due 10/6 online at 11:55pm**	Ch 7
10/10,11	Assembly Language and The Assembler	

Date	Topics	Chapter
10/12,13	Detailed example in LC-3 Assembly language	
10/17,18	Physical I/O	Ch 8
10/19,20	TRAP Routines, TRAP Vector Tables, Saving State **Program 2 Due 10/20 online at 11:55pm**	Ch 9
10/24,25	Subroutines - Library and User-defined	
10/26,27	Stacks. Parameters. How are they passed	
10/31,11/1	Example Applications	
11/2,3	Example Applications **Program 3 Due 11/3 online at 11:55pm**	
11/7,8	*Catch up, Review*	
11/9,10	**Second Mid-term Exam (Syllabus - Chapters 5,6,7,8 and 9)** **Friday 11/11 (7:00-8:15pm Location: WEL 2.224)**	
11/14,15	Interrupt Processing	Ch 10
11/16,17	Interrupt Processing	
11/21,22	ASCII/binary Conversion **Program 4 Due 11/22 online at 11:55pm**	
11/28,29	Stack use for Arithmetic expression parsing; The Calculator Example (Putting it all together)	
11/30,12/1	Final Exam Review **Program 5 Due 12/1 online at 11:55pm**	

Date	Topics	Chapter
	Final Exam (Comprehensive) (Time and location TBD)	

Disclaimer

Instructor reserves the right to modify course policies, the course schedule, and assignment/problem-set/exam point values and due dates.

Additional Details

The deadline for dropping without possible academic penalty is 11/1/16.

The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4241 TDD, or the College of Engineering Director of Students with Disabilities, 471-4321.