

Department of Electrical and Computer Engineering
The University of Texas at Austin

EE 460N, Fall, 2016

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Course Outline

August 24, 2016

August 24: Lecture 1: Intro to the course. Levels of Transformations. Basic architectural choices. Science of Tradeoffs.

August 25,26: First Discussion Session. Bookkeeping, overview, expectations, PL0

Programming Lab 0 is due, Sunday night, August 28, 11:59pm. (The program itself will be empty. The purpose of the assignment is to make sure we are on the same page re: using the system.)

August 29: Lecture 2: Intro to Instruction Set Architecture, with examples taken from many diverse ISAs. ISA tradeoffs. Detailed discussion of LC-3b, with Assembly language constructs. The Assembler, how it works. PL1

August 31: Lecture 3: Microarchitecture, LC-3b data path, state machine, microsequencer.

September 1,2: Discussion Session. ISA, microarchitecture, PL1.

September 5: No class, Labor Day

September 7: Lecture 4: Pipelining, Branch Prediction (The HEP)

September 8,9: Discussion session: Microarchitecture, Pipelining, Branch Prediction, PL1.

Programming Lab 1 is due, Sunday night, September 11, 11:59pm. (Write a program in LC-3b Assembly Language. Write an Assembler. Assemble the program you have written.)

September 12: Lecture 5: Physical memory, unaligned access, interleaving, SRAM, DRAM

Problem set 1 due before class, September 14. (Emphasis: ISA, uarch of the LC-3b, the Assembly Process)

September 14: Lecture 6: Physical Memory (continued).

September 15,16: Discussion session: Physical Memory, PL2.

September 19: Lecture 7: Virtual memory, page tables, tlb, VAX model, IA32 model, contrast with segmentation.

September 21: Lecture 8: Virtual memory, continued.

September 22,23: Discussion Session. Emphasis on Virtual memory, PL2

Programming Lab 2 is due, Sunday night, September 25, 11:59pm. (Write a program in C that simulates at the instruction cycle level the baseline LC-3b ISA. Test your simulator with the output of the assembler for the application program written in Programming Lab 1.)

September 26: Lecture 9: Cache Memory

September 28: Lecture 10: Cache Memory, continued.

September 29,30: Discussion session: Cache Memory, Review for exam.

October 2,3: Lecture 11: Class will not meet formally. Instead, there will be two review sessions, Sunday afternoon, October 2 and Monday class time, October 3. Problem set 2 should be turned in at one of those times. The problem set will emphasize physical memory, virtual memory, and cache memory.

October 5: Lecture 12: Exam 1.

October 6,7: No discussion section, prepare for Oklahoma game on October 8.

October 10: Lecture 13: The notion of Process, the unit of work managed by the Operating System, and its implications on Interrupts and Exceptions and Virtual memory.

October 12: No class. The original Columbus Day.

October 13,14: Discussion session: Exam solution, PL3

Programming Lab 3 is due, Sunday night October 16, 11:59pm. (Finish the clock cycle level Simulator for the LC-3b. Test it on the application program written in Programming Lab 1.)

October 17: Lecture 14: Input/Output.

October 19: Lecture 15: Input/Output, continued.

October 20,21: Discussion session: I/O, PL4.

October 24: Lecture 16: Integer Arithmetic

October 26: Lecture 17 : Floating point arithmetic and the IEEE Standard.

October 27,28: Discussion session: Floating Point, PL4

Problem set 3 due before class, October 31. (Cache memory, arithmetic.)

October 31: Lecture 18: Single-thread parallelism (SIMD, VLIW, Vectors).

November 2: Lecture 19: Single-thread parallelism (Tomasulo, HPS, Data Flow).

November 3,4: Discussion session: Single thread parallelism, PL4

Programming Lab 4 is due, Sunday night November 6, 11:59pm. (Interrupts/Exceptions)

November 7: Lecture 20: Intro to Multiprocessing, Amdahl's Law, Speed-up, efficiency.

November 9: Lecture 21: Interconnection networks, Cache Coherency, Sequential Consistency.

November 10,11: Discussion Session. Multiprocessors.

November 14: Lecture 22: Systems Issues (BW, SMT, Power, Accelerators)

Problem set 4 due before class, November 16. (Data flow, MP issues.)

November 16: Lecture 23: Review or catch up.

November 17,18: Discussion session. Review for exam.

November 21: Lecture 24: Exam 2.

November 23: No class, university holiday, Thanksgiving.

November 24,25: No discussion section.

Programming Lab 5 is due, Sunday night November 27, 11:59pm. (Virtual memory)

November 28: Lecture 25: Pot Pourri (Measurement methodology, GPUs, Maxeler, etc.)

November 30: Lecture 26: Introduction (reprise!)

December 1,2: Discussion session: Review of the course, Prepare for Final, PL6

December 5: Lecture 27: Last class, free for all!

Programming Lab 6 is due, Monday, December 5, 11:59 pm. (Pipelining)
Problem set 5. A study guide, not to be turned in.

Final exam: Probably Friday, December 9, 7-10pm. Registrar has the right to change the dates of the final exams. Please keep checking the Registrar's web site and our announcements to be sure when/where the final exam will be given.