

CS311: Computer Organization

Fall 2018

Classroom	Terman Hall, Creative Building
Course Web Page	http://www.ecl.kaist.ac.kr/courses/2018-fall-cs311-board and KLMS
Instructor	Prof. Soontae Kim (김순태)
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TA	Wonyoung Lee, Jinkweon Kim, Myungjae Jang, Haejin Nam (Room 922 in N1 Building) and 3 more TAs

Objective of the Course

We will study the internals of modern computer systems and how to design them. We will first look at instruction set design issues. Then, we will design the datapath and memory system. Parallel processors are also studied. After taking this course, you should be able to understand the organization and design issues of modern computer systems and to explain them to other non-major people.

Prerequisites

Digital system design or System programming (mandatory) and experience with high-level language(C/C++) programming.

Textbook

Patterson and Hennessy, Computer Organization and Design The hardware/Software Interface, 5th Ed., Elsevier Korea LLC (Asian edition).

Grading Policy (tentative)

Homework assignments	20%
Project	20%
Midterm exam	25%
Final exam	30%
Attendance	5% (-1 for missing a class)

Cheating is not allowed in all exams and homework assignments. You will be given zero points for cheating. Do not look at the solutions you obtained on the Internet for homework assignments. Do not make noise and move around not to annoy me and other students. If you do so, I may ask you to leave the classroom.

Course Schedule (subject to change)

Week	Date	Topic	Reading (textbook)	Assignments
1	8/28	Class introduction		
	8/30	Computer abstractions and technology	Chapter 1	
2	9/4	Instruction set architecture (ISA)	Chapter 2.1 ~ 2.3	
	9/6	MIPS ISA	Chapter 2.4 ~ 2.7	
3	9/11	MIPS ISA II	Chapter 2.8 ~ 2.10	
	9/13	MIPS assembly programming	Section 2.11 ~ 2.13	Hw#1
4	9/18	Review - combinational logic	Appendix B	
	9/20	Integer arithmetic	Section 3.1 ~ 3.4	
5	9/25	No class		Chuseok Holiday
	9/27	Floating-point arithmetic	Section 3.5	
6	10/2	Review - sequential logic	Appendix C	
	10/4	Building a datapath	Section 4.1 ~ 4.3	Hw#2
7	10/9	No class		Hangul Holiday
	10/11	Datapath – simple implementation	Section 4.4	
8	10/16	Midterm exam	Chapter 1 ~ 4.4, Appendix B	
9	10/23	Pipelining – overview	Section 4.5	
	10/25	Pipelining – datapath & control	Section 4.6	
10	10/30	Pipelining – data hazards	Section 4.7	
	11/1	Pipelining – control hazards	Section 4.8	Hw#3
11	11/6	Pipelining – exceptions	Section 4.9	
	11/8	Instruction-level parallelism	Section 4.10	
12	11/13	Memory hierarchy – basics	Section 5.1, 5.2	
	11/15	Memory hierarchy – cache performance	Section 5.3	
13	11/20	Memory hierarchy – cache performance II	Section 5.4	Hw#4
	11/22	Memory hierarchy – virtual memory	Section 5.5~5.7	
14	11/27	Memory hierarchy – common framework	Section 5.8~5.10	
	11/29	No class		Undergraduate Exam
15	12/4	Memory hierarchy – real stuffs	Section 5.13	
	12/6	Parallel processing, SIMD, multithreading	Section 6.1 ~ 6.4	
16	12/11	Final exam	Chapter 4.5~6.4	