



National Yang Ming Chiao Tung University
Computer Architecture & System Lab

Computer Organization Syllabus

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Course Information

- Instructor: **Tsung Tai Yeh**
 - ttyeh@cs.nycu.edu.tw
- TA team+: (EC-619)
- Lecture: M2R56
- Course website
 - <https://reurl.cc/EbkjG1>



Course website QR Code



Course Information

- **Lecture time:**
 - 9:00 - 9:50 am (Monday.) and 1:20 pm - 3:10 pm (Thur.)
- **Classroom:** EC-115
- **Grade:**
 - 30% for 5 lab assignments
 - 10% for 2 quiz
 - 30% for Midterm Exam
 - 30% for Final Exam
 - Midterm exam: Apr. 16
 - Final exam: June. 11



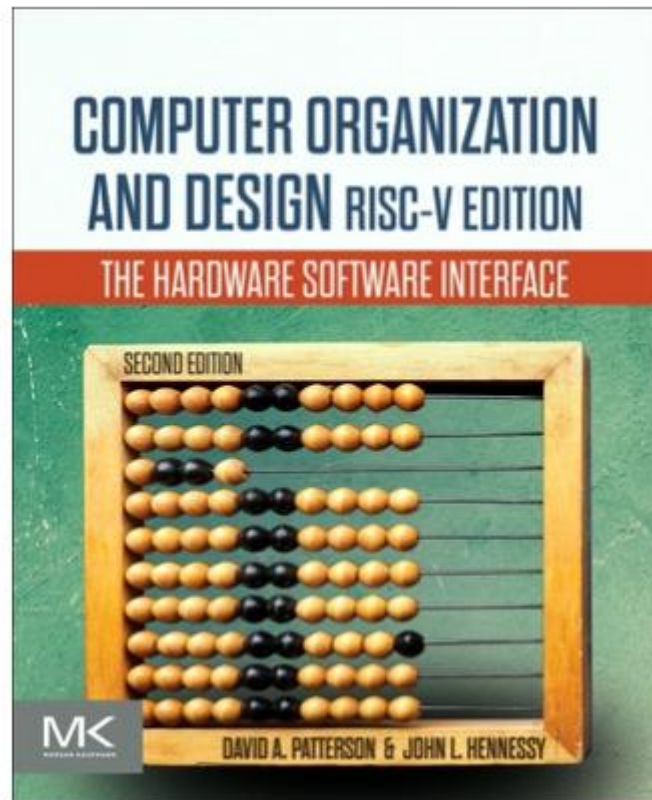
Intended Lecture Outcomes (ILOs)

- Learn the great ideas of computer organization
- Learn the formats of the RISC-V **instruction set**
- Understand the details of the **pipelining CPU** processor organization
- Introduce the **memory hierarchies** (DRAM and Cache)
- Implement a simple RISC-V CPU processor



Textbook

- Computer Organization and Design, RISC-V Edition, 2021
 - John L. Hennessy and David A. Patterson





Lecture Topics

- RISC-V Instruction Set Architecture (ISA)
- CPU Processor Organization
 - Pipelining
 - Branch prediction
 - Multi-core
- Memory Hierarchy
 - DRAM Memory
 - Cache Organization



Prerequisite Courses

- Prerequisite Courses
 - Digital Circuit Design
 - Data Structures and Object-oriented Programming
- Prerequisite Techniques
 - C/C++ Programming
 - Verilog Programming



Lab Assignments

- 5 lab assignments
- Need to use Verilog and Python to do each lab assignment
- Please submit your code to E3 by the deadline
- You can ask questions via discord
- <https://discord.gg/bGmSQgb8hX>
- Late submit penalty: cut 10% score of that lab per week





Lab Assignments

- Lab 0 (for practice)
 - Environment Setup & simple Verilog practice
- Lab 1 (5%)
 - RISC-V Assembly Programming
- Lab 2 (5%)
 - ALU, Multiplier
- Lab 3 (5%)
 - Single-Cycle CPU
- Lab 4 (10%)
 - Advanced Pipeline CPU
- Lab 5 (5%)
- Implement Cache Manager