

COMPUTER ORGANIZATION

Course Introduction

Chia-Heng Tu
Dept. of Computer Science and Information Engineering
National Cheng Kung University

1931
國立成功大學
National Cheng Kung University

Our Team

- Instructor: Chia-Heng Tu
  - chiaheng@ncku.edu.tw
  - Office @ Room 65B03
  - Office hours: by appointment
  - Tel: 06-2757575 ext. 62527

- *Angels*： 禹丞、昊霆、皓廷、鈞彥、柏安、峻廷、昱宗
  - Office @ Room 65704
    (Advanced Systems Research Lab)
  - Tel: 06-2757575 ext. 62530 #2704
  - Email: asrlab@csie.ncku.edu.tw
    Email subject starts with ``[Comp2024]''
  - Please check Moodle frequently for news update

Class Arrangement

- A 3-hour class is separated into three time slots:
  1. 9:10 ~ 10:30 (1st half)
  2. 10:30 ~ 10:50 (Let's take a nap/rest)
  3. 10:50 ~ 12:00 (2nd half)

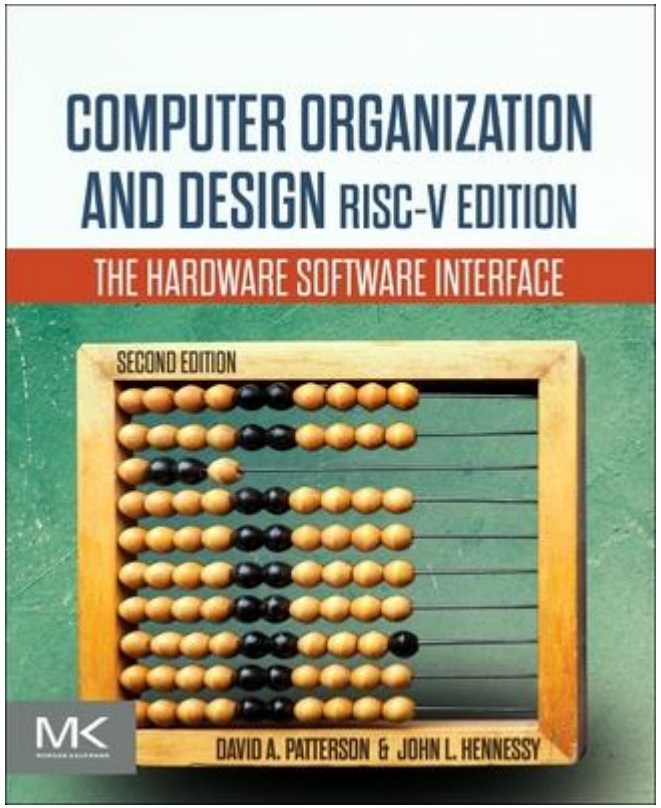
Requirements

- Pre-requisite:
  - Programming in C

- Efforts:
  - Attend classes
  - Read the slides/textbook(s)
  - Do/Demo the programming HWs
  - Take the quizzes & midterm/final examinations

Textbooks and References

- *Computer Organization and Design RISC-V Edition*: The Hardware Software Interface, 2/e
  - by David Patterson and John Hennessy
  - Morgan Kaufmann, 2020-12-17
  - ISBN: 0128203315
  - ISBN-13: 9780128203316



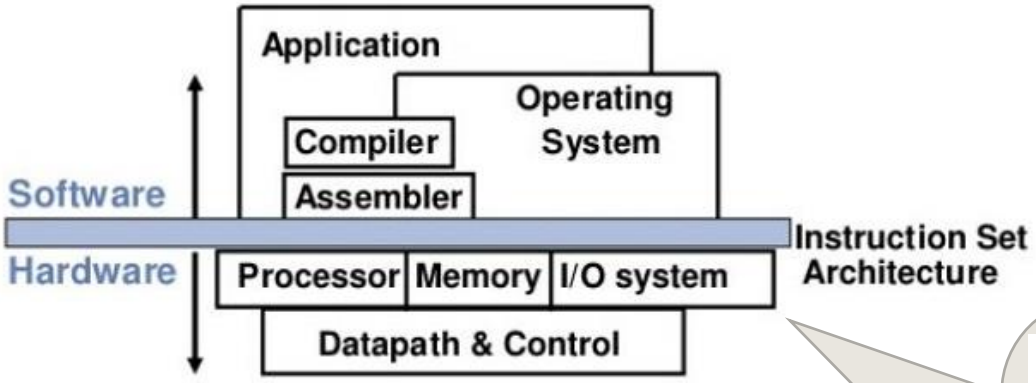
- Spike - RISC-V ISA Simulator
- You can find out more useful information on the Internet

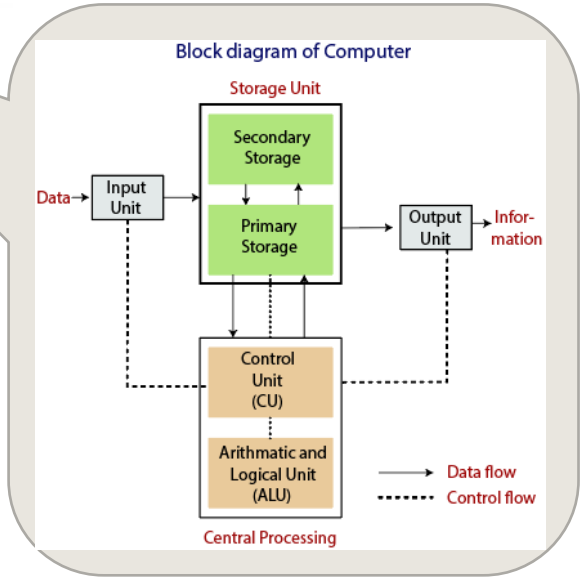
Topics

- Computer Abstraction and Technology
- Instructions
- Arithmetic for Computers
- The Processor
- Memory Hierarchy
- Parallel Processors from Client to Cloud

Overview of a Computer System

- Abstraction is the key to a computer system
  - Various abstraction interfaces
  - Instruction set architecture is the major focus of this course





Courtesy of img, img2

Grading

- In-class Quiz: 16%
- Midterm: 20%
- Final: 24%
- Programming Assignments: 40%

These weights are subject to minor revision

In-class Quiz, 16%

- 2 quizzes before Midterm
- 2 quizzes before Final

- It will be announced on the Moodle one week before
- Please do take the quizzes!!!

Midterm and Final, 44%

- It is important that you learn something from the class
- Score is a means to evaluate what you have learned

- *ZERO* tolerance for cheating on the exams/quizzes
- NCKU Rules for taking examinations

Programming Assignments, 40%

- To have a deep understanding of computer architecture
- To have a better understanding of processor design
  - ➢by implementing the key components of a processor and
  - ➢by evaluating the performance impact of design alternatives

- Three assignments in total
  - ❖Homework #1: 10%
  - ❖Homework #2: 15%
  - ❖Homework #3: 15%
  - ❖Grade: each assignment has basic requirements (100%) and may has optional achievements (extra points)
  - ➢Submit the code/project to NCKU Moodle based on the instructions

Programming Assignments, 40% (Cont'd)

Honor code

- Homework must be individual work
  - While you are allowed (and encouraged) to work together in understanding the concepts of the course, sharing of algorithms or code is NOT ALLOWED

- Software plagiarism detection tools will be used to check the similarity of the code you uploaded
  - For those have *similar* codes, you will have *ZERO* points of the programming assignment

Programming Assignments, 40% (Cont'd)

- Penalty for late upload
  - 30% *discount*
  - within seven days of the given deadline
- Exact deadlines will be announced along with the assignments

Timetable

2/22	1.	Course Introduction
2/29	2.	Computer Abstraction and Technology
3/7	3.	Instructions – Languages of the Computer 1
3/14	4.	Instructions – Languages of the Computer 2
3/21	**5.**	**HW #1** & Quiz
3/28	6.	Arithmetic for Computers
4/4	**7.**	**Spring break! No Class!!!**
4/11	**8.**	**HW #2** & Quiz
4/18	9.	Midterm
4/25	10.	The Processor 1
5/2	11.	The Processor 2
5/9	12.	The Processor 3
5/16	**13.**	**HW #3** & Quiz
5/23	14.	Large and Fast-Exploiting Memory Hierarchy
5/30	15.	Large and Fast-Exploiting Memory Hierarchy
6/6	16.	Parallel Processors from Client to Cloud & Quiz
6/13	17.	Final
6/20	**18.**	**Project demo (An enhanced RISC-V processor)**

← Could be changed

← Check Moodle

Why Study Computer Architecture?

- Because you use it everyday
  - ranging from smart home, cellphones, and cars to cloud servers
- Because you will likely use it for the rest of your life
- Because you are a CS major, studying computer science
- Because computer architecture is perhaps the most fundamental subject in computer science
  - Without computers, the field of computer science does not exist
- Because you can build up your career based on your knowledge on computer architecture
  - Together with compiler, OS, and other system software knowledge

Courtesy of this page

Questions?