Computer Organization and Architecture

0 Course Information

Tongwei Ren

Sep. 3, 2018

南京大學
NANJING UNIVERSITY

Instructor & TA

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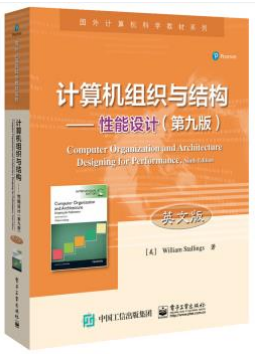
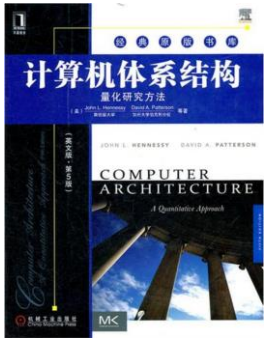
MAGUS

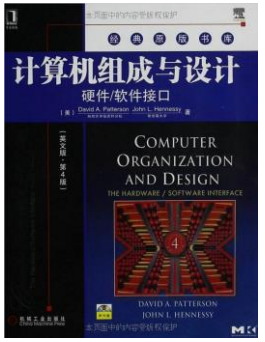
    - Contact: at class OR by email rentw@nju.edu.cn
      - Email subject: **COA19: ******
- Teaching Assistants (TBD)
  - Lusha Chen, Haobin Guo, Yunqing He, Xinwen Hu, Piao Huang, Li Lin, Fangming Lu*, Shaoxun Zeng*

Textbook

- Textbook
  - William Stallings. Computer Organization and Architecture: Designing for Performance
- Recommended reading
  - John L. Hennessy and David A. Patterson. Computer Architecture: A Quantitative Method
  - David A. Patterson, and John L. Hennessy. Computer Organization and Design: The Hardware / Software Interface





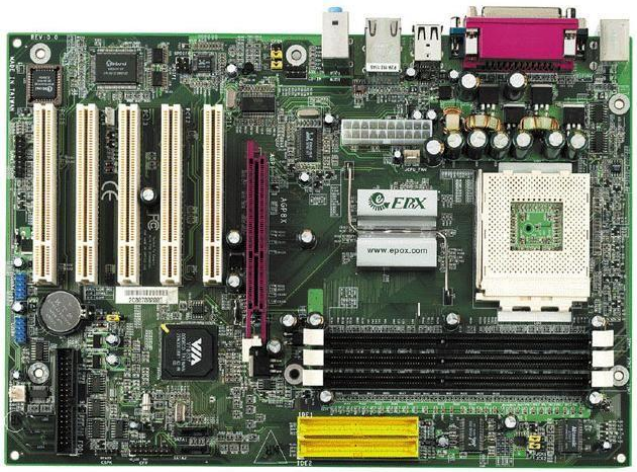


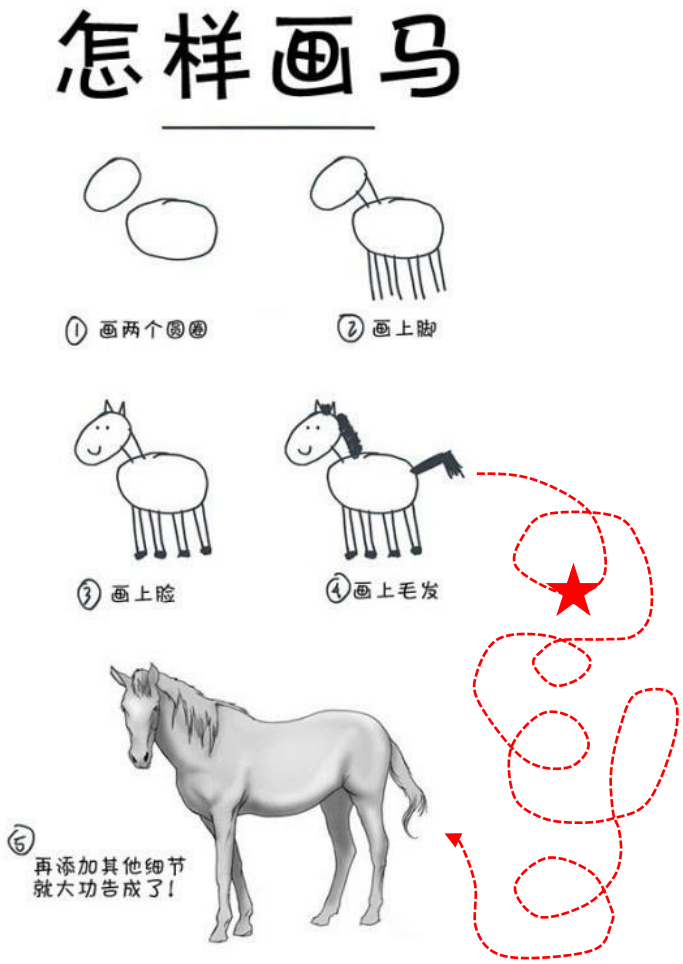
Requirement

- Fundamentals of computing system
  - Prof. Haoran Wang
- Reading material
  - Daoxu Chen, Haoran Wang, and Jidong Ge. Fundamentals of Computing System
  - Chunfeng Yuan. Introduction to Computer Systems
  - Randal E.Bryant and David R. O'Hallaron. Computer Systems: A Programmer's Perspective

Learning Objective

- Know more about computer components and how computers work
- Know something about computer performance
- Gather skills to help in solving programming problems

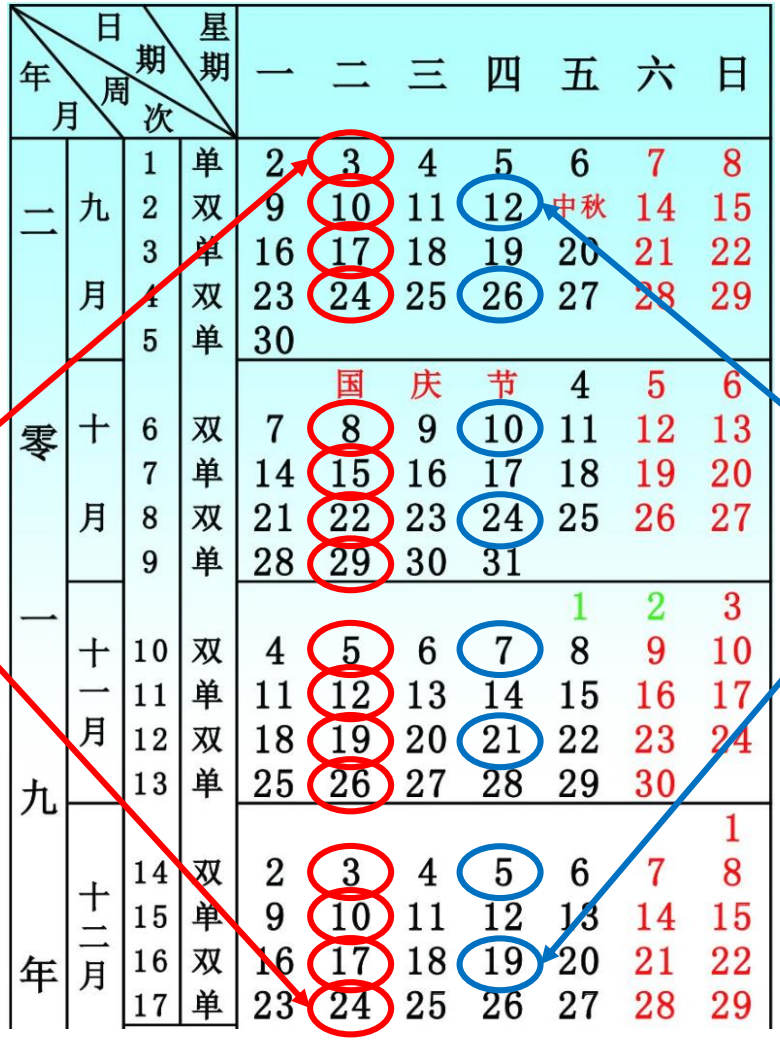




Why Difficult

设计计算机系统以获得高性能向来是非常重要的要求，但这个要求从来没有像现在这样强烈和难以满足。计算机系统的所有基本性能特征，包括处理器速度、存储器速度、存储容量和互联数据速率都在迅速提高，并且在以不同的速度提高。我们总是想设计出均衡的系统，它可以充分发挥所有元素的最佳性能和全部价值，但各种技术不平衡的发展速度使我们的目标难以实现。因此，计算机设计越来越成为一个补偿游戏，在某个方面改变结构或功能，以补偿另一个方面的性能不足。我们将在许多设计决策中看到这个让人筋疲力尽的游戏。

Calendar



lecture

assignment
explanation

Syllabus

Overview

- Lecture 01: Introduction
- Lecture 02: A top-level view of computer

CPU

Data Representation

- Lecture 03: Integer representation
- Lecture 04: BCD representation
- Lecture 05: Floating-point representation

- Lecture 06: CPU structure and function

Arithmetic

- Lecture 07: Integer arithmetic
- Lecture 08: Decimal arithmetic
- Lecture 09: Floating-point arithmetic

Storage

- Lecture 10: Internal memory
- Lecture 11: Cache
- Lecture 12: Virtual memory
- Lecture 13: External memory
- Lecture 14: RAID

- Lecture 15: Addressing
- Lecture 16: Instruction set
- Lecture 17: Exception and Interrupt

Input / Output

- Lecture 18: Input / output

Bus

- Lecture 19: Bus

- Lecture 20: Control unit

More

- Lecture 21: New computing platforms

What is Different?

More assignments

Programming
(Test platform by Prof. Qin Liu)

Writing
(WeChat micro-program)

Grading

- Programming examination: 30%
- Final examination: 40%
- Writing assignments: 10% (only before deadlines)
- Programming assignments: 20% (only before deadlines)
- Bonus: 10%
  - Obvious contribution to course construction

Applicable for all students

You need to submit assignments and attend exams even if you are retaking the course

In-class Courtesy

- Attendance
- Arrive late, leave early or break
- Food
- Noise
- Telephone call

Thank You

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