

Logic and Computer Design Fundamentals

Introduction

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Why learn this course?

- The computer system is a general, complex, and widely used digital system
 - Computers deal with discrete numerical elements – **digits => digital systems/circuits/computers.**
 - These systems are based on **logic circuits** operating on two elements, TRUE (1) and FALSE (0)
 - “**Logic circuits**” and “**digital circuits**” are synonymous
- This course is a powerful support for software design

Course Objective

- **Introduce basic theory and design methods for digital logic.**
- **Give students basic skills to analyze and design electronic digital computer logic circuit**
- **Prepare for the further studies on hardware related courses, such as**
 - **Computer Organization**
 - **Computer Architecture**
 - **Embedded Systems**
 - **Communication**
 - ...

Course Contents

- **Number representation, digital codes**
- **Boolean algebra and logic minimization techniques**
- **Sources of delay in combinational circuits and effect on circuit performance, survey of common combinational circuit components**
- **Sequential circuit design and analysis, timing analysis of sequential circuits,**
- **Concept of programmable logic devices and memories.**
- **Experiments (supervised by Mr. Jiang)**

Assessment

➤ Theory: 70%

- Quizzes 40% * 70% = 28%
- Projects: 20% * 70 = 14%
- The final Examination: 40% * 70% = 28%
 - Necessary condition: the score ≥ 50

➤ Experiments: 30%

➤ Quizzes

- Not regular and without notification (once every 2-3 weeks)
- Questions are from textbook and home assignments

➤ Project:

- The source code, source project and technical report should be submitted
- The technical report: including the analysis and design process, the debugging process, and the simulation sequential diagram
- **Deadline: One week after the final examination**

Home assignments

- **Need not submit answers**
- **Answer sheet will be published**
- **Typical exercises will be analyzed on class**
- **Home assignments, the project technical report, quizzes and the final paper examination should be finished in English**

Textbook & References

➤ Textbook

- "Logic and Computer Design Fundamentals", Fifth Edition, M. Morris Mano and Charles R. Kime, Prentice Hall

➤ References for experiments

- "Verilog Digital System Design Tutorial", Xia Yuwen, Beihang University Press

➤ The slides will be placed at “王跃明老师答疑版”:

<http://www.cc98.org/list.asp?boardid=714&page=1>

Requirements of Experiments

- Study Verilog HDL language **by yourself**
- In advance of each experiment related to Verilog HDL, every one should input and debug the Verilog source code and perform the behavior simulation

Questions?