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. Hong)**

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**

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?