

Introduction

Logic Design

Teaching Team

- Instructor



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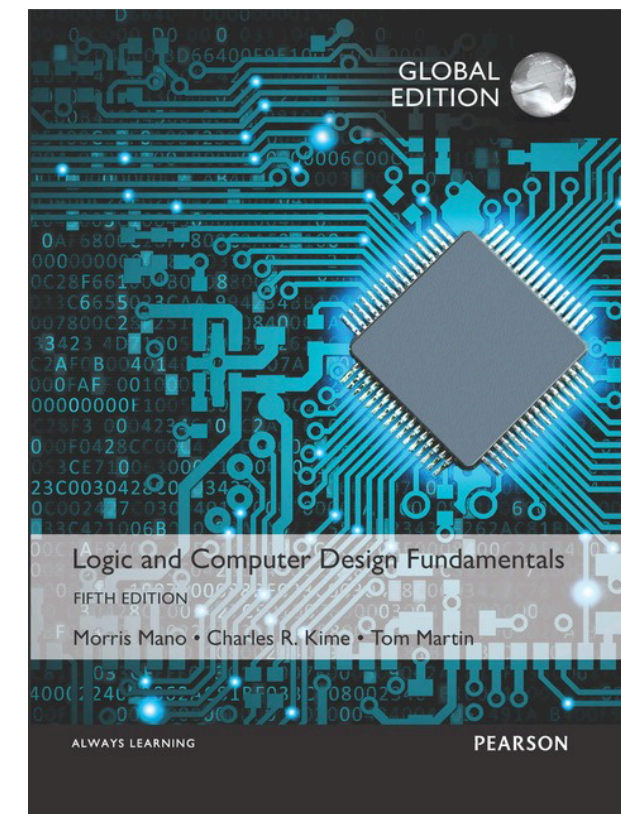
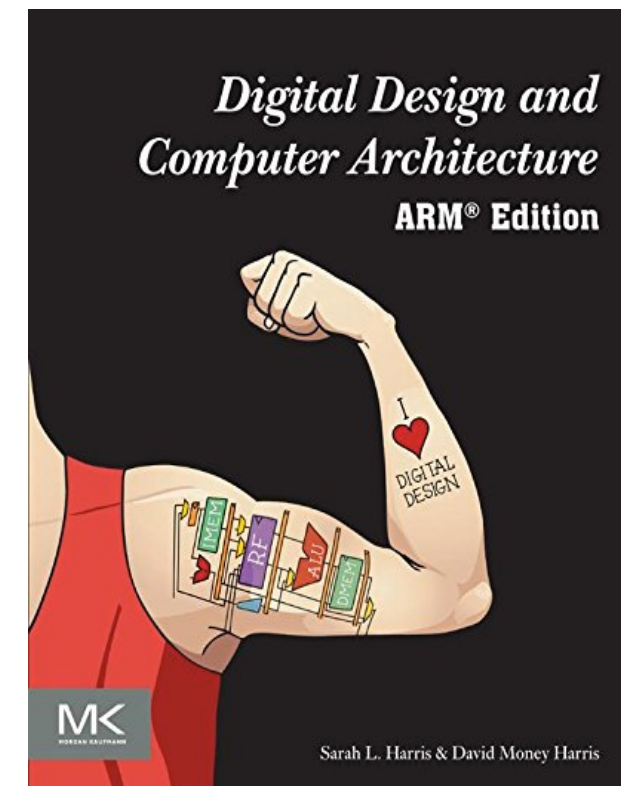


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Textbooks

- **Digital Design and Computer Architecture**, Sarah Harris, David Harris
- Mano M. M., Kime C. R., **Logic and Computer Design Fundamentals**, 4th Edition, Prentice Hall, 2008.

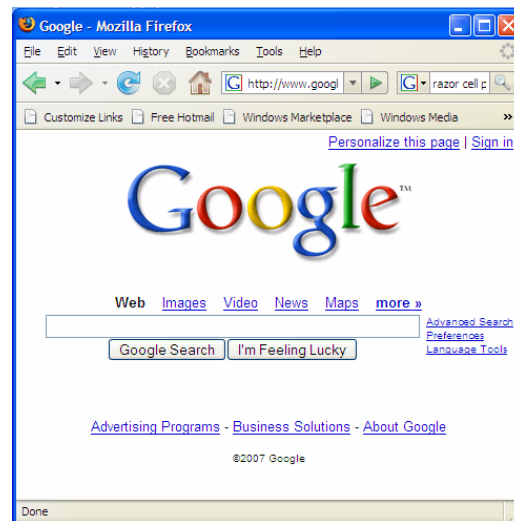


Grading

- 28% Midterm + 12% Labs + %60 Final
- Attendance to labs is **mandatory**
 - for all students taking the course for the first time
 - for all students failed with a grade **FF**
- We are planning to have 6+ labs
 - You should attend to **all labs**
 - Absence **without any acceptable** reason may result in you **failing** the course.

Computers are Everywhere!!!

- Microprocessors have revolutionized our world
 - Cell phones, Internet, rapid advances in medicine, etc.

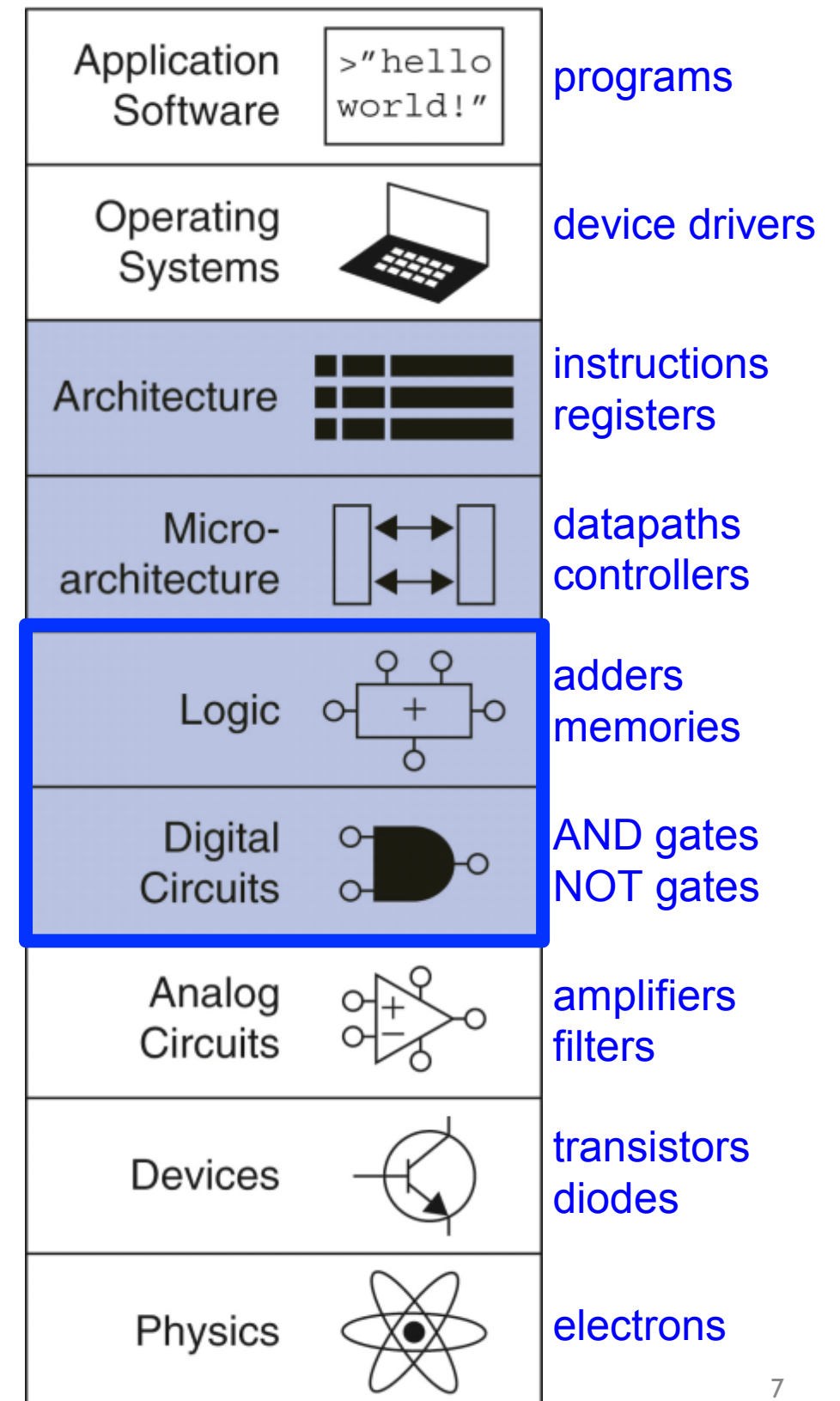


What is Computation?

- Why do we have computers?
 - image processing, AI,..., any other example?
- How does a computer solve problems?
 - What is an algorithm? Example?

Layers We Will Cover

- Understand what's under the hood of a computer
- Learn the principles of digital design
- Learn to systematically debug increasingly complex designs
- Design and build a **microprocessor**



Why Logic Design?

- As long as everything goes well, not knowing what happens underneath (or above) is not a problem.
- What if
 - The program you wrote is running slow, does not run correctly, or consumes too much energy?
- What if
 - The hardware is too hard to program or it is too slow?
- What if
 - You want to design a much more efficient and higher performance system?

Why Logic Design?

- You are **computer engineers**
 - Build hardware/software systems
- System **performance** is important
- Designing **efficient** systems
 - How the machine works!
 - Hardware-software interaction
- Assessing/evaluating/improving the performance of systems
 - Fundamental hardware knowledge

Topics

- Number Systems
- Gates and Boolean Equalities
- Minterms, Maxterms, Standard Forms
- Karnough Maps
- Combinational Circuits
- Decoders, Encoders, Multiplexers,
- Arithmetic Circuits
- Sequential Circuits