Orange Coast College
Business Division
Computer Science Department

CS 116- Computer Architecture

Course Orientation
Who Am I?

• Matthew Beers
• Doctoral student at UCI
  – Research area: Compilers
• Last minute substitution
How to Reach Me?

• Email:
  – mbeers@occ.cccd.edu
• Phone:
  – On-Campus: Ext. 22579
• Office location:
  – Officially None.
• Office Hours:
  – TBD
• URL:
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Where are we?

- Computer Architectures!
- OCC Catalog Description:
  - A course in the architecture of computers. Topics include Boolean algebra and computer arithmetic, digital logic, micro and macro-architecture, assembly language, performance, Datapath and control, memory hierarchies, interfacing and peripherals, and multi-processing.
What does that mean?

• Foundation Theoretical Perspective
• Practical Hardware Specification
• Software Interaction
Theoretical

• Underlying mathematical concepts behind digital logic

• Foundation of why computers work the way they do
Hardware Aspects

• In-depth understanding of inner-structure, evolution, tradeoffs, & HW/SW boundary of modern computers
• Understand how data are processed & controlled
• Learn about limitations caused by I/O devices and how to overcome some of them
• Measure CPU’s & other HW performance
• Follow the changes in technology and it’s impact on all aspects of computer science & engineering
Software Aspects

• Efficient programming needs computer organization knowledge
  – Hierarchical memories, parallel processors
  – How can the organization affect performance

• Build high-performance software for fun and profit
Personal Aspects

• Make purchasing decisions
• Offer “expert” advice
• Troubleshooting
• Enhance marketability
  – Scientist
  – Programmer
  – System analyst
Last, but not least....

UC Transfer Credit!
What do you need?

• Prerequisites:
  • CS 115 or CS 150

• Recommended preparation
  • Assembly language course
    (CS240-Microcomputer System Development)

• Textbook
  • Patterson and Hennessy,
    *Computer Organization & Design*
    The Hardware/Software Interface, 2nd Edition,
    Morgan Kaufmann Publishers, 1998
Other Materials

• PPT Presentations
  – Copyright 1998 Morgan Kaufmann Publishers
  – Adapted & Modified by Martha Malaty
  – Further adapted by Matthew Beers

• Software used
  – SPIM Simulator

• Web extension
Texts

• Optional
    ISBN: 007136207X.
    ISBN 0-07-065050-0
Other Useful References

• Digital Electronics
  – M. Morris Mano & Kime Charles,
    *Logic and Computer Design Fundamentals, 2nd Ed.*, Prentice-Hall, 1999
  – M. Morris Mano,
    *Digital Design, 2nd Edition*,
    Prentice-Hall, 1991
  – John F. Wakerly,
    Prentice-Hall, 1994
  – Derek Green,
    *Digital Electronics, 5th Edition*,
    Addison-Wesley, 1998
Other Useful References

• Computer Architecture & Organization:
The Syllabus

• Grading
• Homework
• Exams
• Term Project
• Policies
  – Academic Honesty
  – Lectures
  – Special Needs
  – Communication
• The Schedule
The Schedule

- Chapter 1: Computer Abstraction & Technology
- App.B & more: The Basics of Logic Design
- Chapter 3 & App.A: Instructions
  - The language of the Machine
  - Assemblers, Linkers, & the SPIM Simulator
- Chapter 2: The Role of Performance
- Chapter 4: Arithmetic for Computers
The Schedule Continued

- Chapter 5: The Processor: Datapath & Control
- Chapter 6: Enhancing Performance: Pipelining
- Chapter 7: The Memory Hierarchy
- Chapter 8: Interfacing Peripherals & Processors
- Chapter 9: Multiprocessors