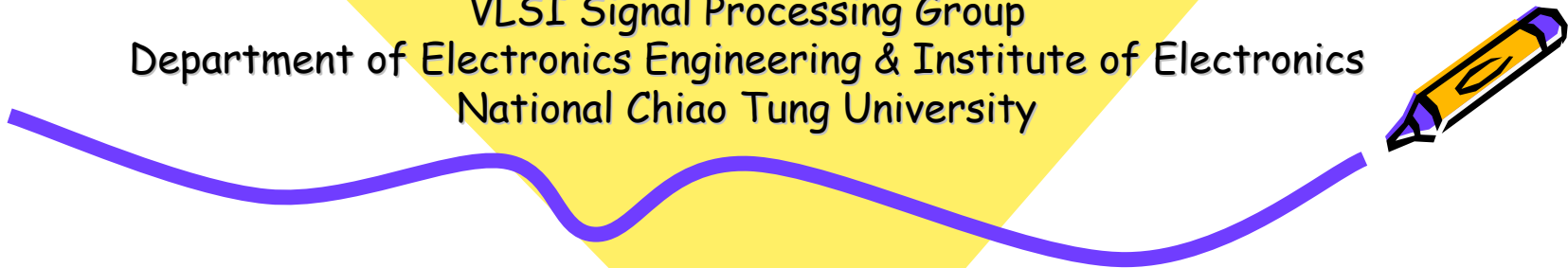


# 5008: Computer Architecture

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# Course Information



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# Course Information



- Text
  - J. L. Hennessy and D.A. Patterson, *Computer Architecture: A Quantitative Approach*, 4th Edition, Morgan Kaufmann Publishers, 2007
- One semester course, which might include Chapters 1~5, Appendix A~C
- Prerequisites:
  - Computer organization
  - Computer programming



# Textbook Structure



- ILP (Instruction-Level Parallelism)
  - Appendix A, Chapters 2&3, and Appendices F&G
- Memory Hierarchy
  - Appendix C and Chapters 5&6
- TLP (Thread-Level Parallelism), DLP (Data-Level Parallelism)
  - Chapter 4, Appendices H& E
- ISA (Instruction Set Architecture)
  - Appendices B&J



# About the Textbook



- **Crosscutting Issues** section
  - A feature that shows how the ideas covered in one chapter intersect with those given in other chapters
- **Putting It All Together** section
  - To show and how the ideas in crosscutting issues section are used in a real machine
- **Another View** section
  - A new feature for the 3rd Ed. that gives a real-world example from the embedded or server space
- **Fallacies and Pitfalls** section
  - This help the reader to learn from the mistakes and traps of others.



# Course Grade (tentative)



- Lectures and Homeworks **25%**
  - Adapted from Prof. David Patterson's class notes
  - Please avoid arriving late or leaving early.
  - At least one problem sets with respect to each lecture
  - Homework should be handed in on time
- Project **15%**
- Midterm and Final Exams. **60%**
- Extra points **5%**
  - 5-page summary report of literature survey



# Spring 2008 Outline



- Chap. 1 Fundamentals of Computer Design
  - The quantitative approach and performance measurement
- Appendix B Instruction Set Principles and Example
  - Examples of contemporary and important historical ISA
- Appendix A Pipelining
- Chap. 2 Instruction-Level Parallelism and its Exploitation
- Chap. 3 Limits on Instruction-Level Parallelism
  - To execute more than one instruction at a time
  - The complexity grows  $\sim N^2$  in order to execute  $N$  instructions simultaneously
- Chap. 4 Multiprocessors and Thread-Level Parallelism
  - A key to simple, power-efficient, and high-performance system implementation that avoids the  $N^2$  problem
  - Shared-memory architectures, Sun T1 (Niagara) processor: 32 threads on a chip
- Appendix C Review of Memory Hierarchy
- Chap. 5 Memory Hierarchy Design
  - Cache and memory hierarchies and virtual memory

