CSE 378 Winter 1998

Machine Organization and Assembly Language Programming

Outline (subject to change)

1. Introduction to architecture and organization (Chapter 1)
2. Instruction set and assembly language (Chapter 3)
   - General computer structure
   - Memory structures: registers, information units, addressing
   - CPU: instructions
3. An example architecture: The MIPS 2000 (Chapter 3 and Appendix A)
   - Introduction to SPIM
   - Overview of MIPS: registers, data types, addressing.
   - Arithmetic-logic instructions;
   - Signed and unsigned numbers (Chapter 4. Sections 4.1 to 4.3)
   - load and store instructions; branches
   - Instruction encoding; addressing revisited.
4. Procedures and stacks (Chapter 3)
5. RISC vs. CISC (Appendix E)
6. Performance metrics (Chapter 2)
7. Processor implementation. Single cycle implementation (Chapter 5)
   - Data path.
   - Multiple cycle implementation. Control.
   - A control alternative: microprogramming
8. Processor implementation. Pipelining (Chapter 6)
   - Data path
   - Data hazards. Forwarding
   - Control hazards. Delayed branches. Branch prediction
   - Instruction level parallelism

9. Memory Hierarchy. Caches (Chapter 7)
    - Cache organization. Parameters
    - Cache write policies
10. Memory Hierarchy. Virtual Memory (Chapter 7)
    - Multiprogramming
    - Paging
    - Virtual address translation: page tables and TLB's
11. Input-Output (Chapter 8)
    - I/O architecture. Buses.
    - I/O devices.
    - I/O control
12. One or more of the following topics
    - Floating-point. Arithmetic and functional units (Chapter 4)
    - Parallel computers (Chapter 9)
    - Networks