CS430 Exam3 Review

Chapter 12 Instruction Sets: Characteristics and Functions (Reading pp. 406-438)

- Instruction Cycle State Diagram
- Instruction Formats encoding opcode, operand, register in the instruction
- Instruction Types
  - ALU
  - Data movement
  - Control
- 0, 1, 2, 3 address machines
- Instruction Set Design
  - Operation repertoire
  - Data types
  - Instruction formats
  - Registers
  - Big-endian vs little-endian
  - Alignment
- Call/Return Instructions
  - stack pointer
  - frame pointer
  - activation record
- call versus an interrupt
- status flag
- logical vs physical addresses including PC update

Chapter 13 Instruction Sets: Addressing Modes and Formats (Reading pp. 452-461, 464-466, 477-479)

- Addressing Modes
  - Immediate
  - Direct
  - Indirect
  - Register
  - Register Indirect
  - Displacement
  - Stack
  - PC Relative
• Variable length

Chapter 14 Processor Structure and Function (Reading pp. 484-503, 518-520)

• Internal structure of CPU
• User-visible registers
  o general purpose
  o data
  o address
  o condition codes
• Control and status registers
  o PC
  o IR
  o MAR
  o MBR
• Instruction cycle with interrupts
• Pipelining
  o Fetch Instruction
  o Decode Instruction
  o Calculate Operands
  o Fetch Operands
  o Execute Instruction
  o Write Operand
• Pipeline Hazards

Chapter 15 Reduced Instruction Set Computers (Reading: pp. 532-538)

• Major architectural advances
  o Family of computers
  o cache memory
  o pipelining
  o multi-processing
• Characteristics of CISC vs RISC
• Characteristic computer changes over the years
• Influence of HLLs on computer design
• Non-pipelined MIPS
  o IF
  o ID
  o EX
- MEM
- WB