

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
 - general purpose
 - data
 - address
 - condition codes
- Control and status registers
 - PC
 - IR
 - MAR
 - MBR
- Instruction cycle with interrupts
- Pipelining
 - Fetch Instruction
 - Decode Instruction
 - Calculate Operands
 - Fetch Operands
 - Execute Instruction
 - Write Operand
- Pipeline Hazards

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

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

- MEM
- WB