

CS430 Exam 2 Review

Chapter 4 Cache Memory (Reading pp. 113-146)

- Memory Hierarchy (registers, cache, ...)
- Memory Design Issues (cache vs main memory vs secondary storage)
- Locality of Reference
- Memory access time, cycle time, transfer rate
- Logical vs Physical Cache
- Virtual address vs Physical address
- Cache Mapping Functions
 - Direct
 - Fully Associative
 - Set Associative
- Cache Replacement Algorithms
 - LRU
 - FIFO
 - LFU
 - Random
- Cache Write Policies
 - Write back
 - Write through
- Cache coherency
 - Bus watching with write through
 - Hardware transparency
 - Noncacheable memory
- Multilevel Caches
- Unified vs Split Cache
- Pentium 4
 - Instruction fetch/decode unit
 - Micro-operations
 - Register Files
- ARM
 - Write Buffer

Chapter 9 Number Systems (Reading pp. 310-317)

- Decimal number system
- MSB, LSB, MSb, LSb

- Binary number system
- Converting between binary & decimal (e.g. 123.75 to binary or 110101.0101 to decimal)
- Hexadecimal notation

Chapter 10 Computer Arithmetic (Reading pp. 320-333; 341-349)

- ALU
- Integer Representation
 - Unsigned
 - Signed
 - 1's Complement
 - 2's Complement
- Addition & Subtraction
 - Unsigned
 - Signed
 - Use of CF & OF flag
 - Meaning of overflow for signed & unsigned
 - Carry-in & carry-out
- Unsigned Multiplication
- IEEE-754 Floating-point Representation
 - Single-precision & double-precision
 - Sign
 - Biased exponent
 - Significand (mantissa)
 - Normalized number
 - Non-normalized number
 - Range of number, range of exponent, range of significand

Chapter 12 Instruction Sets: Characteristics & Functions (Reading pp. 406-418)

- Machine Instruction
 - Opcode
 - Source & destination operand
 - Number of Addresses
 - Zero
 - One
 - Two
 - Three

- Operand Types
 - Addresses
 - Numbers
 - Binary fixed point
 - Binary floating point
 - BCD (packed & unpacked)
 - Characters
 - Logical Data
- Big-endian & little-endian
- Basic CISC vs RISC
- Data alignment penalties