

Ceng 255 Final Topics

1. Basic Structure of Computers (Chapter 1)
 - a. Performance
 - i. Basic Performance Equation
 - b. CISC vs. RISC
2. Machine Instructions and Programs (Chapter 2)
 - a. Number Representation
 - b. Addition & Subtraction of Signed Numbers
 - i. Overflow
 - c. Memory
 - i. Byte-addressable
 - ii. Big-endian vs. Little-endian
 - iii. Word Alignment
 - d. Instructions
 - i. Basic Instruction Types
 - ii. Instruction Execution
 - iii. Branching
 - iv. Condition Codes
 - e. Addressing Modes
 - i. Pointers
 - f. Assembly language
 - i. Assembler directives

Pre -Midterm

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- g. Stacks and Queues
 - h. Subroutines
 - i. Nesting, Processor Stack
 - ii. Parameter Passing
 - iii. Stack Frame
 - i. Additional Instructions
 - i. Logic Instructions
 - ii. Shift & Rotate
 - iii. Multiplication/Division
 - j. Encoding of Machine Instructions

Post -Midterm

3. Input/Output Organization (Chapter 4)

- a. Accessing I/O Devices
 - i. I/O mapping (memory mapped, I/O mapped)
 - ii. Program controlled I/O (Polling)
- b. Interrupts
 - i. Handling
 - ii. Enabling and Disabling
 - iii. Multiple Devices
 - 1. Vectored Interrupts
 - 2. Interrupt Nesting
 - 3. Interrupt priority
- c. Exceptions
- d. Direct memory Access (DMA) (General ideas only)
- e. Buses
 - i. Synchronous Bus
 - ii. Asynchronous Bus

4. Memory System (Chapter 5)

- a. Processor-Memory Connection
- b. Memory Speed
- c. RAM
 - i. Static vs. Dynamic
- d. ROM
- e. Memory Hierarchy (Speed, Size, Cost)
- f. Cache
 - i. Principle of locality
 - ii. Mapping (direct, associative, set-associative)
 - iii. Replacement
 - 1. LRU
 - iv. Cache Hit/Miss
 - v. Write-back vs. write through
 - vi. Cache performance
 - 1. Hit rate, miss rate
 - 2. Average access time
- g. Virtual Memory
 - i. Page fault