

EEL 4709C: Computer Design Final Review

Fall, 2009

Contents

- Input/Output
- Computer Arithmetic
- Instruction Set Architecture
- Parallel and distributed computing

Input/output

- I/O Modules and peripheral devices
 - Basic components in a I/O module
- Three types of I/O
 - Program I/O
 - What
 - Memory mapped, isolated (special purpose) I/O
 - Interrupt I/O
 - Basic steps
 - DMA
 - What/why/how
 - Cycle steal, burst transfer

Computer Arithmetic

- Integer representation and arithmetic
 - Unsigned/sign-magnitude/2's complement
 - What
 - Data range
 - Problem
 - 2's complement
 - Converting n bit to m bit
 - Addition/subtraction
 - Overflow problem

Computer Arithmetic

- Real number representation and arithmetic
 - Representation
 - Three components
 - Biased notation and normalization
 - Floating number \leftrightarrow real number
 - Several issues
 - Expressible numbers
 - Maximum/minimum number
 - Overflow/underflow
 - Representation of zero
 - Accuracy
 - Floating point arithmetic

Instruction Set Architecture

- Instruction
- Instruction sets
 - Numbers of addressing
 - Addressing modes
 - Tradeoffs between addressing modes vs performance
- Memory alignment and endianness
- Procedure call

Parallel and distributed computing

- Why parallel and distributed computing
- Flynn's computer models
- Taxonomy of parallel architectures
 - Shared memory
 - SMP
 - NUMA
 - Distributed memory
- Performance limitation
 - Parallelism
 - Communication cost

Questions?
