

October 29

- Review for 2nd Exam
- Ask Questions!

Chapter 1

- Computer Abstractions
- Input/Output/Memory/Datapath/Control
- *Instruction Set Architecture*
- “This interface enables *implementations* of varying cost/performance to run identical software”

Chapter 2 Performance

- Only complete and reliable measure is TIME
- CPU execution time is the product of 3 basic measurements of different levels in the computer: instruction count, CPI, clock cycle time
- Any measure that summarizes performance should reflect execution time.

Chapter 3 Instructions

Two key principles:

1. Instructions are represented as numbers
2. programs can be stored in memory and accessed just like numbers

Instruction Formats: R, I, J

Instruction Fields: OP, RS, RT, RD, SHAMT, FUNCT, ADDRESS

Chapter 4 Arithmetic

- Bit patterns have no inherent meaning
- They may represent
 - instructions
 - signed integers
 - unsigned integers
 - floating point numbers
 - etc.
- What is represented depends on the instruction
- Computer numbers have limited size and precision

Chapter 5 Processor

- Combining our *Data Path* with *Control* implements the major part of a processor
- *Finite State Machines* are a simple way of combining logic with a clock to get sequential behavior

Five Execution Steps

- Instruction Fetch
- Instruction Decode and Register Fetch
- Execution, Memory Address Computation, or Branch Completion
- Memory Access or R-type instruction completion
- Memory Read Completion

INSTRUCTIONS TAKE FROM 3 - 5 CYCLES!

- A FSM looks at the op-code to determine how many...