17-uarch-notes

Microarchitecture

Agenda

- 0. Re-Orienting
- 1. Terms
- 2. Correspondence to Homeworks
- 3. Correspondence to the textbook (Fig 4.23)
- 4. Valves and Knobs
- 5. rmmovl %eax, 23(%ebx)
- 6. The FSM

Here are the slides (https://ssl.cs.dartmouth.edu/~sws/cs51-s15/17-uarch/slides.pdf)

0. Re-Orienting

The computer scientist thinks about algorithms and programs in a high-level language.

Special software (e.g., compilers) turns that into low-level assembly for an ISA

And then (e.g., assemblers) into machine language

- (nits and caveats)

Which then executes on hardware!

Which is typically a specially structured sequential logic circuit

Of Boolean gates

Built out of transistors

1. Terms

ISA

Datapath

Control path

Microarchitecture

- the datapath elements
- the knobs and valves
- the machine that drives the knobs and valves

2. Correspondence to Homeworks

ISHIM

DSHIM

Register File

- split in two, for LogiSim
- External registers let you read and change values

ALU

Cnd, Microsequencer

3. Correspondence to the textbook (Fig 4.23)

icode, ifun, rA, rB, valC

PCincrement, valP

valA, valB , srcA, srcB

dstE, dstM

aluA, aluB, alu fun

CC, valE

Addr, Data, ValM

4. Valves and Knobs

Fetch

Decode

Execute

Memory

PC

5. rmmovl %eax, 23(%ebx)

6. The FSM

States

Implementation