Computer Architecture

Lecture 2

September 17, 2019

Instruction Set

- The instrcutions fed to a CPU

- Used for arithmetic / logical, memory + port transfers and flow control.

Instruction set design

Approaches: **RISC** (*Reduced Instruction Set Computer*) and **CISC** (*Complex Instruction Set Computer*)

RISC

- Simple instructions that only take about 1 clock cycle

CISC

- Complex multi clock instructions.

- x86 etc

MIPS

- Has 32x32-bit registers.

- Used for Values of resultsm arguments, temps, global pointer, stack pointer, program counter, etc.

Integer arithmetic

- *MIPS* can process both integer and floating point numbers

- It has both 32 and 64 nit architectures.

- When a 32-bit integer is **signed**, **the most significant bit** (*bit 31*) is used to denote negativity.

- 2's compliment is used to invert the most significant bit and invert the entire number (*see notes*)

MIPS Instructions

- Can only have **3 operands**.

- Eg: *add $0 $S0 $S2*

MIPS R-format instructions

R-formated just means that the instruction is encoded using a format which means:
The op takes 6 bits, the registers then take 5 bits, the shift takes 5 bits, and the funct takes 6 bits

See wiki for more info.

Memory Operands

- MIPS memory is **byte-addressed**. You can load single bytes from memory.