CS251 Notes

Jacky Zhao

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1 ARM Overview

What is ARM?

- Advanced RISC Machines
- RISC: Reduced Instruction Set Computing

We will be learning 64-bit ARM in this course, the textbook teaches ARM (Legv8).

1.1 Registers

There will be a total of 32 registers. They can be used like variables in a program, but via ARM instruction.

- each register has 64 bits, or 8 bytes
- X0, X1, ... , X31
- X31 (XZR) always contains 0
- registers are hardware storage containers

For example, suppose we have a high level code:

$$f = (g + h) - (i + j)$$

What would be the equivalent in ARM assembly?
Assumption: the values of the variables are pre-looaded into the registers.

X1: f X2: g X3: h X4: i X5: j Here are the ARM instructions:

ADD X6, X2, X3 ;;X6 holds a temp value
ADD X7, X4, X5 ;;X7 holds a temp value
SUB X1, X6, X7 ;;X1 has the final value

ADD, SUB instructions are known as R-format instructions

We are still imcomplete as

- we have not store the result into Data Memory (variable f)
- we have not show how to load variables into the registers