EE511 Computer Architecture

Project 1. Instruction Set Simulator (ISS)

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Due date: Oct. 8, 2022

1. Introduction

In Project 1, you will implement an instruction set simulator (ISS) for the KAIST RISC Processor 2.0 (KRP 2.0). The ISS should follow the instruction set architecture (ISA) specified in "KRP User's Manual," and meet the requirements in Section 2.

2. Requirements

- ✓ Language: C/C++
- ✓ Project environment: Linux server
- ✓ Execution file name: krpiss
- ✓ Output file: A dump file of the data memory
- ✓ Data memory size: 4KB
- ✓ Program memory size: 4KB
- ✓ Endian: Little endian

3. ISS Implementation

- ✓ **Definition of Displayed Information on the Prompt**

  (1) Program Counter (PC, the address of the current instruction)

  : (**NOTE**: Do not display the currentPC, PC+4)

  (2) Instruction Register (IR, the current instruction)

  (3) Interrupt Enable (IE)

  (4) Interrupted PC (IPC)

(5) General-purpose registers (GPR)

: The state of GPR after executing the current instruction

✓ **How to Execute**

krpiss *input_file_name output_file_name*

*You can refer to ISS/run.sh

1) When started, ISS is idle waiting for the user's command

2) When **s** is typed on the prompt

: Execute one instruction

A. Display PC, IR, IE, IPC, and GPR on the prompt

3) When **b** is typed on the prompt

: Set a break point

A. The break point is the instruction number in program

4) When **r** is typed on the prompt

: The program is executed to a breakpoint

A. Break point must be set before **r** is typed

B. Does not display PC, IR, IE, IPC, and GPR on the prompt

C. The entire contents of the data memory should be dumped into the output file after execution of the program

5) When **d** is typed on the prompt

: Display the PC, IR, IE, IPC, and GPR on the prompt

4. Submission

✓ **Due date: Oct. 8 (Sat.) 23:59**

✓ Submit 1) a zip file

A. Zip file: ZIP all the relevant files (source codes) and upload it to the KLMS project1 assignment page.

B. Zip file name: {StudentNumber}_{YourName}_project1.zip

(Follow the formats of the file name, or you will get deduction)

✓ Assessment

(1) Correctness of the execution results

: Several test programs will be executed and the results will be checked.

(2) Quality of the source code (including comments)

(3) **NOTE**: If you submit past the due date, you will not receive any credit.

(4) **NOTE**: If you copy other's work, you will not receive any credit.