CS2610 : Computer Organization Architecture Lab

Lab 1 : Introduction to RISC-V Toolchain and Assembly

27th January 2025

In this lab you will be introduced to write basic RISC-V assembly programs. The goal of this lab is to introduce basic assembly instructions.

Question 1:

Write an riscv assembly program, which initializes an integer array in memory containing 5 elements and to each array element adds a constant equal to the index of that element using a loop. For example, the array starts as [5, 3, 4, 6, 5], it will become [5, 4, 6, 9, 9]. Using spike commands complete the following:

- Dump the contents of the array at the start
- Dump the contents of the array at the end
- Dump the array contents at any 4 iteration counts w.r.t loop traversing the array

Question 2:

Write an assembly program which loads two **word-size** numbers from the memory, performs the following computations and stores the result in memory.

1. Addition
2. Subtraction
3. Logical and
4. Logical or
5. Logical xor

Using spike commands complete the following:

- Dump the contents of the two input memory locations at the start
- Dump the contents of the resultant memory location at the end

Submission:

1. The assignment should be done individually.

2. The following artifacts need to submitted:
    a. Screenshots of the output as mentioned for each question
    b. Code files per question
    c. Report: Explain the commands you used to inspect the memory dump via spike debug mode.
3. Zip all the contents and submit on Moodle.