Ho Chi Minh City University of Technology

Faculty of Computer Science and Engineering
Course: Computer Architecture Lab (CO2008)

Lab 1

Arithmetic instructions

Ho Chi Minh City, March 2025

Contents

1 Introduction

- To download the MARS MIPS simulator, the link from developers (https://dpetersanderson.github.io/download.html) can be used. In case the previous link couldn't be used, this Google Drive link (https://bit.ly/3zdHclD) can be used as an alternative.
- The MARS MIPS simulator requires JDK which is downloadable from Oracle website to execute.
- To get a simple MARS MIPS tutorial, please check out this link (https://bit.ly/3lxjqMn) and this link (https://bit.ly/3zl35zc).
- Please note that the register $zero can be described as $0.
- **The main purpose of this week is to get familiar with arithmetic instructions. It is required that students ONLY use arithmetic and data instructions.**.
- Students must submit their answers to the BKeL system no later than the last period of the lab section. Then, the instructor will evaluate all students' work during the lab section's final period.

2 Exercises

2.1 Exercise 1

Write a MIPS program that takes a name as a string and print out a "Hello <name>".
For example, if the input is **John**, then the output should be **Hello, John**.

2.2 Exercise 2

Write a MIPS program to allow the user to first input an array with 5 elements. The prompts should be: "Please input element 0:", "Please input element 1:", etc. Then print the value from the element chosen by the user (Assume the user only input 0 to 4). The prompt for this is: "Please enter index:".

For example, an array may have elements such as **5, 10, 15, 20, 25**. If the user input **1** the output shown on the terminal should be 10. If the user input **4**, the output should be **25**.

2.3 Exercise 3

Write a MIPS program to print out the result of F:

$$F = \frac{(a+10) \times (b-d) \times (c-2 \times a)}{a+b+c}$$

where a, b, c, and d are integers inserted by the user. Note that a, b, c, and d are inserted in this exact order. Moreover, "a+b+c" is assume to not equal to 0. The output of division should print both the quotient and the remainder.
The input prompts should be as such: "Insert a: ", "Insert b: ", etc.
For example, if the input is 3, 4, 5, 6 then the output should be: **F = 2, remainder 2**.

2.4 Exercise 4

Write a MIPS program to print out the 4-bit binary value of a decimal number. The number should be selected by the user.
The input shall be restricted only to a positive integer that is less than 16.
The input prompt should be: "Please enter a positive integer less than 16: ".
For example, if the decimal number is **10** then the output should be **Its binary form is: 1010**.