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, October 23rd 2023

Contents

1 Introduction

- The main purpose of this session is to get familiar with MARS MIPS simulator tool and the first two instruction classes (arithmetic and data transfer).

- To download the MARS MIPS simulator, the link from developers (https://bit.ly/3lrKYmg) 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.

- Please note that the register $zero can be described as $0.

- **The main purpose of this week is to get familiar with arithmetic 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. Please note that we will randomly choose 50% of the questions to mark.

2 Exercises

2.1 Exercise 1

Write a MIPS program that does the following steps:

1. Request the user to insert 2 numbers.

2. Request the user to choose a mathematical operation (including addition, subtraction, multiplication, and division).

3. Perform that selected operation and return the result.

2.2 Exercise 2

Write a MIPS program to reverse the elements of an array of 20 elements.

2.3 Exercise 3

Given a 15 elements array. Let the user choose between two modes:

1. Print the value of the element chosen by the user (the user is required to enter an index number from 0 to 14).

2. Print a sequence of values from the elements chosen by the user (the user is required to enter two index numbers from 0 to 14, the first number must be smaller or equal to the second number).

2.4 Exercise 4

Write a MIPS program to print out the result of F and G:
$F = \dfrac{(a + b) * (c - d)}{a^2}$
$G = \dfrac{(a + 1) * (b + 2) * (c - 3)}{c - a}$

2.5 Exercise 5

Write a MIPS program to print a sequence of numbers "N, N*M, N*M*M, N*M*M*M, ..." X times, where N, M, X are specified by the user.

2.6 Exercise 6

Write a MIPS program to print out the decimal value of a 10-bit binary number.

2.7 Exercise 7

Write a MIPS program to calculate the factorial of a number.