

HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY



FACULTY OF COMPUTER SCIENCE AND ENGINEERING
COURSE: COMPUTER ARCHITECTURE LAB (CO2008)

Lab 2

Branches and procedures

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1 Introduction

- The main purpose of this session is to get familiar with conditional branch, unconditional jump instructions, and call procedures.
- Students are also expected to be able to work with recursion in this lab.
- Students must submit their answers to the LMS 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 does the following steps:

1. Declare a string and count the number of each character that appears in the string.
2. Print the characters and their number of appearance by ascending order (if the number of appearance is the same between some numbers, print the one that has the smaller ASCII code first).

For example, if the input string is **abdeefggff** the output should be **a, 1; b, 1; d, 1; e, 2; g, 2; f, 3**.

2.2 Exercise 2

Write a MIPS program that requests two positive integers called **a** and **b** from the user (please check if they are positive or not). The program then prints their greatest common divisor (GCD) and lowest common multiple (LCM) utilizing recursive. The input numbers should be after the prompt: "**a =** " and "**b =** ". For example, if the user input **a=6** and **b=45**, the result should be **GCD=3, LCM=90**.

2.3 Exercise 3

Write a MIPS program to find the second largest element in a 10-elements integer array. The program is also required to find all their indexes. Print



the value and all of its indexes. The elements of the array must be inserted by the user after the prompt: "Please insert a element:"

For example, if the array is 1, 2, 7, -7, 3, 7, 4, 6, 8, 7 the output should be **Second largest value is 7, found in index 2, 5, 9.**