GEORGIA STATE UNIVERSITY

Department of Computer Science

CSC 3210 Computer Organization Programming

Lab Section:

Lab 2: Assembly Basics

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Contents

1 Introduction

This project focuses on understanding basic assembly language operations and solving computational problems using two different assembly dialects: NASM [1] and RISC-V. This lab will have two main objectives:

1. Converting a C program to NASM and RISC-V.
2. Solving the Tower-of-Hanoi problem using a binary solution.

This lab aims to show how assembly language translates high-level instructions into low-level computer language.

2 Apparatus

- SNOWBALL server
- RISC-V on VS Code
- Code templates
- RISC-V reference card

3 Methods

- Complete the codes using available code templates.
- Run them using the SNOWBALL server.
- Present the question base on the question sheet.

3.1 Subsection

- Conver the file addTwo.c into NASM and RISC-V
- Input the set of numbers and record the output.
- Explain why some outputs are not expected.

3.2 Subsection

- Describe how to implement the Tower-of-Hanoi binary solution
- Implement the solution and demo the program.
- Justify the largest number of disks the program can handle.

4 Results and Discussion

There is a limit constraint of memory while testing the programs. It seems that the max number is 2147483647 and the min number is -2147483647. If not careful, programs can exceed the limit, creating errors, or even physical damage to the machine.

5 Conclusions

This lab provides the opportunity to learn about converting high-level language to low-level. Also, there is a limit for every computer architecture. It is important to know the limit of your machine the utilize the resource efficiently.

6 References

[1] NASM: Netwide Assembler