GEORGIA STATE UNIVERSITY

Department of Computer Science

CSC 3210 Computer Organization Programming

Lab Section:

Lab 2: Assembly Basics

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**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