CS2610: Computer Organization and Architecture Lab

Lab Assignment - 3

25-02-2021

1 Problem - Fibonacci Numbers (100 pts)

In a Fibonacci sequence, a number is obtained by adding the preceding two numbers in the sequence,

$$F(n) = F(n-1) + F(n-2) \tag{1}$$

$$F(0) = 0 \tag{2}$$

$$F(1) = 1 \tag{3}$$

Your task is to write a program which outputs the Nth fibonacci number when given N as the input. You have to implement both the recursive and iterative versions of the problem. Observe the time taken to compute the output for both the versions and give your insights on the reasons behind the time difference. You can assume that the output fits in a 32-bit register i.e no input will be given which results in a overflow of a 32-bit register. You can use a separate text file to record your observations and insights.

1.1 Sample input and output

7

13

2 Bonus Question(5 pts)

It is often better to show the results on paper. There are different ways to measure the time taken for a computation. One of the ways is to use the *rdtscp* instruction, which helps in reading the time stamp counter which is incremented every clock cycle. Refer to the attached Intel Manual (Volume 2) for more information about the instruction. Use it to measure the time taken for the computation and support your observations with the obtained results.

3 Submission Guidelines

- There will be points for the readability of the code. Write the code with proper comments wherever necessary and maintain proper indentation.
- Name the program with your roll_no. Ex: If your roll_no is CS19B001, your file name should be CS19B001.asm. If there are multiple files, use CS19B001_1.asm, CS19B001_2.asm etc..
- You need not submit the io.o and io.mac files.
- Place all the required files in a folder and compress the folder using zip compression. Name your folder in the following format. If your roll_no is CS19B001, name it as CS19B001_A$.zip, where '$' denotes the assignment number.