

Computer Architecture - CS2323. Autumn 2022

Lab-2 (Basic Computations)

The programs need to be implemented and submitted during the lab hours only.

1. Write an assembly program using RISC-V instructions in RIPES simulator (V2.2.4) to compute and store 'n' numbers of the Square Numbers Series into memory starting from location 0x10000100. The value of 'n' is present at location 0x10000000. Use any instruction that you feel suitable for the implementation. Use of **MULT** instruction is **not** allowed.

Example: Let's say the location 0x10000000 contains 6

After completing your program, the memory location from 0x10000100 should contain:

0x10000100: 1

0x10000108: 4

0x10000110: 9

0x10000118: 16

0x10000120: 25

0x10000128: 36

Hint: Square numbers are 1, 4, 9, 16, 25, ...

They can be written as: 1, 1+3, 4+5, 9+7, ...

which corresponds to the series: $F(n) = F(n-1) + (2n - 1)$

2. Extend the above program to also calculate the sum of the numbers of the Square Numbers Series and store the sum at memory location 0x10000010. For example, for the above case, the value at 0x10000010 should be 91

Instructions:

1. Use Ripes simulator from:
https://github.com/mortbopet/Ripes/releases/download/v2.2.4/Ripes-v2.2.4-linux-x86_64.AppImage
2. Configure simulator for 64-bit processor (click on the processor symbol below File in the top-left and select 64-bit single cycle processor).
3. While doing this exercise, try to use breakpoints, single stepping, etc. features of the simulator for a better understanding. We will need these features when debugging the programs in subsequent assignments. Also, see the corresponding disassembled (translated) code in the right pane and try to understand the same.

Submission instructions:

Submit the assembly code as a file named YOUR_ROLLNUM.s (e.g., CSYYBTECHXXXXX.s) in the google classroom.