

# Computer Organization, Spring 2021

Lab 1 : RISC-V Programming

Due: 2021/03/25

## 1. Goal

In Lab0, students will know the difference between assembly and high-level languages. In order to test the correctness of the program, students should use RISC-V simulator - Ripes to simulate the programs. **Feel free to generate assembly code in any way!**

## 2. Attached Files

- (A). "factorial.c": C code.
- (B). "factorial.s": RISC-V assembly code for "factorial.c".
- (C). "bubble\_sort.c": C code.
- (D). "gcd.c": C code.
- (E). "fibonacci.c": C code.

## 3. Lab Description

We provide "factorial.c" and "factorial.s" for example. You should generate the assembly codes for "bubble\_sort.c", "gcd.c", "fibonacci.c" correspond to "bubble\_sort.s", "gcd.s", "fibonacci.s".

With our giving data in C program, you have to answer the questions below, and please describe the answers in your report.

- (A). How many instructions are actually executed? You have to explain clearly how you calculate your instructions. There is no specific answer. (Hint: loop need to be counted every single time.)
- (B). What is the maximum number of variable be pushed into the stack at the same time when your code execute? There is only one correct answer.

## 4. Grade

- (A). Assembly Code: 30%.
- (B). Report (70%): You should include
  - i. The answer of the question for three program. Every question you got 10%, totally 60%. For example, you answer question 1 and question 2 for "bubble\_sort.s" in your report you got 20%.
  - ii. Experience: 10%

## 5. Hand in

- (A). Zip your folder and name it as “ID.zip”(e.g. 0816001.zip) before uploading to newe3. Other filenames and formats such as \*.rar and \*.7z are NOT accepted! Multiple submissions are accepted, and the version with the latest time stamp will be graded.
- (B). Please include ONLY Assembly source code(\*.s) and your report(\*.pdf) in the zipped folder.

## 6. Link

- (A). **Ripes Introduction:** <https://github.com/mortbopet/Ripes/wiki/Ripes-Introduction>
- (B). **Ripes Download:** <https://github.com/mortbopet/Ripes/releases/tag/v.1.0.4>
- (C). **Please download v.1.0.4**

## 7. Q&A

- (A). Feel free to ask any question if you need.
- (B). We will not debug for you.

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