CA2020 – HW3

RISC-V Assembly Code – Solving recurrence equation

Description

- In this homework, you have to use a RISC-V simulator to develop a program that can solve recurrence equation to practice procedure call.

TODO: Solving recurrence equation

- In this homework, you are asked to solve a recurrence equation:

$$f(n) = \begin{cases} f\left(\left\lfloor \frac{n}{2} \right\rfloor\right) + f\left(\left\lfloor \frac{n}{4} \right\rfloor\right) + n, if\ n \geq 2 \\ 1, o.w. \end{cases}, n \in \mathrm{Z}, -1024 \leq n \leq 1024$$

- Input format
  - Input file contains only one line. Line1: n
- Time limit: 30 seconds per input
- Pseudo-instruction is not allowed

Sample code

- Operations related to I/O have been implemented in the sample code. n will be stored in register $a0$. You have to store the result to $s0$ and jump to `result`. Please DON'T modify the code outside the TODO block.

```
10 ##################################################################
11 # write your recursive code here, n is stored in a0
12 # please store the answer to s0 and jump to "result"
13
14 ##################################################################
```

Sample output

```
d08922025@linux1 [~/CA2020_hw3] jupiter -b hw3.s
-1
1

Jupiter: exit(0)
d08922025@linux1 [~/CA2020_hw3] jupiter -b hw3.s
0
1

Jupiter: exit(0)
d08922025@linux1 [~/CA2020_hw3] jupiter -b hw3.s
2
4

Jupiter: exit(0)
d08922025@linux1 [~/CA2020_hw3] jupiter -b hw3.s
5
10

Jupiter: exit(0)
```

Scoring

- We will judge the correctness of your code by running
  `$ timeout 30 jupiter -b hw3.s < input_file` on CSIE workstation
- Time limit exceeded will be treated as wrong answer
- Don't worry about overflow/underflow, it won't happened
- 100 pts for calculator (20 testcase, 5 pts per testcase)
- 10 pts off per day for late submission
- You will get zero pts for plagiarism

Submission

- Due date: 2020/11/04 Wed. 14:20
- Please compress your homework into a *.zip file and upload to NTUCOOL.
- After unzipping, the folder should have the following structure:
  - d08922025_hw3 (lowercase)
    - readme.txt (Write down what platform you use. Linux, windows, MacOS …)
    - hw3.s (Remember to change the filename)