Description

In this homework, you are going to use Jupiter RISC-V simulator to develop two well-known sequences, Fibonacci sequence and Recamán's sequence.

After finishing this homework, you will be familiar with Jupiter basic I/O, RISC-V calling convention, and the implementation of array and pointer in assembly level.

Requirements

Given an integer n, your program should output the nth item of given sequence.

1. Fibonacci sequence

The definition of Fibonacci sequence is as follows.

$$F_0 = 0$$
$$F_1 = 1$$
$$F_n = F_{n-1} + F_{n-2}$$

Input format	Output format
$n \ (0 \leq n \leq 15)$	[Result of F_n]

Sample Input 1	Sample Output 1
0	0

Sample Input 2	Sample Output 2
2	1

Sample Input 3	Sample Output 3
5	5

2. Recamán's sequence

The definition of Recamán's sequence is as follows.

$$a_n = \begin{cases} 0, & if\ n = 0 \\ a_{n-1} - n, & if\ a_{n-1} - n > 0\ and\ is\ not\ already\ in\ the\ sequence \\ a_{n-1} + n, & otherwise \end{cases}$$

Input format	Output format
$n\ (0 \leq n \leq 200)$	[Result of a_n]

Sample Input 1	Sample Output 1
0	0

Sample Input 2	Sample Output 2
2	3

Sample Input 3	Sample Output 3
10	11

Input

Every input file has one line, which contains an integer n.

Output

The output should contain only one integer which is the nth item of given sequence.

Grading policy

We will judge the correctness of your program by running the following commands on CSIE workstation.

```
$ jupiter [student_id]_hw3_fibonacci.s < input_file

$ jupiter [student_id]_hw3_recaman.s < input_file
```

- There are 6 testcases for Fibonacci sequence, 4 testcases for Recamán's sequence, 10 points per testcase.
- Time limit: 60 seconds per testcase.
  - Time limit is only used for auto judgement, and it shouldn't be the part of grading. If you can output correct answers but can't meet the timing requirement, please contact TA using email.
  - However, it's very likely that your program has some bugs if it's stuck for 1 minutes. (infinite loop, stack become a mess…etc)
- 10 points off per day for late submission.
- You will get zero point if we find out that you implement the sequence without using recursion.
- You will get zero point if we find out that you solve the problem by storing all possible answers and print it out directly.
- You will get zero point for plagiarism.

Submission

Due date: 11/9 23:59

You are required to submit **.zip** file to NTU Cool.

Please rename your program **[student_id]_hw3_fibonacci.s** for Fibonacci sequence, **[student_id]_hw3_recaman.s** for Recamán's sequence and pack 2 files using the following folder structure:

```
[student_id (lower-cased)].zip
    /[student_id]/ <-- folder
        [student_id]_hw3_fibonacci.s <-- file
        [student_id]_hw3_recaman.s <-- file
```

For example, if your student id is **b12345678**, your zip file should have followed structure:

```
b12345678.zip
    /b12345678/ <-- folder
        b12345678_hw3_fibonacci.s <-- file
        b12345678_hw3_recaman.s <-- file
```

Reference

- Lecture slides
- Jupiter RISC-V simulator
  https://github.com/andrescv/Jupiter
- Jupiter RISC-V simulator docs
  https://github.com/JupiterSim/Docs
- RISC-V Instruction Set Manual
  https://github.com/riscv/riscv-isa-manual
  https://riscv.org/technical/specifications