

Description

In this homework, you are going to use Jupiter RISC-V simulator to develop a simple calculator which supports seven operators, addition, subtraction, multiplication, division, minimum, power and factorial.

After finishing this homework, you will be familiar with the usage of Jupiter RISC-V simulator, register definition, and some basic operations in RV32I Base Integer Instruction Set.

Requirement

The calculator should support the following operations:

$+$, $-$, \times , $/$, \min , $^$, $!$

Input format:

A

$operator$

B

Output format:

[Result]

$0 \leq A, B \leq 1024, op \in \{0, 1, 2, 3, 4, 5, 6\}$

If $op = 0$, calculate $A + B$ and output the result.

If $op = 1$, calculate $A - B$ and output the result.

If $op = 2$, calculate $A \times B$ and output the result.

If $op = 3$, calculate A / B and output the result. (Quotient)

If $op = 4$, calculate minimum (A, B) and output the result.

If $op = 5$, calculate A^B and output the result.

If $op = 6$, calculate $A!$ and output the result. (In this case, $B = 0$)

If division by zero occurs, the program should print "*division by zero*".

(Don't worry about overflow or underflow.)

Note : No need to handle 0^0 .

Input

Every input file has three lines. The first line contains a non-negative integer A , the second line contains a non-negative integer op , the third line contains a non-negative integer B , corresponding to the first operand, the operator, and the second operand.

Output

The output should contain only one integer that is the result of the input equation.

Sample Input 1

7
0
4

Sample Output 1

11

Sample Input 2

7
3
4

Sample Output 2

1

Sample Input 3

7
3
0

Sample Output 3

division by zero

Sample Input 5

10
4
1024

Sample Output 5

10

Sample Input 6

3
6
0

Sample Output 4

6

Grading policy

For operations `+`, `-`, `×`, `/`, `min`, each operation has 4 testcases, 3 points per testcase. For operations `^` and `!`, each operation has 5 testcases, 4 points per testcase.

We will judge the correctness of your program by running the following command:

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

10 points off per day for late submission.

You will get zero points for plagiarism.

Submission

Due date: 03/22 23:59

Please name your program file **[student_id].s** and upload it to NTUCOOL.

For example, if your student id is **b12345678**, your program file name should be **b12345678.s**.

Reference

- 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>