

Homework 1

CCC 2015 Junior 1

<https://cemc.math.uwaterloo.ca/contests/computing/2015/stage%201/juniorEn.pdf>

Problem J1: Special Day Problem

Description February 18 is a special date for the CCC this year. Write a program that asks the user for a numerical month and numerical day of the month and then determines whether that date occurs before, after, or on February 18. If the date occurs before February 18, output the word Before. If the date occurs after February 18, output the word After. If the date is February 18, output the word Special.

Input Specification

The input consists of two integers each on a separate line. These integers represent a date in 2015. The first line will contain the month, which will be an integer in the range from 1 (indicating January) to 12 (indicating December). The second line will contain the day of the month, which will be an integer in the range from 1 to 31. You can assume that the day of the month will be valid for the given month.

Output Specification

Exactly one of Before, After or Special will be printed on one line.

Sample Input 1

1
7

Output for Sample Input 1

Before

Sample Input 2

8
31

Output for Sample Input 2

After

Sample Input 3

2
18

Output for Sample Input 3

Special

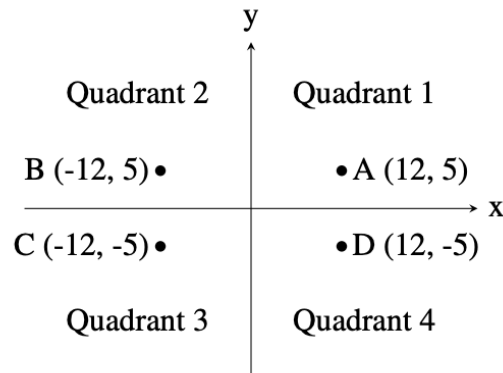
Homework 2

CCC 2017 J1

<https://cemc.math.uwaterloo.ca/contests/computing/2017/stage%201/juniorEF.pdf>

Problem J1: Quadrant Selection

Problem Description A common problem in mathematics is to determine which quadrant a given point lies in. There are four quadrants, numbered from 1 to 4, as shown in the diagram below:



For example, the point A, which is at coordinates (12, 5) lies in quadrant 1 since both its x and y values are positive, and point B lies in quadrant 2 since its x value is negative and its y value is positive. Your job is to take a point and determine the quadrant it is in. You can assume that neither of the two coordinates will be 0.

Input Specification

The first line of input contains the integer x ($-1000 \leq x \leq 1000$; $x \neq 0$). The second line of input contains the integer y ($-1000 \leq y \leq 1000$; $y \neq 0$).

Output Specification

Output the quadrant number (1, 2, 3 or 4) for the point (x, y) .

Sample Input 1

12
5

Output for Sample Input 1

1

Sample Input2

9
-13

Output for Sample Input 2

4

Homework 3
CCC 2012 Junior 3

Problem J3: Icon Scaling

Problem Description

You have been asked to take a small icon that appears on the screen of a smart telephone and scale it up so it looks bigger on a regular computer screen.

The icon will be encoded as characters (\times and $*$) in a 3×3 grid as follows:

```
*×*
 ××
*  *
```

Write a program that accepts a positive integer scaling factor and outputs the scaled icon. A scaling factor of k means that each character is replaced by a $k \times k$ grid consisting only of that character.

Input Specification

The input will be a positive integer k such that $k < 25$.

Output Specification

The output will be $3k$ lines, which represent each individual line scaled by a factor of k and repeated k times. A line is scaled by a factor of k by replacing each character in the line with k copies of the character.

Sample Input

```
3
```

Output for Sample Input

```
***×××***
***×××***
***×××***
  ××××××
  ××××××
  ××××××
***      ***
***      ***
***      ***
```

Problem J2: Rotating letters

Problem Description

An artist wants to construct a sign whose letters will rotate freely in the breeze. In order to do this, she must only use letters that are not changed by rotation of 180 degrees: I, O, S, H, Z, X, and N.

Write a program that reads a word and determines whether the word can be used on the sign.

Input Specification

The input will consist of one word, all in uppercase letters, with no spaces. The maximum length of the word will be 30 letters, and the word will have at least one letter in it.

Output Specification

Output YES if the input word can be used on the sign; otherwise, output NO.

Sample Input 1

SHINS

Output for Sample Input 1

YES

Sample Input 2

NOISE

Output for Sample Input 2

NO