🅷 ♠ Practice   ◷ Compete   💼 Jobs   ⚇ Rank   🏆 Leaderboard

Badge Progress (Details)

Points: 126 Rank: 270333

Simple Game 🔖

by **zxqfd555**

| Problem | Submissions | Leaderboard | Discussions | Editorial 🔒 |

Big Cat and Little Cat love playing games. Today, they decide to play a Game of Stones, the *Kitties are Coming* edition. The game's rules are as follows:

- The game starts with N stones that are randomly divided into M piles.

- The cats move in alternating turns, and Little Cat always moves first.

- During a move, a cat picks a pile having a number of stones ≥ 2 and splits it into any number of non-empty piles in the inclusive range from 2 to K.

- The first cat to be unable to make a move (e.g., because all piles contain exactly 1 stone) loses the game.

Little Cat is curious about the number of ways in which the stones can be initially arranged so that she is guaranteed to win. Two arrangements of stone piles are considered to be different if they contain different sequences of values. For example, arrangements $(2, 1, 2)$ and $(2, 2, 1)$ are different.

Given the values for N, M, and K, find the number of winning configurations for Little Cat and print it modulo $10^9 + 7$.

Note: Each cat always moves *optimally*, meaning that they're both playing to win and neither cat will make a move that causes them to lose the game if some other (winning) sequence of moves can be made.

Input Format

The first line of input contains three space-separated integers, N (the number of stones), M (the number of piles), and K (the maximum number of piles into which a pile can be split during a single move), respectively.

Constraints

- $1 \leq M \leq 10$

- $M \leq N \leq 600$

- $2 \leq K \leq 600$

Output Format

Print the number of initial arrangements of piles that will result in Little Cat winning, modulo $10^9 + 7$.

Sample Input

```
4 3 3
```

Sample Output

```
3
```

Explanation

There are three possible arrangements:

1. $(1, 1, 2)$

2. $(1, 2, 1)$

3. $(2, 1, 1)$

For any arrangement, Little Cat can pick a pile containing 2 stones and split it into 2 piles with 1 stone each. At this point, the pile configuration will be $(1, 1, 1, 1)$, so Big Cat won't be able to make any moves and the game ends. We then print the result of $3 \% (10^9 + 7) = 3$ on a new line.

Submissions:109

Max Score:60
Difficulty: Hard

Rate This Challenge:
☆ ☆ ☆ ☆ ☆

More

Current Buffer (saved locally, editable)   Java 7

```
 1  import java.io.*;
 2  import java.util.*;
 3  import java.text.*;
 4  import java.math.*;
 5  import java.util.regex.*;
 6
 7  public class Solution {
 8
 9      public static void main(String[] args) {
10          /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11      }
12  }
```

Line: 1 Col: 1

⬆ Upload Code as File   ☐ Test against custom input   Run Code   Submit Code

Join us on IRC at #hackerrank on freenode for hugs or bugs.

Contest Calendar | Blog | Scoring | Environment | FAQ | About Us | Support | Careers | Terms Of Service | Privacy Policy | Request a Feature