Tom and his Unusual Legs

Lab Exam 1 - Replay

Computer Programming
Date: 3 October, 2019

Problem Code: **TAL [15 Marks]**

Problem Statement: Tom is an unusual creature from a distinct planet named Mark LXXXV where all the creatures live happily and peacefully. Greta, on the other hand is inter-galactic friend of Tom, who lives in a rather miserable planet suffering from adverse climatic changes. She is a climate activist and wanted to bring some serious reforms on her planet too (like Mark LXXXV), hence she planned to use his light speed space ship, The Milano to go and meet Tom.

The very strange thing that Greta observed after reaching Mark LXXXV is that the creatures living on that planet had both the legs of different lengths, one leg is of length 1 and other of length **K** (yeah, you thought legs are always of the same length?)

Tom lives on the top floor of a building, and in order to reach to the top floor, he had to climb a total of **N** stairs. Now as Greta is climbing up the stairs with Tom, she was wondering in how many ways can Tom reach his home, starting from the ground (consider each stair of length 1)

For example, if Tom's legs are of length 1 and 3, the total number of ways in which Tom can reach to floor number 4 are

1. $0 -> 1 -> 4$ (using leg of length 1 and then 3)
2. $0 -> 3 -> 4$ (using leg of length 3 and then 1)
3. $0 -> 1 -> 2 -> 3 -> 4$ (only using leg of length 1)

Since Greta was so busy bringing climatic changes on her planet from a very early age she forgot to do her math homeworks and couldn't come up with the answer. Can you help Greta find the answer?

Input:
First line contains the number of test cases T.
Each of these T test cases consists of two space separated integers, N and K, the total number of stairs and length of Tom's longer leg respectively.

Output:
Total number of ways in which Tom can reach to the N^{th} floor. Since this answer can be large, output the actual answer $\%\ 10^9 + 7$

Constraints
$1 \leq T \leq 100$
$1 \leq N \leq 10^5$
$2 \leq K \leq 100$

Time Limit: 1 sec
Memory Limit: 256 MB

Sample Test Case

Input	Output
3 4 4 4 3 5 2	2 3 8