

Problem 4: Stand-up Maths' Protégée

9 Points

Problem ID: `tntrelay`

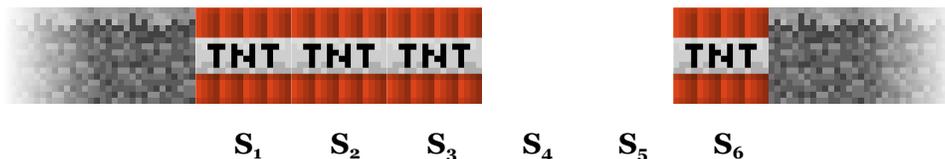
Rank: 2

Introduction

While exploring a Minecraft trial chamber with your party you come across a swarm of [Bogged](#). Sounds scary, doesn't it? This rare skeleton variant can inflict you with a poison in just one hit. Everyone panics and starts running, but the chamber is full of challenging puzzles, most notably a TNT bridge where blocks fall after getting stepped on. How many members of your party will be able to survive?

Problem Statement

You are given an N long sequence of blocks S_1, S_2, \dots, S_N forming a course for players to run across. Each block is either a TNT block or an air block. All players start on an unseen block preceding S_1 , and aim to complete the course by stepping on an unseen block following S_N .



The player moves from left to right, and can also jump—skipping at most up to K blocks at a time. The player can step on TNT blocks but will fall through air blocks. When a player steps on a TNT block, it falls away, leaving an air block in its place.

Find the maximum number of players, P , that are able to cross the TNT bridge and escape the trial chamber if every block that the previous player used falls and can't be used anymore.

Input Format

The first line of the input contains a single integer T denoting the number of test cases that follow. For each test case:

- The first line contains an integer N , which denotes the number of blocks in the course, and an integer K , which denotes the maximum jump distance of each player.
- The second line contains an array of N characters S_1, S_2, \dots, S_N denoting each block in the course before any players run on it. Blocks are one of the following:
 - A TNT block, denoted by a pound sign #
 - An air block, denoted by a dash -

Output Format

For each test case, output P , the number of players who can make it across the TNT run. If infinitely many players can complete the course, then output -1.

Constraints

$$1 \leq T \leq 100$$

$$1 \leq N \leq 10000$$

$$1 \leq K \leq 10000$$

The initial TNT Run course is possible to complete.

Sample Test Cases

Sample Input

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```
5
6 4
###--#
7 4
-####-#
4 4
----
12 5
#----##-#----
20 3
###-#---###-#####--#
```

Sample Output

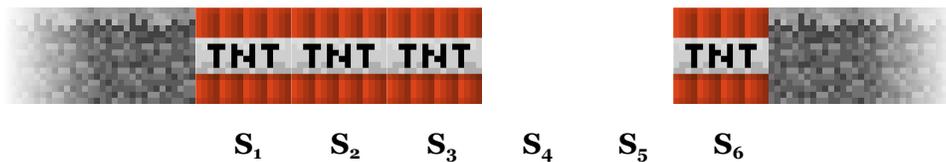
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```
3
4
-1
2
1
```

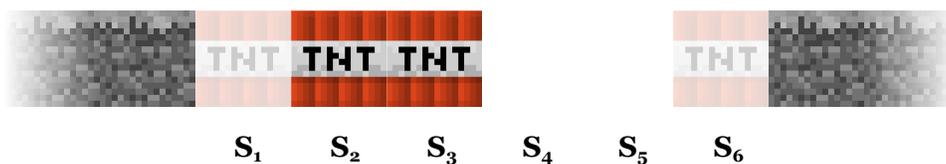
Sample Explanations

Test Case #1:

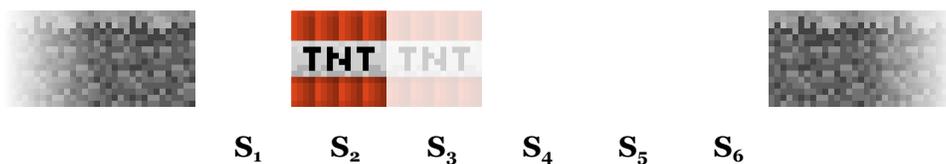
The course initially looks like this:



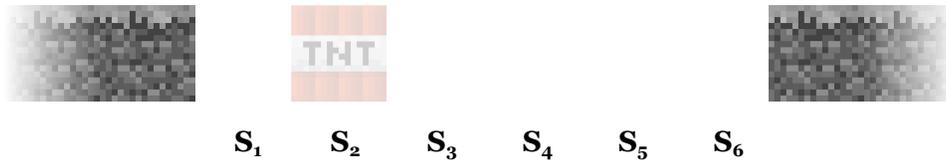
The first player can start at the first TNT block. From there, they can jump to the TNT block on the sixth space and complete the course.



The second player can start by jumping to the third block. From there, they can skip to the unseen block past the sixth block and complete the course.



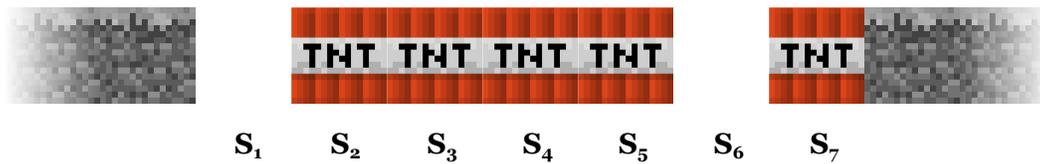
Similarly, the third player can start by jumping to the second block. From there, they can skip to the unseen block past the sixth block and complete the course.



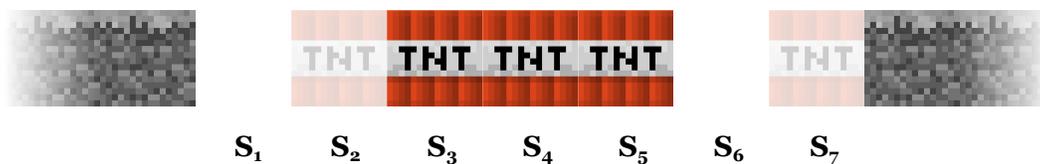
After this, the fourth player attempts to complete the course, but cannot start as there are no blocks remaining. Therefore, the maximum number of players that can pass this course is 3.

Test Case #2:

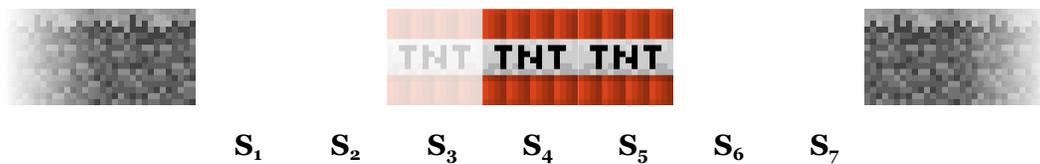
The course initially looks like this:



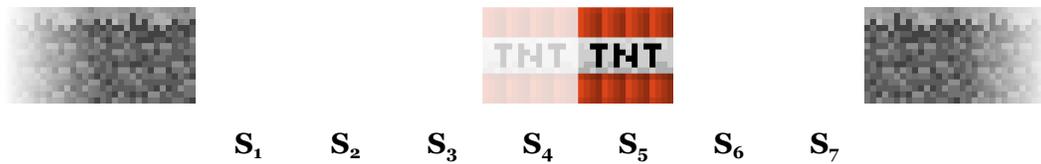
The first player starts by skipping to the second TNT block. From there, they jump to the TNT block on the seventh space and complete the course.



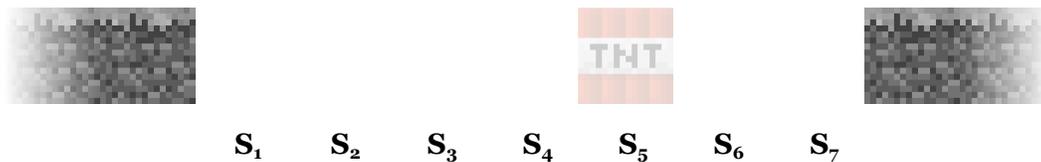
The second player can start by jumping to the third block. From there, they can skip to the unseen block past the seventh block and complete the course.



Similarly, the third player can start by jumping to the fourth block. From there, they can skip to the unseen block past the seventh block and complete the course.



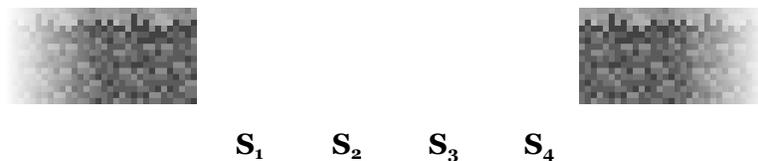
Lastly, the fourth player can start by jumping to the fifth block (this is the maximum number of blocks they can skip). From there, they can skip to the unseen block past the seventh block and complete the course.



After this, the fifth player attempts to complete the course, but cannot start as there are no blocks remaining. Therefore, the maximum number of players that can pass this course is 4.

Test Case #3:

The course initially looks like this:



The first player starts by skipping over the entire course because four blocks does not exceed the maximum number a player can skip. Since the course remains unchanged as they didn't step on any blocks, each player that follows can do the same thing as the first player. This means infinitely many players can complete the course, which is why the output is -1.

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