Problem E – Exponential points game.

Adapted by: Juan Pablo Marín

The exponential points game is a two person board game. The board consists of N tiles numbered from 1 to N arranged over a straight line. Before the game begins, both players agree in a set of K tiles to be marked so that none of the players will take any of those tiles in the game.
The two players will alternate turns. On each turn, the player marks 1 or more unmarked tiles, but if the player marks more than one tile, all tiles marked in the turn should share a side (tile i is adjacent to tile $i-1$ and to tile $i+1$). In turn k, if the player marked m_k tiles then he scores $m_k \times 2^{k-1}$ points. The game continues until all the boxes are marked. As you can guess, the player with higher score wins the game.
Santiago is a fan of this game so he has challenged you to play. Since he is more experienced in the game, he says he will take the first turn, and also, he won't take any points from that turn to give you a chance to win. Then in this game, the first turn, Santiago will get $m_1 \times 0$ points, in the second turn you get $m_2 \times 1$ points, the third turn Santiago gets $m_3 \times 2$ points, the fourth turn you get $m_4 \times 4$ points, etc.
What Santiago does not know is that you are an expert in the game as well, so, you suspect Santiago is not giving a chance to win taking the first turn, instead, he is ensuring you will lose. You know both of you will play the game optimally, can you determine the minimum number of tiles Santiago has to mark in the first turn so that you don't have a chance to win?

Input

The first line of the input contains two numbers separated by a space N ($1 \leq N \leq 1000$) and K ($0 \leq K \leq N$), representing the number of tiles in the board and the number of tiles marked before the game starts, respectively. The following K lines contain each a number between 1 and N, inclusive representing the tiles that are marked before the game starts. No tile is marked twice in the input.

Output

Output a single line with an integer indicating the minimum number of tiles to take in the first turn so that Santiago wins the game. If no such number exists, print -1.

Sample input 1	**Sample output 1**
`4 0`	`2`

Sample input 2	**Sample output 2**

`5 3`
`1`
`2`
`3`
	`-1`

Sample input 3	**Sample output 3**

`8 3`
`1`
`5`
`7`
	`1`