Ants

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

An army of n ants walk on a horizontal pole of length l cm, each with a constant speed of 1 cm/s. When a walking ant reaches an end of the pole, it immediately falls off it. When two ants meet, they turn back and start walking in opposite directions. We know the initial positions of ants on the pole, and their initial directions in which the ants start walking. Your task is to compute the time needed for all the ants to fall off the pole.

Input

The first line of input contains two integer numbers: l, the length of the pole (in cm) and n, the number of ants residing on the pole. These two numbers are followed by n integers indicating the position and direction of each ant on the pole. The absolute value of this integer stands for the distance measured from the left end of the pole. And if this integer is positive, it means the ant is facing right, and a negative integer means the ant is facing left. All absolute values of input integers are not bigger than 1000000 and they are separated by whitespace.

Output

Print the time needed for all the ants to fall off the pole.

Examples

standard input	standard output
10 3 2 -6 7	8
20 2 19 -1	1