Task Overview Sheet

	Farm	Milk Trading	Flowers
Type	Batch (stdin/stdout)	Batch (stdin/stdout)	Batch (stdin/stdout)
Time Limit (per test case)	0.5 seconds	1 second	1 second
Memory Limit (per test case)	16 MB	32 MB	64 MB
Points	150	150	150

Farm

Hareedi is building a new farm, the two most important tasks he needs to do are to build a fence to protect his plants from animals, and a pond for his animals to drink from. He decided that the pond and the fence will have **rectangular shapes**, and because of the machines he uses to make the fence and the pond, the length of each side must be an integer (whole number). The materials he has to make the pond and the fence are limited, he wants the area of the fenced region to be maximized to plant more plants, and the perimeter of the pond to be maximized so that more animals can drink from the pond at the same time.

NOTE: A rectangular shape may be a rectangle or a square.

TASK

Write a program that given the perimeter of the fenced region or the area of the pond, which can be built using the available materials, calculates **the maximum area for the fenced region** or the **maximum perimeter for the pond** respectively. **You do not have to use all the materials.**

CONSTRAINTS

0 <= **T**<= 1	**T** specifies whether Hareedi wants to build a pond or a fence.
4 <= **M** <= 1,000,000,000	The maximum perimeter of the fenced region (if T is 1) or the maximum area of the pond (If T is 0).

INPUT

- Line 1 contains an integer **T :**
  - **T** is 0 if Hareedi wants to build a pond or 1 if Hareedi wants to build a fence.
- Line 2 contains an integer **M**.

OUTPUT

- A single line containing a single integer, the maximum area or perimeter according to **T.**

GRADING

- For some test cases, worth **50 points T** will be equal to 0.
- For some test cases, worth **50 points T** will be equal to 1.
- For some test cases, worth **30 points M** will not exceed 10,000.
- For some test cases, worth **60 points M** will not exceed 10,000,000.

EXAMPLE A

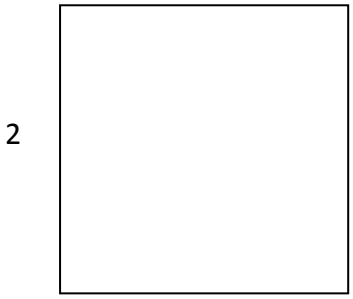
Sample Input	Sample Output
0 4	10

The materials available are enough to make a pond of area 4. The best solution is to build a 4x1 rectangular pond, which has a perimeter equal to 10 (maximum perimeter possible).

EXAMPLE B

Sample Input	Sample Output
1 9	4

The materials available are enough to make a fenced region of perimeter 9. The best solution is to build a 2x2 square fence, which has a perimeter equal to 8 and an area equal to 4 (maximum area possible).



Milk Trading

Hareedi and Hanadi live in a village with **N** houses built next to each other along one straight roadway with equal distances between adjacent houses. Some people own cows and sell the milk their cows produce, while others do not own cows and may need to buy milk. Every morning, Hareedi and Hanadi transport milk around the village such that everyone buys or sells the exact number of bottles they want. Transporting one bottle of milk from one house to an adjacent house results in one unit of work. **Fortunately**, the number of milk bottles needed by people is always equal to the number of milk bottles sold by cow owners.

TASK

Write a program that given the number of milk bottles that people at each house needs to buy or sell, represented as an integer, finds the minimum work necessary to transport the bottles from sellers to buyers.

CONSTRAINTS

2 <= **N** <= 1,000,000	The number of houses.
-1000 <= B_i <=1000	Integer representing the number of bottles to be bought from or sold to people at the house at position **i.**

INPUT

- Line 1 contains the integer **N,** the number of houses.
- Each of the next **N** lines contains an integer B_i. If $B_i > 0$ then people in house **i** are cow owners and want to sell B_i bottles of milk, if $B_i <= 0$ then people at house **i** are not cow owners and want to buy B_i bottles of milk.

OUTPUT

- A single line containing a single integer, the minimum work units necessary to transport the bottles of milk.

GRADING

- For some test cases, worth **35 points N** will not exceed 1,000.
- For some test cases, worth **75 points N** will not exceed 10,000.

EXAMPLE

Sample Input	Sample Output
5 5 -4 1 -3 1	9

There are 5 houses as shown in the table.

Position	1	2	3	4	5
Bottles	5	-4	1	-3	1

4 bottles are transported from house 1 to house 2, 1 bottle from house 1 to house 4, 1 bottle from house 3 to house 4, 1 bottle from house 5 to house 4.

Flowers

Hanadi has **N** flower pots each with a unique flower. The pots are arranged along a line. One day she decided to change their order under the condition that no two pots that were originally next to each other remain next to each other.

TASK

Write a program that given the number of pots, calculates the number of possible orders satisfying the condition **modulo some given integer M**.

CONSTRAINTS

1 <= **N** <= 1,000	The number of pots.
2 <= **M** <= 1,000,000	

INPUT

- Line 1 contains the integer **N,** the number of flower pots.
- Line 2 contains the integer **M.**

OUTPUT

A single line containing one integer between **0** and **M-1** (inclusive): the number of possible orders **modulo M**.

GRADING

- For some test cases, worth **30 points N** will not exceed 20.

EXAMPLE

Sample Input	Sample Output
5 11	3

For 5 pots there are 14 orders satisfying Hanadi's condition, assuming the original order of pots was "ABCDE" then the 14 possible orders are:

ACEBD
ADBEC
BDACE
BDAEC
BECAD
CADBE
CAEBD
CEADB
CEBDA
DACEB
DBEAC
DBECA
EBDAC
ECADB

14 modulo 11 = 3, so the answer is 3