B. Equalize Prices

time limit per test
1 second
memory limit per test
256 megabytes
input
standard input
output
standard output

There are n products in the shop. The price of the i-th product is a_i. The owner of the shop wants to equalize the prices of all products. However, he wants to change prices smoothly.
In fact, the owner of the shop can change the price of some product i in such a way that the difference between the old price of this product a_i and the new price b_i is at most k. In other words, the condition $|a_i-b_i| \le k$ should be satisfied ($|x|$ is the absolute value of x).
He can change the price for each product **not more than once**. Note that he can leave the old prices for some products. The new price b_i of each product i should be positive (i.e. $b_i > 0$ should be satisfied for all i from 1 to n).
Your task is to find out the **maximum** possible **equal** price B of **all** productts with the restriction that for all products the condiion $|a_i-B| \le k$ should be satisfied (where a_i is the old price of the product and B is the same new price of all products) or report that it is impossible to find such price B.
Note that the chosen price B should be integer.
You should answer q independent queries.

Input

The first line of the input contains one integer q ($1 \le q \le 100$) — the number of queries. Each query is presented by two lines.
The first line of the query contains two integers n and k ($1 \le n \le 100, 1 \le k \le 10^8$) — the number of products and the value k. The second line of the query contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^8$), where a_i is the price of the i-th product.

Output

Print q integers, where the i-th integer is the answer B on the i-th query.
If it is impossible to equalize prices of **all** given products with restriction that for all products the condition $|a_i-B| \le k$ should be satisfied (where a_i is the old price of the product and $B$is the new equal price of all products), print `-1`. Otherwise print the **maximum** possible equal price of **all** products.

Example

input

Copy

```
4
5 1
1 1 2 3 1
4 2
6 4 8 5
2 2
```

```
1 6
3 5
5 2 5
```

output

Copy

```
2
6
-1
7
```

Note

In the first example query you can choose the price $B=2$. It is easy to see that the difference between each old price and each new price $B=2$ is no more than 1.

In the second example query you can choose the price $B=6$ and then all the differences between old and new price $B=6$ will be no more than 2.

In the third example query you cannot choose any suitable price B. For any value B at least one condition out of two will be violated: $|1-B| \leq 2$, $|6-B| \leq 2$.

In the fourth example query all values B between 1 and 7 are valid. But the maximum is 7, so it's the answer.