

# Tall Poppies

time limit per test: 3 seconds  
memory limit per test: 768 megabytes  
input: standard input  
output: standard output

points: 100 · problem code: tallpoppies · author: glipR

Will is a Florist who owns a flower bed of poppies. Every day, all of Will's poppies will grow exactly  $x$  centimetres taller.

As part of managing a healthy flower bed, Will does one of two things:

- Harvest the tallest poppy to sell at his shop
- Plant a poppy of height  $y$  cm

Will would like to know the height of the poppies that he harvests so that he can set the correct selling price. Can you help him?

## Input

Input will start with three space-separated integers  $x$ ,  $P$  and  $E$ , the number of centimetres a poppy grows in a day, the number of poppies in the flower bed at day 0, and the number of events we'll be observing. The next line will contain  $P$  space-separated integers, the heights of the poppies at start of day 0.

$E$  lines will follow. Each of these  $E$  lines will start with two space-separated integers,  $d$  and  $b$ .  $d$  is the day on which this event is occurring (You may assume all events are occurring at the start of the day).

- If  $b$  is 0, then this event is Will harvesting the tallest poppy in his flowerbed, and no more input will follow on this line.
- If  $b$  is 1, then this event is Will planting a poppy, an additional integer will follow  $p$ , the height of this individual poppy.

## Example Input

```
1 4 5
5 8 3 6
1 0
1 1 8
2 1 6
4 0
5 0
```

Here poppies grow at 1cm a day, and Will:

- Has 4 poppies to begin with at day 0, of heights 5, 8, 3 and 6 cm.
- On Day 1 - Will harvests the tallest poppy then plants a poppy of height 8cm
- On Day 2 - Will plants a poppy of height 8cm
- On Day 4 - Will harvests the tallest poppy
- On Day 5 - Will harvests the tallest poppy

## Output

If your input contains  $X$  event lines containing  $b = 0$ . For each corresponding harvest event, you should print a single integer representing the height of the harvested poppy.

## Example Output

```
9
11
11
```

- The poppies start off with heights 5, 8, 3, 6.
- At the start of Day 1, we have heights 6, 9, 4, 7 - so Will harvests the 9 height poppy.
- We plant an addition poppy, so new heights are 6, 4, 7, 8
- At the start of Day 2, we have heights 7, 5, 8, 9, and we plant a poppy of height 6
- At the start of Day 4, we have heights 9, 7, 10, 11, 7, and so we harvest the poppy of height 11

- At the start of Day 5, we have heights 10, 8, 11, 8, and so we harvest the poppy of height 11

**Constraints**

- $0 \leq d \leq 10^9$  (Day of an event)
- $0 \leq p \leq 10^9$  (Individual poppy heights)
- $0 \leq x \leq 10$  (Growth per day)
- Harvest events will never occur when the flower bed is empty

**Test Set A (50%)**

- $1 \leq P \leq 100$  (Number of initial poppies)
- $1 \leq E \leq 100$  (Number of events)

**Test Set B (50%)**

- $1 \leq P \leq 10^6$  (Number of initial poppies)
- $1 \leq E \leq 10^6$  (Number of events)