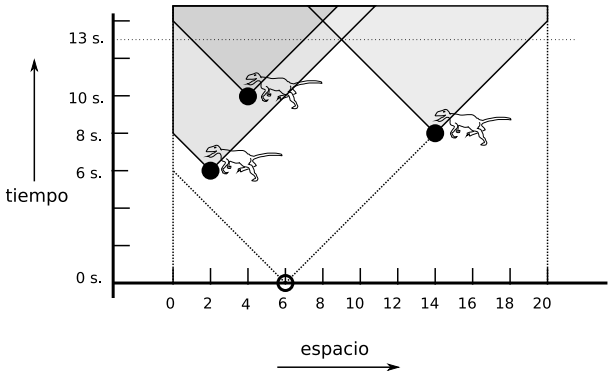
Velociraptors 301 P88665_en

When you go out from the toilet to go back to class you discover that a group of velociraptors has entered to the classroms and has devoured your classmates. The corridor where you are is closed: running away is impossible. Velociraptors, inside the classroms digesting, will go out at any moment to finish with you. Oh, well! It is known that this kind of things happen sometimes.

The corridor of your high school is represented by a segment of the real line from 0 to $2n-2$, with n doors of n classroms, placed over the points $0, 2, 4, \ldots, 2n-2$ of the line. The toilet where you are going out from is placed at the point k with $0 \leq k \leq 2n-2$ and even k. You as well as the velociraptors take 1 second to cover a distance unit over the line (velociraptors are already satisfied and they are not going to run for a miserable desert).

You are asked to, assuming that you know which velociraptors will go out from the classroms to devour you and the moments of time t_i that they will do it, and also assuming that these ones will head for you (wherever you are) as soon as they go out, say how many seconds you can extend your (brief but intense) life time making the right movements.

We consider that will be very useful to think in space-time diagrams as the one on the right, where it is illustrated a possible situaton for $k = 6$ and $n = 11$, where 3 velociraptors go out from the classroms placed in the points 2, 4 and 14 at the moments 6, 10 and 8 respectively. The correct answer to this case is 13.



Input

A test data contains various cases. Each case starts with three naturals n, m and k, with $0 \leq k \leq 2n-2$, $1 \leq n \leq 10^8$ and $1 \leq m \leq 10000$, where n and k are as it is describe in the wording and m is the number of velociraptors. The next m lines of the input contain a pair of numbers c_i, t_i, where c_i is the classroom that has devoured the i-th velociraptor and t_i is the moment of time that it will go out for its desert. It is fulfilled that $0 \leq a_i \leq 2n-2$ and $0 \leq t_i \leq 10^9$ for any i, that c_i and t_i are even, and that all the c_i are different.

Output

For each case, your program must print in a line the time that you can extend your life. As times t_i and classrooms are even numbers it is fulfilled that the answer will always be an integer.

Scoring

- **Test1:** **45 Points**

  Test data with no more than 20 cases with $n = m \leq 100$ and where the c_i appear sorted (as in the instance 1).

- **Test2:** **30 Points**

  Test data with no more than 20 cases with $n \leq 1000$ and $m \leq 100$ (as in the instances 2 and 3).

- **Test3:** **25 Points**

  Test data with no more than 20 cases of $n \leq 10^8$ and $m \leq 10^4$ (as in the instance 4).

Sample input 1

```
5 5 4
0 0
2 2
4 4
6 2
8 0

5 5 4
0 0
2 2
4 6
6 2
8 0

5 5 4
0 0
2 6
4 6
6 6
8 0

5 5 4
0 20
2 2
4 20
6 20
8 20

5 5 4
0 2
2 20
4 20
6 20
8 0

5 5 4
0 2
2 4
4 0
6 2
8 2

5 5 0
0 2
2 0
4 10
6 10
8 10

3 3 2
0 10
2 10
4 10
```

Sample output 1

```
4
4
4
```

Sample input 2

```
11 3 6
2 6
4 10
14 8
```

Sample input 3

```
1000 1 0
100 100

1000 1 0
100 98

540 5 482
508 1064
392 286
472 338
186 818
62 840

43 2 0
24 72
44 44

90 7 18
68 112
34 84
8 16
82 82
24 60
52 152
36 28
```

Sample input 4

```
50000000 7 67958422
87401816 62889408
6968110 151700716
72342116 155469888
89165870 73851810
94055040 7972090
34446444 32438808
11204152 4411784

50000000 10 54159472
16811258 75071762
82396964 125722710
45739798 94247702
8034262 18999860
36992544 92063428
87918930 66633664
82468966 168041758
40581626 31570418
```

```
8
5
0
2
11
```

Sample output 2

```
13
```

Sample output 3

```
200
198
944
88
170
```

```
50437158 161755152
19037120 148790458
```

Sample output 4

```
47617381
```

```
78714732
```

Problem information

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