G - Get Many Cola   Editorial (/contests/abc415/tasks/abc415_g/editorial)   🇯🇵 / 🇬🇧

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 575 points

Problem Statement

> The setting of this problem is similar to Problem D. It differs from Problem D in the
> target of maximization and some constraints.

There is a mysterious cola shop. This shop does not sell cola directly, but provides an
exchange service between empty cola bottles and new bottled cola.

Initially, Takahashi has N bottled colas, and from now on he can choose and take one of the
following actions any number of times (possibly zero):

- Drink 1 bottled cola that he has. The number of bottled colas he has decreases by 1,
  and the number of empty bottles increases by 1. (If he has no bottled cola before the
  action, he cannot take this action.)
- Choose an integer i between 1 and M, inclusive. Give A_i empty bottles to the cola
  shop, and receive B_i bottled colas in return. (He cannot choose i such that the number
  of empty bottles he has before the action is less than A_i. If there is no i that can be
  chosen, he cannot take this action.)

Takahashi loves cola. When he acts optimally, what is the maximum number of colas he can
drink?

He initially has no empty bottles.

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Constraints

- $1 \le N \le 10^{15}$
- $1 \le M \le 2 \times 10^5$
- $1 \le B_i < A_i \le 300$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

```
N   M
A_1   B_1
A_2   B_2
⋮
A_M   B_M
```

Output

Output the answer as an integer.

Sample Input 1   Copy

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```
5 3
5 4
5 1
4 2
```

Sample Output 1   Copy

Copy

```
11
```

Consider the following actions:

- Initially, Takahashi has 5 bottled colas.
- Repeat drinking 1 bottled cola 5 times. Takahashi has 5 empty bottles.
- Make an exchange with $i = 1$, giving 5 empty bottles in exchange for 4 bottled colas. Takahashi has 4 bottled colas.
- Repeat drinking 1 bottled cola 4 times. Takahashi has 4 empty bottles.
- Make an exchange with $i = 3$, giving 4 empty bottles in exchange for 2 bottled colas. Takahashi has 2 bottled colas.

- Repeat drinking 1 bottled cola 2 times. Takahashi has 2 empty bottles.

At this point, Takahashi has drunk a total of $5 + 4 + 2 = 11$ colas. No matter how he acts, he cannot drink 12 or more colas, so the answer is 11.

Sample Input 2 [Copy]

```
3 3
5 1
4 2
5 1
```
[Copy]

Sample Output 2 [Copy]

```
3
```
[Copy]

He can only drink the bottled colas he originally had.

Sample Input 3 [Copy]

```
925532735634776 8
91 40
273 265
286 153
155 126
92 83
291 228
216 90
234 9
```
[Copy]

Sample Output 3 [Copy]

```
31583804603529464
```
[Copy]

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