

Zimdon O'yini

Robert yangi o'yin yasamoqda. O'yin bir qahramonni, n ta raqibni va $n + 1$ ta zimdonni tashkil qiladi. Raqiblar 0 da $n - 1$ gacha raqamlangan va zimdonlar 0 dan n gacha raqamlangan. Raqib i ($0 \leq i \leq n - 1$) joylashgan zimdon i va uning kuchi $s[i]$. n -zimdonga raqib yo'q.

Qahramon x — zimdonga kirish, va z kuch bilan o'yinni boshlaydi. Har safar qahramon har qanday i ($0 \leq i \leq n - 1$) zimdonga kirganida, u i -raqib bilan to'qnash keladi, va quyidagilarning biri ro'y beradi

- Agar qahramonning kuchi raqibining $s[i]$ kuchidan katta yoki teng bo'lsa, qahramon yutadi. Bu qahramonning kuchini $s[i]$ ga **oshishga** olib keladi $s[i] \geq 1$. Bu holatda qahramon keyingi navbatda $w[i]$ zimdonga kiradi ($w[i] > i$);
- Aks holda, qahramon yutqizadi. Bu qahramonning kuchini $p[i]$ ga oshishga olib keladi $p[i] \geq 1$.
- Otherwise, the hero loses. This causes the hero's strength to **increase** by $p[i]$ ($p[i] \geq 1$). In this case the hero enters dungeon $l[i]$ next. Qahramon keyingi bo'lib $l[i]$ zimdonga kiradi.

E'tibor beringki, $p[i]$, kichik, katta, teng $s[i]$ bo'lishi mumkin. Va $l[i]$ ham kichik, teng, katta i bo'lishi mumkin.

Jangning natijasidan qat'iy nazar raqib i -katakda qoladi va $s[i]$ kuchini saqlab qoladi.

O'yin qahramon n -zimdonga kirganida tugaydi. Isbotlash mumkinki o'yin qahramonning boshlang'ich pozitsiyasi va kuchidan qat'iy nazar o'yin cheksiz davom etmaydi, ya'ni qachondir tugaydi.

Robert sizdan o'yinni q ta simulyatsiya yordamida tekshirishni so'radi. Har bir simulyatsiya uchun, Robert qahramonning boshlang'ich zimdonini x ga va boshlang'ich kuchini z ga teng deb hisoblab ko'radi. Sizning vazifangiz har bir simulyatsiya uchun qahramonning o'yin tugagandagi kuchi qancha bo'lishini topish

Implementatsiya tafsilotlari

Siz quyidagi prosedurani implementatsiya qilishingiz kerak:

```
void init(int n, int[] s, int[] p, int[] w, int[] l)
```

- n : raqiblar soni.
- s , p , w , l : arrays of length n . For $0 \leq i \leq n - 1$:
 - $s[i]$ is the strength of the opponent i . It is also the strength gained by the hero after winning against opponent i .
 - $p[i]$ is the strength gained by the hero after losing against opponent i .

- $w[i]$ is the dungeon the hero enters after winning against opponent i .
- $l[i]$ is the dungeon the hero enters after losing against opponent i .
- Bu procedura bir marta ham `simulate` ni chaqirmasdan oldin ishga tushiriladi .

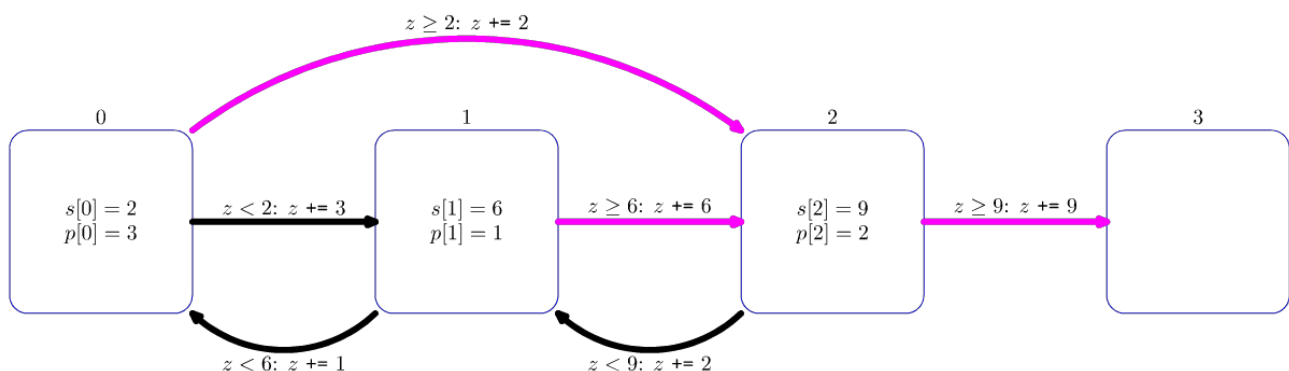
```
int64 simulate(int x, int z)
```

- x : the dungeon the hero enters first.
- z : the hero's starting strength.
- Qahramon x -zimdonga boshlaganda va z kuchga ega bo'lganda o'yin ohirida kuchi necha ekanligini qaytarish kerak.
- Bu funksiya aynan q marta chaqiriladi.

Misollar

Quyidagi funksiyani olaylik:

```
init(3, [2, 6, 9], [3, 1, 2], [2, 2, 3], [1, 0, 1])
```



Tepadagi diagramma shu funksiyani ifodalaydi. Har bir kvadrat zimdonlarni ko'rsatadi. 0, 1 va 2 zimdonlar uchu, $s[i]$ va $p[i]$ qiymatlari kvadrat ichida ko'rsatilgan. Siyohrang strelkalar qahramon raqibni yutgan taqdirda qayerga borishini ko'rsatadi, va qora strelkalar qahramon yutqizgandagi boradigan joyini ko'rsatadi.

Aytaylik grader `simulate(0, 1)` ni chaqirsin.

O'yin quyidagi tartibda boradi:

Zimdon	Qahramonning jangdan oldingi kuchi	Natija
0	1	Lose
1	4	Lose
0	5	Win
2	7	Lose
1	9	Win
2	15	Win
3	24	Game ends

As such, the procedure should return 24.

Let's say the grader calls `simulate(2, 3)`.

The game proceeds as follows:

Zimdon	Qahramonning jangdan oldingi kuchi	Natija
2	3	Lose
1	5	Lose
0	6	Win
2	8	Lose
1	10	Win
2	16	Win
3	25	Game ends

As such, the procedure should return 25.

Chegaralar

- $1 \leq n \leq 400\,000$
- $1 \leq q \leq 50\,000$
- $1 \leq s[i], p[i] \leq 10^7$ (for all $0 \leq i \leq n - 1$)
- $0 \leq l[i], w[i] \leq n$ (for all $0 \leq i \leq n - 1$)
- $w[i] > i$ (for all $0 \leq i \leq n - 1$)
- $0 \leq x \leq n - 1$
- $1 \leq z \leq 10^7$

Qism masalalar

1. (11 points) $n \leq 50\,000$, $q \leq 100$, $s[i], p[i] \leq 10\,000$ (for all $0 \leq i \leq n - 1$)

2. (26 points) $s[i] = p[i]$ (for all $0 \leq i \leq n - 1$)
3. (13 points) $n \leq 50\,000$, har bir raqib bir xil kuchga ega, $s[i] = s[j]$ for all $0 \leq i, j \leq n - 1$.
4. (12 points) $n \leq 50\,000$, ko'pi bilan 5 ta har xil $s[i]$ qiymatlari bor.
5. (27 points) $n \leq 50\,000$
6. (11 points) Qo'shimcha chegaralar yo'q.

Namunaviy grader

The sample grader reads the input in the following format:

- line 1: $n \ q$
- line 2: $s[0] \ s[1] \ \dots \ s[n - 1]$
- line 3: $p[0] \ p[1] \ \dots \ p[n - 1]$
- line 4: $w[0] \ w[1] \ \dots \ w[n - 1]$
- line 5: $l[0] \ l[1] \ \dots \ l[n - 1]$
- line $6 + i$ ($0 \leq i \leq q - 1$): $x \ z$ for the i -th call to `simulate`.

The sample grader prints your answers in the following format:

- line $1 + i$ ($0 \leq i \leq q - 1$): the return value of the i -th call to `simulate`.