Coloring

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

You are given n elements numbered from 1 to n. Element i has value w_i and color c_i. Each element also has a pointer a_i to some other element.

Initially, the color of element s is 1, while the color of all the other elements is 0. More formally, $c_s = 1$ and $c_i = 0$ for all $i \neq s$ $(1 \leq i \leq n)$.

You can perform the following operation for any number of times:

- Assign $c_i \leftarrow c_{a_i}$ at a cost of p_i.

Your score is equal to the sum of values of all the elements with color 1 after the operations minus the sum of costs of the operations.

Find the maximum possible score you can obtain.

Input

The first line contains two integers n, s $(1 \leq s \leq n \leq 5 \times 10^3)$ — the number of elements and the element with color 1 initially.

The second line contains n integers $w_1, w_2, \ldots, w_n$ $(-10^9 \leq w_i \leq 10^9)$ — the value of the elements.

The third line contains n integers $p_1, p_2, \ldots, p_n$ $(0 \leq p_i \leq 10^9)$ — the cost of changing the color of each element.

The fourth line contains n integers $a_1, a_2, \ldots, a_n$ $(1 \leq a_i \leq n,\ a_i \neq i)$.

Output

Output one integer representing the answer in one line.

Examples

standard input	standard output
3 1 -1 -1 2 1 0 0 3 1 2	1
10 8 36175808 53666444 14885614 -14507677 -92588511 52375931 -87106420 -7180697 -158326918 98234152 17550389 45695943 55459378 18577244 93218347 64719200 84319188 34410268 20911746 49221094 8 1 2 2 8 8 4 7 8 4 (There won't be extra line breakers in the actual test cases.)	35343360

Note

In the first sample, you can successively perform the following operations:

1. Assign $c_2 \leftarrow c_{a_2}$ at a cost of p_2, then $c = [1, 1, 0]$;
2. Assign $c_1 \leftarrow c_{a_1}$ at a cost of p_1, then $c = [0, 1, 0]$;
3. Assign $c_3 \leftarrow c_{a_3}$ at a cost of p_3, then $c = [0, 1, 1]$;
4. Assign $c_2 \leftarrow c_{a_2}$ at a cost of p_2, then $c = [0, 0, 1]$.

After the operations, only the color of element 3 is 1, so your score is equal to $w_3 - (p_2 + p_1 + p_3 + p_2) = 1$. It can be shown that it is impossible to obtain a score greater than 1.