A

Description

There are n sticks numbered from 1 to n, and the length of the i-th stick is a_i .

Find out the maximum area of the rectangle made by 4 different sticks from these sticks.

Standard Input

The first line contains a single integer $n(4 \leq n \leq 10^5)$ — the number of sticks.

The second line contains n integers $a_1, a_2, \ldots, a_n(1 \leq a_i \leq 10^9)$.

Standard Output

Print the maximum possible area of the rectangle. If no rectangle can be formed, print 0.

Sample

Sample Input 1

```
6
3 1 2 4 2 1
```

Sample Output 1

```
2
```

Sample Input 2

```
10
3 3 3 3 4 4 4 5 5 5
```

Sample Output 2

```
20
```

B

Description

There is a numerical sequence of length $3N$, now Xiao P want to remove N numbers in this sequence without changing the order of the remaining numbers to get a new sequence P'.

Xiao P defines the value of P' is $\sum_{i=1}^{N} P_i' - \sum_{i=N+1}^{2N} P_i'$

Please calculate the maximum value.

Standard Input

The first line of the input contains an integer number N $(1 \leq N \leq 10^5)$.

The second line contains $3N$ integers $a_1, a_2, \ldots, a_{3N} (1 \leq a_i \leq 10^9)$.

Standard Output

Print one number — the maximum of the value.

Sample

Sample Input 1

```
2
3 1 4 1 5 9
```

Sample Output 1

```
1
```

Sample Input 2

```
3
8 2 2 7 4 6 5 3 8
```

Sample Output 2

```
5
```

C

Description

Given you an $N \times M$ grid *S*. In this grid, if $S_{i,j} = 1$, the square at the *i*-th row and *j*-th column is black, otherwise it is white.

In this problem, for every pair of two black squares a and b, there is at most one path that starts from a, repeatedly proceeds to an adjacent (side by side) white square, and finally reaches b, without traveling the same square more than once.

Now you need to answer Q queries. In each query, you should answer how many connected components consisting of black squares there are in the region of the grid bounded by the x_1-th row, x_2-th row, y_1-th column, and y_2-th column.

Standard Input

The first line contains three integers n , m , Q
$(1 \leq n \leq 2000; 1 \leq m \leq 2000; 1 \leq Q \leq 2 \times 10^5)$.

Then follow n lines, each line contains m integers $S_{i,j} (0 \leq S_{i,j} \leq 1)$.

Then follow Q lines, each containing 4 integers x_{1i}, x_{2i}, y_{1i} y_{2i}
$(1 \leq x_{1i}, x_{2i} \leq n, 1 \leq y_{1i}, y_{2i} \leq m)$.

Standard Output

For each query, print the number of the connected components consisting of black squares in the region.

Sample

Sample Input 1

```
3 4 4
1101
0110
1101
1 1 3 4
1 1 3 1
2 2 3 4
1 2 2 4
```

Sample Output 1

```
3
2
2
2
```

Sample Input 2

```
5 5 6
11010
01110
10101
11101
01010
1 1 5 5
1 2 4 5
2 3 3 4
3 3 3 3
3 1 3 5
1 1 3 4
```

Sample Output 2

```
3
2
1
1
3
2
```

D

Description

Though I said there is no math problem in this contest, here is a hard math problem.

Given N pairs of integers A_i, B_i and a limit C, You should calculate this formula.

$$\sum_{x_1=A_1}^{B_1}\sum_{x_2=A_2}^{B_2}\dots\sum_{x_N=A_N}^{B_N} x_1^{c_1}\times x_2^{c_2}\dots\times x_N^{c_N} \mod (10^9+7)$$

$$s.t.\ \sum_{i=1}^{N} c_i = C$$

$$0 \le c_i \le C$$

Standard Input

The first line contains two integers $N, C (1 \le N, C \le 400)$.

The next line contains N integers A_i.

The third line contains N integers B_i.

$(1 \le A_i \le B_i \le 400)$

Standard Output

Print the answer.

Sample

Sample Input 1

```
2 3
1 1
1 1
```

Sample Output 1

```
4
```

In this case, for c_i , it can have 4 situations. $c_1 = 0, 1, 2, 3, c_2 = 3, 2, 1, 0$, and the sum of this formula is 4.

Sample Input 2

```
3 100
7 6 5
9 9 9
```

Sample Output 2

```
139123417
```

Sample Input 3

```
4 8
3 1 4 1
3 1 4 1
```

Sample Output 3

```
421749
```

E

Description

You are given an undirected graph with n vertices and m edges. For edge i, it connects two points u_i and v_i, and you need A_i energy and B_i time to go through it.

Now you are at vertex 1 with S energy. Each vertex has a charging machine, at the charging machine in vertex i, you can spend D_i time to get C_i energy.

For each $t = 2, \ldots, N$, find the minimum time you need to travel from vertex 1 to vertex t.

Standard Input

The first line contains 3 integers $N, M, S (2 \leq N \leq 50, N-1 \leq M \leq 100, 0 \leq S \leq 10^9)$.

The next m lines contain 4 integers
$u_i, v_i, A_i, B_i (1 \leq u_i < v_i \leq n, 1 \leq A_i \leq 50, 1 \leq B_i \leq 10^9)$, meaning i-th edge.

The next n lines contain 2 integers $C_i, D_i (1 \leq C_i, D_i \leq 10^9)$, meaning i-th charging machine.

Standard Output

For each $t = 2, \ldots, N$, print a line containing the minimum time you need to travel from vertex 1 to vertex t.

Sample

Sample Input 1

```
3 2 1
1 2 1 2
1 3 2 4
1 11
1 2
2 5
```

Sample Output 1

```
2
14
```

Sample Input 2

```
6 5 1
1 2 1 1
1 3 2 1
2 4 5 1
3 5 11 1
1 6 50 1
1 10000
1 3000
1 700
1 100
1 1
100 1
```

Sample Output 2

```
1
9003
14606
16510
16576
```

F

Description

Given a sequence A of length n. Now you need to replace the subsequence $[l, r]$.

Therefore, you need to find the two-position (x, y) satisfying $x < l \leq r < y$, and there is no $(x', y')(1 \leq x' \leq y' \leq n)$ satisfying $(x, y) \neq (x', y'), (A_x, A_y) = (A_{x'}, A_{y'})$.

please find out the $\min(y - x + 1)$ that satisfies the constraint.

Standard Input

The first line contains three integers n and l, r $(3 \leq n \leq 10^6; 1 < l \leq r < n)$.

The second line contains n integers $A_i (1 \leq A_i \leq 10^6)$.

Standard Output

Output a number $min(y - x + 1)$ or -1 if no solution for (x, y).

Sample

Sample Input

```
10 4 6
2 1 4 7 4 8 3 6 4 8
```

Sample Output

```
6
```

G

Description

Given a sequence A of length n. You should calculate the value like :

$$\sum_{p} \max_{i=1}^{n} \sum_{j=1}^{i} a_{p_j} \mod 998244353$$

In this problem, p means the full permutation of 1 to n.

Standard Input

The first line is a positive integer $n(1 \leq n \leq 20)$.

The second line contains n integers $a_i(\sum_{i=1}^{n} |a_i| \leq 10^9)$.

Standard Output

Output a number of the value mod 998244353.

Sample

Sample Input

```
2
-1 2
```

Sample Output

```
3
```