A - Not Found

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 100 points

Problem Statement

You are given a string S of length between 1 and 25 consisting of lowercase English letters.
Output one lowercase English letter that does not appear in S.
If there are multiple such letters, you may output any one of them.

Constraints

- S is a string of length between 1 and 25 (inclusive) consisting of lowercase English letters.

Input

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

$$S$$

Output

Output one lowercase English letter that does not appear in S. If there are multiple such letters, you may output any one of them.

Sample Input 1

```
a
```

Sample Output 1

```
d
```

$S =$ a.

Any lowercase English letter other than a (that is, b, c, …, or z) is a correct answer.

Sample Input 2

```
abcdfhijklmnopqrstuvwxyz
```

Sample Output 2

```
e
```

The lowercase English letters not included in S are e and g.

Sample Input 3

```
qazplwsxokmedcijnrfvuhbgt
```

Sample Output 3

```
y
```

B - Grid Rotation

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 250 points

Problem Statement

There are two grids S and T, each with N rows and N columns. Let (i, j) denote the cell at the i-th row from the top and the j-th column from the left.

Each cell of grids S and T is colored either white or black. Cell (i, j) of S is white if $S_{i,j}$ is `.`, and black if $S_{i,j}$ is `#`. The same applies to T.

You may perform the following two types of operations any number of times in any order. Find the minimum number of operations required to make grid S identical to grid T.

- Choose one cell of grid S and change its color.
- Rotate the entire grid S 90 degrees clockwise.

Constraints

- $1 \leq N \leq 100$
- N is an integer.
- Each of $S_{i,j}$ and $T_{i,j}$ is `.` or `#`.

Input

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

$$
\begin{array}{l}
N \\
S_{1,1}S_{1,2}\ldots S_{1,N} \\
\vdots \\
S_{N,1}S_{N,2}\ldots S_{N,N} \\
T_{1,1}T_{1,2}\ldots T_{1,N} \\
\vdots \\
T_{N,1}T_{N,2}\ldots T_{N,N}
\end{array}
$$

Output

Output the minimum number of operations required.

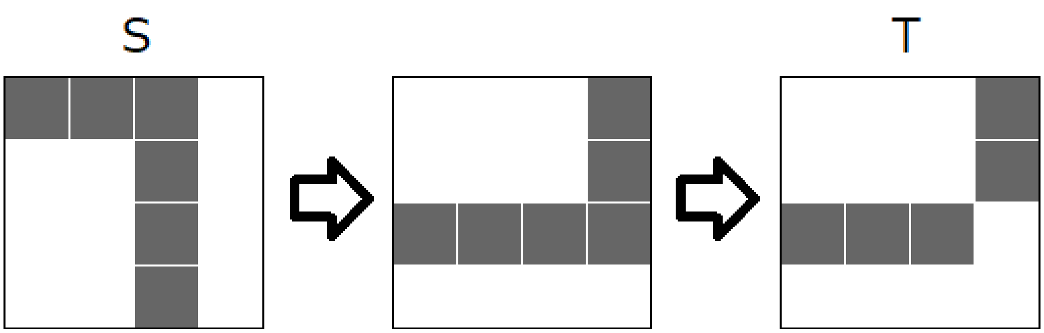
Sample Input 1

```
4
###.
..#.
..#.
..#.
...#
...#
###.
....
```

Sample Output 1

```
2
```

You can match S to T in two operations as shown below.



Sample Input 2

```
13
.#..###..##..
#.#.#..#.#.#.
#.#.###..#...
###.#..#.#.#.
#.#.###..##..
.............
..#...#....#.
.##..#.#..##.
#.#..#.#.#.#.
####.#.#.####
..#..#.#...#.
..#...#....#.
.............
.............
.#....#...#..
.#...#.#..#..
####.#.#.####
.#.#.###..#.#
.##....#..##.
.#....#...#..
.............
..##..###.#.#
.#.#.#..#.###
.#.#..###.#.#
.#.#.#..#.#.#
..##..###..#.
```

Sample Output 2

```
5
```

C - Cycle Graph?

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 300 points

Problem Statement

You are given a simple undirected graph with N vertices and M edges. The vertices are numbered $1, 2, \ldots, N$ and the edges are numbered $1, 2, \ldots, M$. Edge i connects vertices A_i and B_i.

Determine whether this graph is a cycle graph.

▶ Definition of simple undirected graph

▶ Definition of cycle graph

Constraints

- $3 \leq N \leq 2 \times 10^5$
- $0 \leq M \leq 2 \times 10^5$
- $1 \leq A_i, B_i \leq N$
- The given graph is simple.
- All input values are integers.

Input

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

$$
\begin{array}{l}
N \quad M \\
A_1 \quad B_1 \\
\vdots \\
A_M \quad B_M
\end{array}
$$

Output

Output `Yes` if the given graph is a cycle graph; otherwise, print `No`.

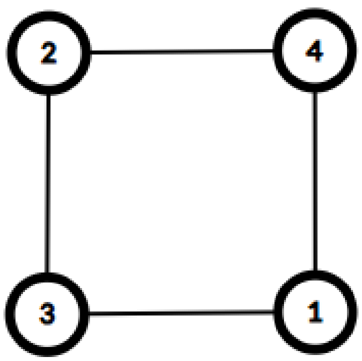
Sample Input 1

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

Sample Output 1

```
Yes
```

The given graph is as follows, and this is a cycle graph.



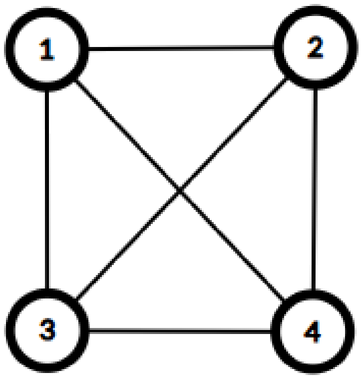
Sample Input 2

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

Sample Output 2

```
No
```

The given graph is as follows, and this is not a cycle graph.



D - Goin' to the Zoo

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 400 points

Problem Statement

In the country of AtCoder there are N zoos, numbered 1 to N. The admission fee for zoo i is C_i yen.

Mr. Suzuki likes M kinds of animals, animals $1, \dots, M$.
Animal i can be seen at K_i zoos, namely zoos $A_{i,1}, \dots, A_{i,K_i}$.

Find the minimum total admission fee required to see all M kinds of animals at least twice each.
If you visit the same zoo multiple times, the animals there are considered seen once per every visit.

Constraints

- $1 \leq N \leq 10$
- $1 \leq M \leq 100$
- $0 \leq C_i \leq 10^9$
- $1 \leq K_i \leq N$
- $1 \leq A_{i,j} \leq N$
- $j \neq j' \Longrightarrow A_{i,j} \neq A_{i,j'}$
- All input values are integers.

Input

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

$$
\begin{array}{l}
N \quad M \\
C_1 \quad \dots \quad C_N \\
K_1 \quad A_{1,1} \quad \dots \quad A_{1,K_1} \\
\vdots \\
K_M \quad A_{M,1} \quad \dots \quad A_{M,K_M}
\end{array}
$$

Output

Output the minimum total admission fee.

Sample Input 1

```
4 3
1000 300 700 200
3 1 3 4
3 1 2 4
2 1 3
```

Sample Output 1

```
1800
```

For example, the following schedule achieves seeing animals $1, 2, 3$ at least twice each for a total of 1800 yen:

- Go to zoo 3. Pay 700 yen and see animals 1 and 3.
- Go to zoo 3. Pay 700 yen and see animals 1 and 3.
- Go to zoo 4. Pay 200 yen and see animals 1 and 2.
- Go to zoo 4. Pay 200 yen and see animals 1 and 2.

Sample Input 2

```
7 6
500 500 500 500 500 500 1000
3 1 2 7
3 2 3 7
3 3 4 7
3 4 5 7
3 5 6 7
3 6 1 7
```

Sample Output 2

```
2000
```

By visiting zoo 7 twice, you can see animals $1, 2, 3, 4, 5, 6$ twice each for a total of 2000 yen.

E - Bowls and Beans

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 475 points

Problem Statement

There are N large bowls arranged in a row, numbered $0, 1, \ldots, N-1$ from the left.
For each bowl i ($1 \leq i \leq N-1$), an integer C_i is written on it, and initially it contains A_i beans.
Bowl 0 has no integer written on it and initially contains no beans.

Consider repeating the following operation any number of times:

- Choose one bowl i ($1 \leq i \leq N-1$) and take out one or more beans from it.
- Distribute the taken beans freely among bowls $i - C_i, i - C_i + 1, \ldots, i - 1$.
    - Formally, when you take out k beans, you must put a total of k beans into bowls $i - C_i, i - C_i + 1, \ldots, i - 1$, and you may choose how many beans go into each bowl.

Find the minimum number of operations required to put all the beans into bowl 0.

Constraints

- All input values are integers.
- $2 \leq N \leq 2000$
- $1 \leq C_i \leq i$
- $0 \leq A_i \leq 1$
- $\displaystyle\sum_{i=1}^{N-1} A_i > 0$

Input

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

$$
\begin{array}{l}
N \\
C_1 \quad C_2 \quad \ldots \quad C_{N-1} \\
A_1 \quad A_2 \quad \ldots \quad A_{N-1}
\end{array}
$$

Output

Output the answer as an integer.

Sample Input 1

```
5
1 1 2 1
1 0 0 1
```

Sample Output 1

```
3
```

For example, the following three operations put all the beans into bowl 0, and this is the minimum:

- Choose bowl 4. It has 1 bean.
  - Put 1 bean into bowl 3.
- Choose bowl 3. It has 1 bean.
  - Put 1 bean into bowl 1.
- Choose bowl 1. It has 2 beans.
  - Put 2 beans into bowl 0.

Sample Input 2

```
6
1 2 1 3 1
1 1 0 1 1
```

Sample Output 2

```
4
```

For example, the following four operations put all the beans into bowl 0, and this is the minimum:

- Choose bowl 5. It has 1 bean.
  - Put 1 bean into bowl 4.
- Choose bowl 4. It has 2 beans.
  - Put 1 bean into bowl 1.
  - Put 1 bean into bowl 2.
- Choose bowl 1. It has 2 beans.
  - Put 2 beans into bowl 0.
- Choose bowl 2. It has 2 beans.
  - Put 2 beans into bowl 0.

Sample Input 3

```
16
1 1 1 2 5 1 1 3 4 1 4 3 1 1 2
1 0 0 0 1 0 0 1 1 0 0 0 0 0 1
```

Sample Output 3

```
7
```

F - Lost and Pound

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 550 points

Problem Statement

There are N push buttons. One of them is the winning button, and the other $N-1$ are losing buttons.

Aoki knows which button is winning, but Takahashi does not. Also, Takahashi cannot distinguish the N buttons.

They play a game using these buttons. The game consists of repeating the following sequence T times:

1. Aoki arranges the N buttons in a random order.
2. Takahashi performs the operation "choose a button and press it" M times. He may choose the same button multiple times.
3. Aoki tells Takahashi the number of times the winning button has been pressed so far since the start of the game.

Takahashi wins if and only if the winning button has been pressed a total of at least K times throughout the T repetitions.

Find Takahashi's probability of winning when he plays to maximize his win probability.

Constraints

- $1 \leq N \leq 2 \times 10^5$
- $1 \leq T \leq 30$
- $1 \leq M \leq 30$
- $1 \leq K \leq 30$
- All input values are integers.

Input

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

$$N \quad T \quad M \quad K$$

Output

Output the answer. Your output is considered correct if its absolute or relative error from the true answer is at most 10^{-6}.

Sample Input 1

```
3 2 2 3
```

Sample Output 1

```
0.222222222222222
```

The game can proceed as follows (not necessarily optimally):

- 1st repetition
  - Aoki randomly arranges the buttons so that the winning button is at position 1, and the losing buttons are at positions 2 and 3.
  - Takahashi presses button 1.
  - Takahashi presses button 2.
  - Aoki tells him the winning button has been pressed 1 time.
- 2nd repetition
  - Aoki randomly arranges the buttons so that the winning button is at position 3, and the losing buttons are at positions 1 and 2.
  - Takahashi presses button 3.
  - Takahashi presses button 3.
  - Aoki tells him the winning button has been pressed 3 times.
- Since the winning button has been pressed not less than 3 times, Takahashi wins.

The true answer in this case is $\frac{2}{9}$, so outputs like `0.222222` or `0.222223141592` are also accepted.

Sample Input 2

```
10 1 10 1
```

Sample Output 2

```
1.000000000000000
```

Sample Input 3

```
100 10 10 2
```

Sample Output 3

```
0.401263060761621
```

G - Specified Range Sums

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 600 points

Problem Statement

You are given an integer N and length-M integer sequences $L = (L_1, L_2, \ldots, L_M)$, $R = (R_1, R_2, \ldots, R_M)$, and $S = (S_1, S_2, \ldots, S_M)$.

Determine whether there exists a length-N **positive integer sequence** A satisfying the following condition. If such a sequence exists, find the minimum possible sum of A.

- $\displaystyle\sum_{j=L_i}^{R_i} A_j = S_i$ for all i ($1 \leq i \leq M$).

Constraints

- All input values are integers.
- $1 \leq N, M \leq 4000$
- $1 \leq L_i \leq R_i \leq N$
- $1 \leq S_i \leq 10^9$

Input

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

$$
\begin{array}{l}
N \quad M \\
L_1 \quad R_1 \quad S_1 \\
L_2 \quad R_2 \quad S_2 \\
\vdots \\
L_M \quad R_M \quad S_M
\end{array}
$$

Output

If there does not exist a length-N positive integer sequence A satisfying the condition, print `-1`.

Otherwise, print the minimum possible sum of A as an integer.

Sample Input 1

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

Sample Output 1

```
12
```

For example, $A = (1, 3, 2, 1, 5)$ satisfies the condition.
Its sum is 12, which is the minimum possible.

Sample Input 2

```
1 2
1 1 1
1 1 2
```

Sample Output 2

```
-1
```

Sometimes no such A exists.

Sample Input 3

```
9 6
8 9 8
3 6 18
2 4 19
5 6 8
3 5 14
1 3 26
```

Sample Output 3

```
44
```