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Junior Group

Task B1. BALANCE

We are given a two-pan balance and n weights of different masses a_1, a_2, …, a_n. We are to put each one of the given weights on the balance, one after another, in such a way that at any moment the left pan is never heavier than the right pan. At each step, we choose one weight that is not yet placed on the balance, and we place it either on the left pan or on the right pan. We continue these steps, until we use all the weights. Write program **`balance`**, which calculates the number of ways to do this.

Input

The integer n is given on the first row of the standard input ($0 < n < 10$). There are n integers on the second row: a_1, a_2, …, a_n ($0 < a_1, a_2, \ldots, a_n < 1000$).

Output

Your program have to output a single integer on the standard output – the searched number of ways.

Example

Input

```
3
1 2 4
```

Output

```
15
```

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Task B2. MAXIMUM SUM

Given is a sequence of n boxes. In each box, there are several balls. On each ball is written one whole number. We choose some (1, 2, ...,, or all) boxes and take one ball from each one of the chosen boxes, keeping the order of the boxes. Then we arrange all taken balls in a line, according to the order of the boxes. Sometimes, the numbers written on the taken balls may form a non-decreasing sequence. Write program **`maxsum`**, which computes what may be the largest sum of these numbers.

Input

The first line contains the value of n. It is followed by n lines, each corresponding to a box. Each of these lines begins with the quantity of balls in the box and then – the numbers written on the balls in this box.

Output

One integer equals to the maximum sum, as is described above.

Constraints

$0 < n < 500$. In each box, there are no more than 50 balls, but at least one. Any whole number, written on a ball, is in a range from 1 till 1000.

Example

Input

```
10
3 2 2 4
2 1 2
3 3 7 10
4 5 5 1 1
1 3
1 2
3 1 9 1
1 5
7 8 1 1 1 1 2 1
1 3
```

Output

```
25
```

Explanation of the example

The sequence of taken balls is 2 + 2 + 3 + 5 + 5 + 8. From the 5^{th}, 6^{th}, 7^{th} and 10^{th} boxes, nothing is taken.

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Task B3. WIDENING OF CHANNELS

In the Waterland country, there are n lakes (numbered from 1 to n) and m channels between them. The width (in meters) of each channel is known. Navigation in the channels can be performed in both directions. It is known that a boat with width of one meter can reach any lake, starting from lake number 1.

Write program **`channels`**, which calculates the minimum number of channels that should be widened, so that a boat with width of k meters can make a trip between every two lakes (the boat can move from one lake to another, if its width is less than or equal to the width of the channel, connecting the lakes).

Input

On the first line of the standard input are given integers, n and m ($1 < n \leq 1000$, $1 < m \leq 100000$).

On each of the next m lines are given three integers, i, j and w, showing that there is a channel of width w ($1 \leq w \leq 200$) between lakes, i and j ($1 \leq i, j \leq n$).

On the last line is given the integer k ($1 \leq k \leq 200$).

Output

On a line of the standard output the program have to write one integer: the minimum number of channels that should be widened.

Example

Input

```
6 9
1 6 1
1 2 2
1 4 3
2 3 3
2 5 2
3 4 4
3 6 2
4 5 5
5 6 4
4
```

Output

```
2
```