Problem A. 111372. Hana Kagerou

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

When preparing problems for the next algorithm quiz, Nyaruko created a problem she couldn't solve herself. Since it was very late she decided to use this problem in a quiz and requested help from you.

You are given a graph with n nodes and m segments with some cost. For each segment $[l, r]$ with cost c, add an edge between vertices x and y with cost c for all pairs of vertices such that $l \leq x < y \leq r$. Find the cost of the minimum spanning tree in the resulting graph. It's guaranteed that the graph will be connected.

Input

The first line contains two integers n, m $(2 \leq n, m \leq 2 * 10^5)$ - the number of vertices and edges. Each of the next m lines contains three integers l, r, c $(1 \leq l < r \leq n, 1 \leq c \leq 10^9)$ - endpoints of the segment and its cost.

Output

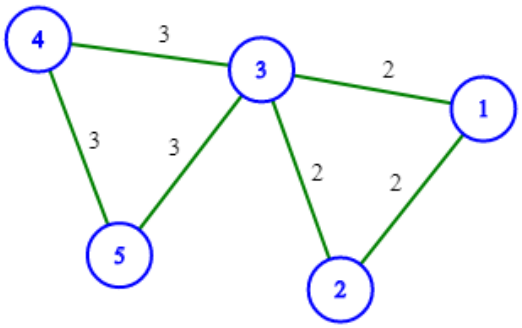
Output single integer - the cost of the MST.

Examples

standard input	standard output
5 2 1 3 2 3 5 3	10
10 3 1 5 3 3 10 100 8 10 4	320

Note

The graph in the first example looks like this.


4
3
2
1
3
3
2
2
5
2

Problem B. 110809. Duck Islands

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Jonathan became a king of Duck Islands recently. He is very happy now, but being a king impose a lot of obligations on him. One of them is to connect all initially disconnected islands with bridges, such that for every pair of islands in his kingdom there is a path between them. The cost of the bridge between islands i and j is $d_i + d_j$, where d_i and d_j are the number of ducks in the islands i and j respectively. Jonathan wants to minimize the total expence of bridge building. He is not good at math, so he asked your help to find amount of money he will spend.

Input

The first line of the input contains the only integer n - number of islands in Jonathan's Duck Kingdom ($1 \leqslant n \leqslant 500$).

The next line contains n integers d_i - the number of ducks in the i_{th} island ($1 \leqslant d_i \leqslant 10^5$).

Output

Print the only integer c - amount of money that Jonathan will spend to connect islands in his kingdom.

Examples

standard input	standard output
5 2 5 4 2 8	27
5 5 5 5 5 5	40

Note

In the first example you can construct four bridges between islands 1 and 2, 3 and 4, 4 and 5, 1 and 4.

In the second sample you can construct any bridges you want.

Problem C. 111452. Travelling

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

The government allocated money to asphalt roads between n villages in the region. There are m existing roads, and each of them connects two cities. There are two types of asphalt material, the first one is made especially for big vehicles and costs x tenge per kilometer, while the second is made for small cars and costs y tenge per kilometer. For each road government said which type of asphalt should be used (maybe both are appropriate). Akimat wants to renovate roads such that it would be possible to reach any village from another via repaired roads, spending as less money as possible, and fulfilling the government's requirements. Help akimat to calculate the total cost of the project.

Input

The first line contains two integers n, m ($1 \leq n, m \leq 1000$) - the number of cities and the number of roads between cities The next line contains two integers x and y ($1 \leq x, y \leq 100$) - the price of asphalt for big and small vehicles. The next m lines contain one string - type of asphalt that should be used, and three integers a, b, c ($1 \leq a, b \leq n; 1 \leq c \leq 100$) denoting the road between cities a and b is c kilometers long.

Output

Print the only integer - the total cost of the project.

Example

standard input	standard output
7 6 4 3 both 2 7 4 both 1 7 2 big 4 6 1 big 3 7 3 small 5 6 1 both 5 7 10	67

Problem D. 111453. Minimal cost

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

An undirected graph without multiple edges and loops is given. It already contains some (possibly zero) number of edges. You can add new edges to it for a fee (the fee is different for each edge). It is required to make the graph connected for the smallest fee.

Input

The first line of input contains a single integer n ($1 \leq n \leq 50$) – the number of vertices in the original graph.

In the next rows $a_{n \times n}$ matrix is given ($0 \leq a_{ij} \leq 100$), zero a_{ij} denotes the edge between vertices i and j, while the positive value of a_{ij} denotes the fee to connect vertices i and j.

Output

Print a single number - the minimum possible cost to make the graph connected.

Example

standard input	standard output
3 0 0 28 0 0 0 28 0 0	0

Problem E. 196802. Nugman and Graph 2

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	256 megabytes

Nugman has an undirected graph, consisting of n vertices and m edges. Nugman loves playing with the graph and now he has invented a new game:

- The game consists of n steps.
- On the i_{th} step Nugman will remove vertex i from the graph. As Nugman removes a vertex, he also removes all the edges that go in and out of this vertex.

Nugman wants to know the number of connected components after deleting each vertex.

Input

The first line contains two numbers n, m ($1 \leq n \leq 2 \cdot 10^5, 0 \leq m \leq min(2 \cdot 10^5, \frac{n \cdot (n+1)}{2})$), denoting the number of vertices and number of edges. Each of the next m lines contains two integers v, u ($1 \leq v, u \leq n$) denoting the edge between vertices v and u.

Output

Print n lines. The i_{th} line should contain number of connected components after first i operations.

Examples

standard input	standard output
8 7 7 8 3 4 5 6 5 7 5 8 6 7 6 8	3 2 2 1 1 1 1 0
5 5 1 2 1 4 1 3 4 5 2 4	2 2 1 1 0