A. Galactical Communication

time limit per test: 2 s.
memory limit per test: 256 MB

There are n planets numbered from 1 to n in a galaxy. Some pairs of planets have interplanetary communication between them, so that the pair of planets can communicate with each other. Interplanetary communication is expensive, and its cost can be represented as an integer number from 1 to 1000. It is known that from each planet it is possible to communicate with any other planet using interplanetary communication (planets are always willing to forward messages to the intended destination using the cheapest cost path). The Guardians of the Galaxy plans to build k new communication lines. For each of the planned lines, we know its cost, and what planets it will connect. To analyze the feasibility of their plan, the Guardians of the Galaxy wants to check the sum of the cheapest cost between all pairs of planets. They have hired you to help them!

Input

The first line contains integer n ($2 \le n \le 300$) — number of planets in the galaxy. Then there follows n lines with n integer numbers each — the matrix of cheapest costs. j-th integer in the i-th row where $i \neq j$ is the cheapest cost between planets i and j. It is guaranteed that $d_{i,i} = 0, d_{i,j} = d_{j,i}$.

Next line contains integer k ($1 \le k \le 300$) — number of planned communication lines. Following k lines contain the description of the planned line. Each line is described by three space-separated integers a_i, b_i, c_i ($1 \le a_i, b_i \le n, a_i \neq b_i, 1 \le c_i \le 1000$) — a_i and b_i — pair of planets, which the line connects, c_i — the cost of the line. There can be several communication lines between a pair of planets, but no line connects the planet with itself (what a waste of money that would be).

Output

Output k space-separated integers q_i ($1 \le i \le k$). q_i should be equal to the sum of cheapest communication costs between all pairs of planets after the construction of communication lines with indexes from 1 to i. Communication lines are numbered from 1 in the input order. Each pair of planets should be taken into account in the sum exactly once, i. e. we count unordered pairs.

Examples

input Copy

```
2
0 5
5 0
1
1 2 3
```

output Copy

```
3
```

input Copy

```
3
0 4 5
4 0 9
5 9 0
2
2 3 8
1 2 1
```

output Copy

```
17 12
```

- Rabin Karp - Preclass
- DP Edit Distance - Homework
- DP Knapsack - Homework
- DP TSP - Preclass
- DP Longest Increasing Subsequence - Homework
- DP Intro - Homework
- DP Tree - Preclass
- Greedy - Homework
- Fenwick Tree - Homework
- DP Knapsack - Preclass
- DP Edit Distance - Preclass
- Segment Tree - Homework
- DP Palindromes - Preclass
- Lazy Segment Tree - Homework
- LCA and Binary Lifting - Homework
- DP intro - Preclass
- Square Root Decomposition - Homework
- DP Longest Increasing Subsequence - Preclass
- Greedy - Preclass
- Fenwick Tree - Preclass
- Bit Manipulation - Homework
- Square Root Decomposition - Preclass
- Fast Exponentiation - Homework
- MST - Homework
- Lazy Segment Tree - Preclass
- LCA and Binary Lifting - Preclass
- Segment Tree - Preclass
- Bit Manipulation - Preclass
- Fast Exponentiation - Preclass
- MST - Preclass
- Graph Traversal 2 - Homework
- Graph Traversal 2 - In Class
- All Pairs Shortest Path - Homework
- All Pairs Shortest Path - In Class
- Single Source Shortest Path - Homework
- Single Source Shortest Path - In Class
- Graph Traversal 1 - Homework
- Graph Traversal 1 - In Class
- Binary Search Tree - Homework
- Binary Search Tree - In Class
- Disjoint Sets - Homework