Cheapest Routes   P40802_en

We have collected abundant information about the local roads and accommodations in a region that we will traverse. Our plan is to go from city A to city B and we would like to spend the least possible money. For each road connecting two cities u and v we know the cost $\omega(u,v) = \omega(v,u)$ to travel along that road (tolls, fuel, meals during the journey, ...). Every time we go from a city u to one of its neighbors v we must stop at v and spend there one night; we know the cost $\omega'(v)$ of stopping at each city v (the cost added by A and B to our route is 0, since they are our initial and final points). All costs, of vertices and of edges, are positive. Thus the cost of the route

$$P = [A, v_1, \ldots, v_n, B]$$

is

$$\mathrm{cost}(P) = \omega(A, v_1) + \omega(v_1, v_2) + \ldots + \omega(v_n, B) + \omega'(v_1) + \ldots + \omega'(v_n).$$

Write a program in C++ which, given an undirected weighted graph with positive costs at the vertices and at the edges, and two vertices A and B, returns the cost of the cheapest route to go from A to B, or an indication that not such route exists.

Input

All data in the input are positive integers. The input starts with two integers $2 \leq n \leq 10000$ and m, $0 \leq m \leq 20n$. After that, a sequence of positive integers $\omega'(0), \ldots, \omega'(n-1)$ of the weights $\omega'(u)$ of the n vertices of the graph. Then the input contains a sequence of the m edges in the graph as triplets of the form $\langle u, v, \omega(u,v) \rangle$. Vertices u and v are integers in $\{0, \ldots, n-1\}$ and the weights $\omega(u,v)$ are positive integers. No weight, of edges or vertices, is larger than 100000.

You can assume that there are no two different edges connecting the same pair of vertices nor any edge connecting a vertex to itself. Finally, there is a sequence of pairs $\langle A_i, B_i \rangle$, with each A_i and B_i denoting vertices of the graph ($0 \leq A_i, B_i < n$).

Output

For each pair $\langle A_i, B_i \rangle$ in the input sequence the program writes the cost δ of the cheapest route between A_i and B_i. with the format $c(A_i, B_i) = \delta$. If no route exists between A_i and B_i the program writes $c(A_i, B_i) = +\infty$. The ouput for each case is ended with a newline (`endl`).

Sample input

```
6 8
3 6 10 15 5 2
0 1 2   1 2 7   2 3 2
0 2 1   1 3 4   2 4 8
3 4 2   3 0 5
0 4
1 4
2 4
3 1
4 1
2 5
2 2
```

Sample output

```
c(0,4) = 19
c(1,4) = 21
c(2,4) = 8
```

```
c(3,1) = 4
c(4,1) = 21
c(2,5) = +oo
c(2,2) = 0
```

Problem information

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