Road Network

It is now the year 3013 and the Earth is one crowded place. Over time borders between countries have become obsolete and now the whole planet has joined in one country, consisting of **N** cities and **M** two-way highways, with integer length in kilometers, connecting pair of cities. For our convenience the cities will be numbered from 1 to **N**.

The government of this modern country wants to repair the highways (some of which were built in the distant 20th century), but he does not want to disconnect any pair of cities. Because of this, he intends to leave N - 1 highways, which won't be repaired, so there is a path (consisting of one or more highways) between any two cities.

You, as a programmer from the future, have been given the task to choose such **N - 1** highways, so that the drivers are as pleased as possible.

Luckily for you, the government is willing to cooperate. It will provide you a prognosis of every route a driver would take during the construction works.

Input

The first line of the input file **graph.in** consists of **N** and **M.** On the next **M** lines, the highways will be given, as the pair of cities they connect and their length in kilometers. The following lines consist of an integer matrix **A** with **N** rows and **N** columns, so that **j**-th number on the **i**-th row is the number of routes, that will be covered by drivers between the cities **i** and **j.**

Output

The output file **graph.out** consists of **N - 1** numbers - the highways which won't be repaired. Every number represents the position of the given highway in the input file.

Constraints:

$2 \le \mathbf{N} \le 300$

The length of every highway is a **natural** number smaller than or equal to 1000.

Every highway connects two different cities and there is at most one highway between two cities.

It is guaranteed, that there exist **N - 1** towns that meet the wanted conditions.

$1 \le$ **A[i][j]** $\le 10^9$; **A[i][i] = 0, A[i][j] = A[j][i]**

In 10% of the cases $2 \le \mathbf{N} \le 6$,
in another 20% of the cases $7 \le \mathbf{N} \le 50$,
in another 20% of the cases $51 \le \mathbf{N} \le 150$ и **A[i][j]** = 1,
in another 30% of the cases $151 \le \mathbf{N} \le 300$,
in another 20% of the cases $100 \le \mathbf{N} \le 300$ and the length of every highway will be at most 2.

Grading:

The grading will be made on the basis of the following formula: $(\text{best}/\text{yours})^3$. Where *best* is the minimum travelled distance by all the drivers, divided by the number of drivers, according to the best solution a competitor reached and *yours* is the travelled distance by all the drivers, divided by the number of drivers, in your solution.

Example:

graph.in	graph.out
5 8 2 1 783 3 2 531 2 4 863 4 3 124 1 5 68 2 5 136 5 3 930 4 5 803 0 315634023 635723059 125898168 628175012	5 6 2 4

315634023 0 369133070 59961394 656478043 635723059 369133070 0 89018457 131176230 125898168 59961394 89018457 0 653377374 628175012 656478043 131176230 653377374 0	