January 2023 CSE 208
Online: Single Source Shortest Path

Time: 30 minutes

Subsection: B2

Mahir and Farhan are brothers. They live in two different states in the country. Each state has its own airport. As Mahir is busy with his studies, he wants to pay a visit to his brother by airways, although he knows that there is a certain layover time he has to wait for at every connecting airport on his way. Help Mahir find the fastest possible route to reach Farhan.

Input

Take input from a file. The first line will contain two space-separated integers n and f, denoting the number of states and number of available flights respectively. **All the flights are two-way**.

In the next n lines, there will be a string (a) and an integer (l) separated by space. Here a denotes the name of a state and l denotes the layover time to be spent at the airport of that state.

In the next f lines, there will be two strings ($a1$, $a2$) and an integer (t) denoting a flight between two states. Here $a1$ and $a2$ denote the names of the two states and t denotes the time to travel between $a1$ and $a2$.

The final line will contain two space-separated strings (s and d), denoting the names of states where Mahir and Farhan live, respectively.

Output

In the first line of the output file, print the minimum time required to visit Farhan.

In the next line, print the names of states that Mahir should follow separating the names with "->".

See the Sample I/O for further clarification.

Sample I/O

Input File

```
10 13
Cal 20
Rho 20
Vir 10
Neb 40
Iow 10
Flo 5
Con 25
Mis 30
Mas 0
Njy 10
Mas Con 200
Cal Mas 1000
Iow Cal 30
Neb Njy 200
Flo Vir 500
Iow Vir 100
Flo Con 50
Con Mis 200
Mis Mas 50
Vir Rho 2
Njy Mas 500
Rho Flo 50
Iow Njy 100
Iow Mis
```

Output File

```
492
Iow -> Vir -> Rho -> Flo -> Con -> Mis
```