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

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