January 2020 CSE208: Data Structures and Algorithms II Sessional

Online on Single Source Shortest Path Problem

Muaz and Mus'ab, two childhood friends, are citizens of Mamaland. Now they are living in two different states of the country. As both of them are very busy, they cannot make time to meet each other. After much difficulty, Muaz has squeezed some time to visit Mus'ab. But due to the outbreak of CoronaVirus, the government of Mamaland has enacted a new law. As per this new law, while entering a state in Mamaland, one needs to stay in the quarantine of that state for a specific amount of time. Muaz wants to visit Mus'ab as soon as possible. Help Muaz to find the fastest route to reach Mus'ab.

Input/Output:

You will take input from an input file and give output to an output file.

Input Format:

The roads in Mamaland are two ways.

The first line has two space-separated integers *S* and *R*, the total number of states and roads in Mamaland.

In each of the next S lines, there will be a string(A) and an integer(Q) separated by space. Here A denotes the name of a state in Mamaland and Q denotes the time to stay in quarantine while entering state A.

In each of the next *R* lines, there will be two space-separated strings(*S1 S2)* and one integer*(T)* denoting a road. Here *S1* and *S2* denote the two states the road is connecting and *T* denotes the time to travel between *S1* and *S2*.

In the next line, there will be the name of the states where Muaz and Mus'ab are living.

You need to find the **route** and the minimum required **time** to visit Mus'ab.

Output Format:

In the first line of the output file, you need to print the time required to visit Mus'ab.

In the next line, you need to print the route Muaz should follow. You need to separate the states with "->".

See the sample I/O for further clarification.

Constraints:

$1 < S \leq 100$
$1 < R \leq S * (S-1)/2$
$|S1| \leq 15,\ |S2| \leq 15,\ |A| \leq 15$
$0 \leq T \leq 1000$
$0 \leq Q \leq 100$

The sample I/O:

Input	Output
7 8 Dhk 60 Khl 10 Syl 15 Rjs 60 Ctg 50 Mym 10 Bgr 25 Ctg Syl 500 Dhk Ctg 100 Khl Mym 300 Khl Dhk 200 Rjs Ctg 240 Dhk Rjs 120 Bgr Syl 50 Mym Syl 100 Dhk Bgr	710 Dhk -> Khl -> Mym -> Syl -> Bgr