

Description

Tom is going to visit several friends by subway in a modern city. You are asked to arrange a shortest subway path with minimum number of transfers for each visiting of Tom. Let $G = (V, E)$ with weight function $w: E \rightarrow \mathcal{R}$ denote a subway map, where V is the set of stations, E is the set of links on the subway and $w(i, j)$ is the length of link from station i to station j . A subway Line on G is a path on G . Assume G has m stations and n Lines.

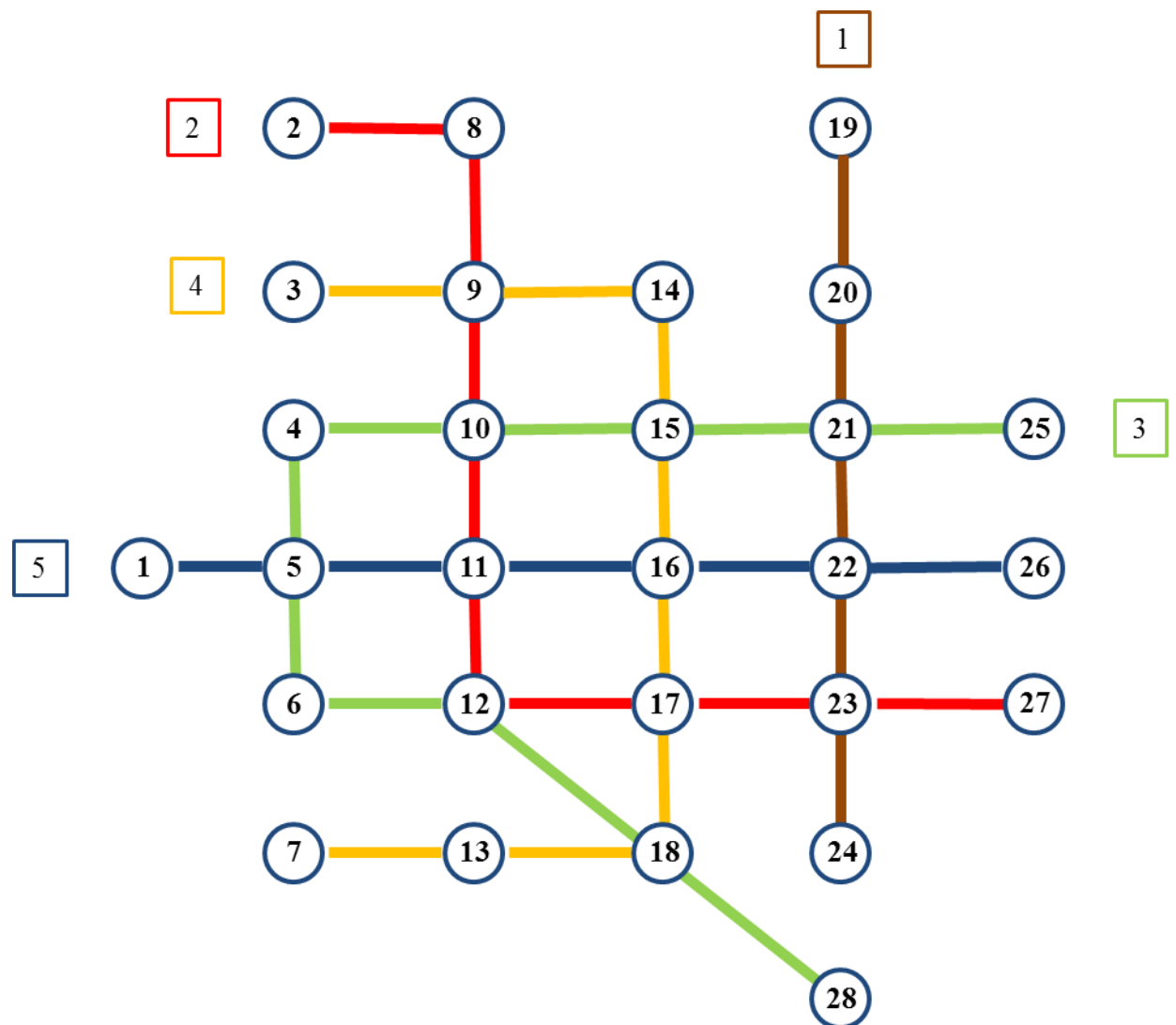


Fig. 1 A subway map

Consider the map shown in Fig. 1. Five subway Lines on the map are listed below.

Line 1: 24, 23, 22, 21, 20, 19

Line 2: 2, 8, 9, 10, 11, 12, 17, 23, 27

Line 3: 25, 21, 15, 10, 4, 5, 6, 12, 18, 28

Line 4: 3, 9, 14, 15, 16, 17, 18, 13, 7

Line 5: 1, 5, 11, 16, 22, 26

Assume the length of each link is 1. If Tom has a visit from station 20 to station 27, the shortest length for the visit is 4 and the shortest subway path with minimum number of transfers is

20 (Line 1) 21 (Line 1) 22 (Line 1) 23 (Line 2) 27.

If Tom has a visit from station 1 to station 9, the shortest length for the visit is 4 and the shortest subway path with minimum number of transfers is

1 (Line 5) 5 (Line 5) 11 (Line 2) 10 (Line 2) 9

Input

The first line consists of the number of Lines and the number of stations, that is, n and m , where $m \leq 1000$ and $n < m/2$. Then the stations on Line 1 to Line n are described in the following n lines. The links and weights are given starting from the $(n+2)$ -th line and each line is in the form of $\langle i \ j \ w(i,j) \rangle$ for a single link from station i to station j . Put a single line with “-1” after the end of the link descriptions. Place visit queries after the line with “-1”. Each line for a visit query is of the form $\langle a \ b \rangle$ to inquire the shortest subway path from station a to station b . It is allowed to have at most 10 visit queries.

$n \ m$

$\langle \text{stations on Line } 1 \rangle$

...

$\langle \text{stations on Line } n \rangle$

$\langle \text{link and weight} \rangle$

...

$\langle \text{link and weight} \rangle$

-1

$\langle \text{query} \rangle$

...

$\langle \text{query} \rangle$

Output

Each line contains a shortest subway path with the minimum transfers for the corresponding visit query.

Sample Input

```
5 28
24 23 22 21 20 19
2 8 9 10 11 12 17 23 27
25 21 15 10 4 5 6 12 18 28
3 9 14 15 16 17 18 13 7
1 5 11 16 22 26
1 5 1.0
2 8 1.0
3 9 1.0
4 10 1.0
4 5 1.0
5 11 1.0
5 6 1.0
6 12 1.0
7 13 1.0
8 9 1.0
9 10 1.0
9 14 1.0
10 15 1.0
10 11 1.0
11 16 1.0
11 12 1.0
12 17 1.0
12 18 1.0
13 18 1.0
14 15 1.0
15 21 1.0
15 16 1.0
16 22 1.0
16 17 1.0
17 23 1.0
17 18 1.0
```

```
18 28 1.0
19 20 1.0
20 21 1.0
21 25 1.0
21 22 1.0
22 26 1.0
22 23 1.0
23 27 1.0
23 24 1.0
-1
20 27
1 9
```

Sample Output

```
20 (Line 1) 21 (Line 1) 22 (Line 1) 23 (Line 2) 27
1 (Line 5) 5 (Line 5) 11 (Line 2) 10 (Line 2) 9
```

Bonus

You will get additional bonus if the previous requirements and one of the following are achieved:

1. Provide time complexity analysis.
2. Provide visualization of results.

程式作業要求

報告撰寫格式

紙張為A4，請包含：

封面頁・班級・學號・姓名

B. 內容：請依下列頁碼分別寫出：

1. 問題描述

2. 解題構想

3. 資料結構與演算法

4. 程式流程圖

5. 程式執行畫面

6. 程式碼 (含註解)



[Redacted text]

1. 問題描述

[Redacted text]

[Redacted text]

[Redacted text]

[Redacted text]

作業要求
在作業中，格式必須依照題目要求，不得有誤。
在作業中，不得有錯誤。
在作業中，不得有錯誤。
在作業中，不得有錯誤。