# 111-2 Data Structure

Homework 7 Graph

Question 1 (80%)

The earth is facing many types of pollution. Our disregard only exacerbates the spread of pollution. Now let's talk about "noise" pollution. We generally use "decibels" as a unit of sound intensity. Noise above 130 decibels can be very uncomfortable, while the sound of normal conversation is about 60 to 65 decibels, and busy traffic is around 70 to 80 decibels.

In the following city map, edges represent streets, and vertices represent intersections. The integer on the edge represents the average noise level of that street.
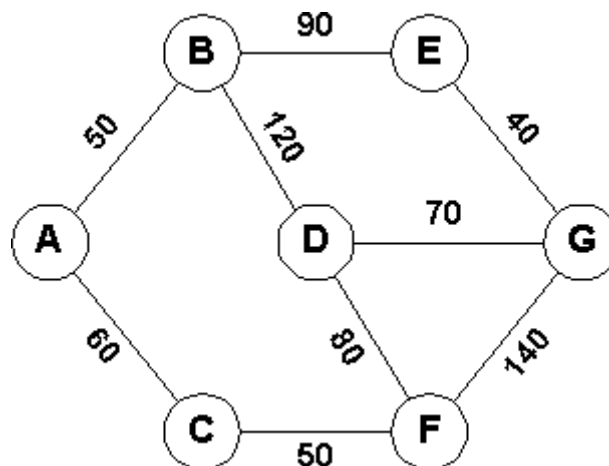
To get from A to G, you can take the path **ACFG**, and the total noise level you have to endure is **250** decibels. If you take the paths **ABEG**, **ABDG**, or **ACFDG**, then the total noise levels you must endure are **180, 240**, and **260** decibels, respectively. Therefore, it is obvious that the minimal total noise level you have to endure is **180**.

In this problem, you are given a graph of the city and asked to find the minimal total noise level to travel from one vertex to another.

Input format

Please read the input from STDIN. The input consists of multiple queries.

Input begins with a line containing three integers C, S, and Q. C is the number of vertices (numbered from 1 to C), S is the number of edges, and Q is the number of queries.

The next S lines each contain three integers $C1$, $C2$, and d, indicating an edge with cost d between vertices $C1$ and $C2$. $C1$ and $C2$ are not equal.

The next Q lines each contain two integers $C1$ and $C2$, indicating a query to find the minimum noise from vertex $C1$ to $C2$.

Constraints

$2 <= C <= 100$
$1 <= S <= 1000$
$1 <= Q <= 1000$

Output format

Please print output to STDOUT. For each query, output the minimum total noise level you must endure to travel from $C1$ to $C2$ (if the path does not exist, output "no path"). Please refer to the sample output for the output format. Please insert a new line after each value. DO NOT print anything else except for the answer.

Sample input 1

```
7 9 3
1 2 50
1 3 60
2 4 120
2 5 90
3 6 50
4 6 80
4 7 70
5 7 40
6 7 140
1 7
2 6
6 2
```
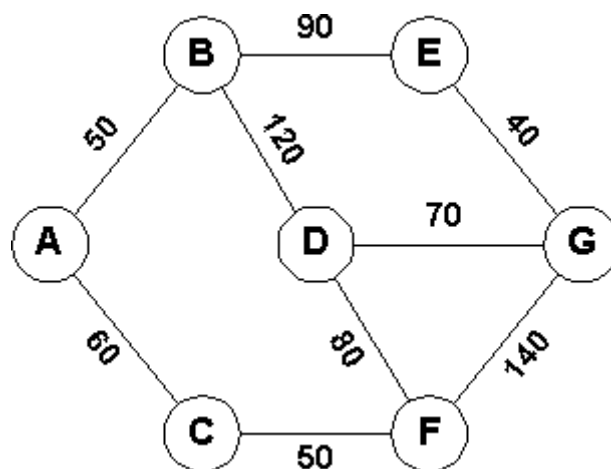
Sample output 1

180
160
160

Sample input 2

7 6 3
1 2 50
1 3 60
2 4 120
3 6 50
4 6 80
5 7 40
7 5
1 7
2 4

Sample output 2

40
no path
120

Question 2 (20%)

Continuing from Question 1, Please find the minimum noise level you must endure to travel from one vertex to another.

To get from A to G, you can take the path **ACFG**, and the maximum noise level you have to endure is **140** decibels. If you take the paths **ABEG**, or **ABDG**, or **ACFDG**, then the maximum noise levels you must endure are **90, 120**, and **80** decibels, respectively. Of course, there are other paths, but obviously **ACFDG** is the most comfortable path because the maximum noise level you face is no more than **80** decibels.

Output format

Please print output to STDOUT. For each query, output the minimum noise level you must endure to travel from $C1$ to $C2$ (if the path does not exist, output "no path"). Please refer to the sample output for the output format. Please insert a new line after each value. DO NOT print anything else except for the answer.

Sample input 1

```
7 9 3
1 2 50
1 3 60
2 4 120
2 5 90
3 6 50
4 6 80
4 7 70
5 7 40
6 7 140
1 7
2 6
6 2
```

Sample output 1

```
80
60
60
```

Sample input 2

```
7 6 3
1 2 50
1 3 60
2 4 120
3 6 50
4 6 80
5 7 40
7 5
1 7
2 4
```

Sample output 2

```
40
no path
80
```

Grading

Each question has **5 test cases**, and you'll get **0.2*the total score of the question** if you pass 1 test case of the question.

Please do not plagiarize, or you'll get 0 point.

Notes

- Please avoid commenting in Chinese, it might cause compiling problem.
- Please comment the code which could produce redundant outputs, e.g., input prompt, debug message, system call, etc.
- You can assume the test cases are designed according to the constraints; you don't have to handle the exceptions.
- Your code must terminate after printing the answer, do not use an infinite loop to get another test case input.

Submission

You can only use C/C++ to write the program. Please name your files as Q{question_id}_{student_id}, for example:

- Q1_123456.c or Q1_123456.cpp
- Q2_123456.c or Q2_123456.cpp