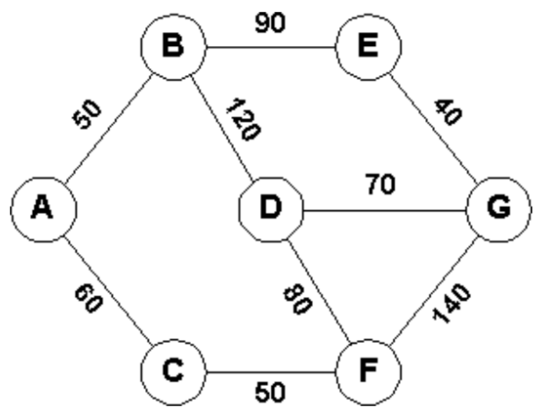
1. Noise pollution, also known as sound pollution, is the propagation of noise with ranging impacts on the activity of human or animal life, most of them are harmful to a degree. The loudness or intensity level of sound is usually measured in decibels and sound having intensity level 130 decibels or higher is considered painful.

Consider the following city map where the edges denote streets and the nodes denote crossings. The integer on each edge is the average intensity level of sound (in decibels) in the corresponding street.



To get from crossing A to crossing G you may follow the following path: A- C- F- G. In that case you must be capable of tolerating sound intensity as high as 140 decibels. For the paths A- B- E- G, A- B- D- G and A- C- F- D- G you must tolerate respectively 90, 120 and 80 decibels of sound intensity. There are other paths, too. However, it is clear that A- C- F- D- G is the most comfortable path since it does not demand you to tolerate more than 80 decibels. In this problem, given a city map you are required to determine the minimum sound intensity level you must be able to tolerate to get from a given crossing to another.

The input may contain multiple test cases. The first line of each test case contains three integers C(≤ 100), S(≤ 1000) and Q(≤ 10000) where C indicates the number of crossings (crossings are numbered using distinct integers ranging from 1 to C), S represents the number of streets and Q is the number of queries. Each of the next S lines contains three integers: c1, c2 and d indicating that the average sound intensity level on the street connecting the crossings c1 and c2 (c1≠ c2) is d decibels. Each of the next Q lines contains two integers c1 and c2 (c1≠ c2) asking for the minimum sound intensity level you must be able to tolerate in order to get from crossing c1 to crossing c2. The input will terminate with three zeros form C, S and Q.

For each test case in the input first output the test case number (starting from 1) as shown in the sample output. Then for each query in the input print a line giving the minimum sound intensity level (in decibels) you must be able to tolerate in order to get from the first to the second crossing in the query. If there exists no path between them just print the line “no path”. Print a blank line between two consecutive test cases.

Sample Input

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

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

0 0 0

Sample Output

Case #1

80

60

60

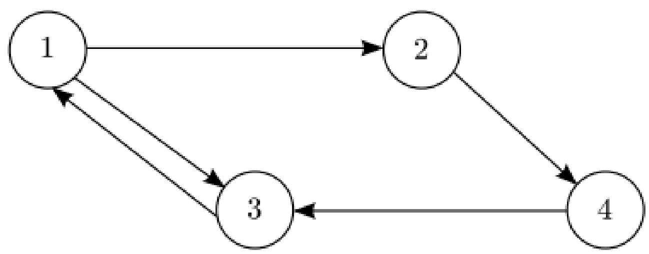
Case #2

40

no path

80

2. It was recently reported that, on the average, only 19 clicks are necessary to move from any page on the World Wide Web to any other page. That is, if the pages on the web are viewed as nodes in a graph, then the average path length between arbitrary pairs of nodes in the graph is 19. Given a graph in which all nodes can be reached from any starting point, your job is to find the average shortest path length between arbitrary pairs of nodes. For example, consider the following graph. Note that links are shown as directed edges, since a link from page a to page b does not imply a link from page b to page a. The length of the shortest path from node 1 to nodes 2, 3, and 4 is 1,1, and 2 respectively. From node 2 to nodes 1, 3 and 4, the shortest paths have lengths of 3, 2, and 1. From node 3 to nodes 1, 2, and 4, the shortest paths have lengths of 1, 2, and 3. Finally, from node 4 to nodes 1, 2, and 3 the shortest paths have lengths of 2, 3, and 1. The sum of these path lengths is 1 + 1 + 2 + 3 + 2 + 1 + 1 + 2 + 3 + 2 + 3 + 1 = 22. Since there are 12 possible pairs of nodes to consider, we obtain an average path length of 22/12, or 1.833 (accurate to three fractional digits).



The input data will contain multiple test cases. Each test case will consist of an arbitrary number of pairs of integers, a and b, each representing a link from a page numbered a to a page numbered b. Page numbers will always be in the range 1 to 100. The input for each test case will be terminated with a pair of zeroes, which are not to be treated as page numbers. An additional pair of zeroes will follow the last test case, effectively representing a test case with no links, which is not to be processed. The graph will not include self-referential links (that is, there will be no direct link from a node to itself), and at least one path will exist from each node in the graph to every other node in the graph.

For each test case, determine the average shortest path length between every pair of nodes, accurate to three fractional digits. Display this length and the test case identifier (they are numbered sequentially starting with 1) in a form similar to that shown in the sample output below.

Sample Input

```
1 2    2 4    1 3    3 1    4 3    0 0

1 2    1 4    4 2    2 7    7 1    0 0

0 0
```

Sample Output

Case 1: average length between pages = 1.833 clicks

Case 2: average length between pages = 1.750 clicks