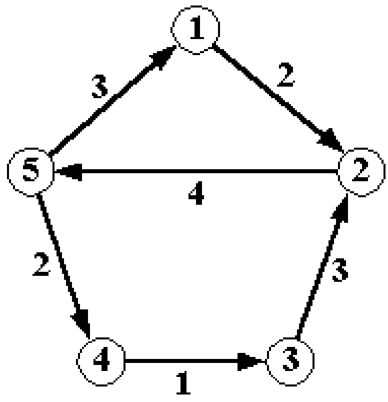
Abul is not the best student in his class; neither is he the best player in his team. Not that he is bad; he is really good, but unfortunately not the best.

Last semester our "not quite the best" *Abul* took a course on algorithms. In one of the assignments he was required to find the shortest path from a given vertex x to another vertex y in a weighted directed graph. As you have probably already guessed, he rarely managed to find the shortest path; instead he always ended up finding the k-th ($2 \leq k \leq 10$) shortest path from x to y. If he was fortunate enough and the shortest k paths from x to y had the same length, he was given credit for his solution.



For example, for the graph on the right, *Abul* was asked to find the shortest path from vertex **5** to vertex **2**. The shortest **7** paths from vertex **5** to vertex **2** are listed below in non-decreasing order of length. For this graph *Abul* was able to find the **5**-th shortest path which could be either $5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 5 \rightarrow 1 \rightarrow 2$ or $5 \rightarrow 1 \rightarrow 2 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2$, each with length 15.

Path	*Length*
$5 \rightarrow 1 \rightarrow 2$	5
$5 \rightarrow 4 \rightarrow 3 \rightarrow 2$	6
$5 \rightarrow 1 \rightarrow 2 \rightarrow 5 \rightarrow 1 \rightarrow 2$	14
$5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 5 \rightarrow 1 \rightarrow 2$	15
$5 \rightarrow 1 \rightarrow 2 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2$	15
$5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2$	16
$5 \rightarrow 1 \rightarrow 2 \rightarrow 5 \rightarrow 1 \rightarrow 2 \rightarrow 5 \rightarrow 1 \rightarrow 2$	23

Given a description of the graph, source vertex x, target vertex y, and the value of k, you need to find out the length of the path *Abul* computed. You may assume that there exists at least one path from x to y in the given graph.

Input

The input may contain multiple test cases.

The first line of each test case contains two integers n ($2 \leq n \leq 100$) and m ($1 \leq m \leq 1000$) giving respectively the number of vertices, and the number of edges in the graph. Each vertex in the graph is identified by a unique integer in $[1, n]$. The second line of the test case contains the values of x, y and k ($1 \leq x, y \leq 100, x \neq y, 2 \leq k \leq 10$). Each of the next m lines contains three integers u, v and l ($1 \leq u, v \leq 100, 0 \leq l \leq 10000$) specifying a directed edge of length l from vertex u to vertex v.

The input terminates with two zeros for n and m.

Output

For each test case in the input output a line containing an integer giving the length of the k-th shortest path in the graph. If the graph does not have at least k paths from x to y, output a '`-1`' instead.

Sample Input

```
3 3
1 3 4
1 3 3
1 2 4
2 3 5
5 6
5 2 5
1 2 2
2 5 4
3 2 3
4 3 1
5 1 3
5 4 2
2 2
1 2 3
1 2 5
2 2 2
0 0
```

Sample Output

```
-1
15
9
```