Problem G. Single source shortest path, negative weights

Time Limit	3000 ms
Mem Limit	1048576 kB
OS	Linux

Input

The input consists of several test cases. Each test case starts with a line with four non-negative integers, $1 \leq n \leq 1000$, $0 \leq m \leq 5000$, $1 \leq q \leq 100$ and $0 \leq s < n$, separated by single spaces, where n is the numbers of nodes in the graph, m the number of edges, q the number of queries and s the index of the starting node. Nodes are numbered from 0 to $n - 1$. Then follow m lines, each line consisting of three (space-separated) integers u, v and w indicating that there is an edge from u to v in the graph with weight $-2000 \leq w \leq 2000$. Then follow q lines of queries, each consisting of a single non-negative integer, asking for the minimum distance from node s to the node number given on the query line.

Input will be terminated by a line containing four zeros, this line should *not* be processed.

Output

For each query, output a single line containing the minimum distance from node s to the node specified in the query, the word "`Impossible`" if there is no path from s to that node, or "`-Infinity`" if there are arbitrarily short paths from s to that node. For clarity, the sample output has a blank line between the output for different cases.

Sample 1

Input	Output
5 4 3 0 0 1 999 1 2 -2 2 1 1 0 3 2 1 3 4 2 1 1 0 0 1 -100 1 0 0 0 0	-Infinity 2 Impossible -100