Min Distance to Vertices

You are given an undirected graph with n vertices and m edges. Your task is to calculate the shortest path length from vertex 0 to other vertices and print them, if there is no path, print out -1.

Input

- First line contains n and m

- Next m lines, each line contains three integers represent for and edge: vertex1, vertex2 and length

Output

Print out shortest path length from vertex 0 to other vertices

Example

Input:
5 3
0 3 55
2 1 3
2 0 78

Output:
81 78 55 -1