Shortest Path - Problem Y

There are n vertices and m edges between them. Determine the shortest path from the first vertex to all other vertices.

Input

The first input line has two integers n and m the number of vertices and edges. The vertices are numbered $1, ..., n$. After the first line, there are m lines describing the edges. Each line has three integers, a, b, and c. Representing an undirected edge between vertices a and b of weight c. You can assume that it is possible to travel from vertex 1 to all other vertices, note that the edges are undirected and all weights are integers.

Output

Print n integers: the shortest routes from vertex 1 to vertices $1, 2, ..., n$, with each integer followed by a whitespace.

Constraints

$1 \leq n \leq 10^5$

$1 \leq m \leq 2 \cdot 10^5$

$1 \leq a, b \leq n$

$1 \leq c \leq 10^9$

Example

Sample Input

```
5 10
1 5 1
2 3 2
4 5 8
3 1 8
5 4 9
3 1 10
4 2 2
1 2 10
2 5 8
4 1 1
```

Sample Output

```
0 3 5 1 1
```