

Shortest Path

The Problem

Find the shortest path between a given node and all the other nodes in a weighted directed graph.

The Input

The first line of input will be a number on a line by itself which is the number of test cases to run. For each test case, the first line will be three each numbers separated by a space N , E and X , where N ($1 \leq N \leq 5000$) is the number of nodes in the graph, E ($1 \leq E \leq 10000$) is the number of edges and X ($0 \leq X < N$) is the source node for the shortest paths. The graph nodes will be numbered 0 to $N-1$. Each of the next E lines contain three numbers S , D and W each separated by a space representing an edge in the graph from S ($0 \leq S < N$) to D ($0 \leq D < N$) with weight W ($0 < W \leq 1000$).

The Output

For each test case, output the test case number on a line by itself. On the next line output a space separated list of the shortest path weights for each node in ascending node number order. If there is no path from the source node to another node print 'NP'. See the example output below.

Sample Input

```
2
5 7 0
0 1 10
1 3 2
1 4 6
3 4 3
2 4 6
0 4 20
0 2 30
5 6 1
0 1 8
0 3 2
0 4 5
1 2 6
2 3 4
3 4 3
```

Sample Output

```
1
0 10 30 12 15
2
NP 0 6 10 13
```