



Bellman-Ford

Your task is to implement Bellman-Ford algorithm computing the shortest paths between a single source and all the remaining vertices. We assume the vertices of the input graph are enumerated by $0, \dots, n-1$, 0 is the source vertex. You should output the distances between 0 and the vertices $0, \dots, n-1$ (output **I** if there is no path from the source), and output **NC** if the input graph contains a cycle of negative total weight.

Your algorithm should work in time $O(n^2m)$, where n and m denote the sizes of the vertex set and of the edge set of the input graph.

Input

The first line contains integer z ($1 \leq z \leq 2 \cdot 10^9$) – the number of data sets. Each data set is as follows:

The first line contains the numbers n ($1 \leq n \leq 4000$) and m ($1 \leq m \leq 20000$) denoting the sizes of the vertex set and of the edge set of the input graph, respectively. Each of the next m lines contains a description $x \ y \ w$ of subsequent edges e of the input graph: $x \ y$ are the endpoints of e , w is the weight of e .

Output

The distances between 0 and the vertices $0, \dots, n-1$ (**I** if there is no path from the source), or **NC** if the input graph contains a negative cycle.



Example

For the input:

```
3
5 8
0 1 2
0 4 4
1 2 2
1 4 1
2 3 2
2 4 -2
3 2 3
4 3 1
3 3
0 1 1
1 2 1
2 0 -3
2 1
1 0 2
```

the output is:

```
0 2 4 3 2
NC
0 I
```