Dijkstra's Algorithm with Heap

Your task is to implement Dijkstra's algorithm which finds the shortest path in a weighted directed graph with n vertices and m edges.

Use `Heap` to implement your algorithm in time $O((n+m)\log n)$.

Input

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

The first line contains number n ($1 \leqslant n \leqslant 1000$) of vertices and number m ($1 \leqslant m \leqslant 1000000$) of edges of the input graph. Each of the remaining lines contains three numbers u v and w representing an oriented edge of weight w ($1 \leqslant w \leqslant 1000$) oriented from u to v.

Output

The weight of the shortest path from vertex 0 to vertex $n-1$. You should output -1 in the case when such a path does not exist.

Example

For the input:

```
2
4 6
0 2 1
0 1 3
0 3 7
2 1 1
2 3 3
1 3 1
5 6
0 2 1
0 1 3
0 3 7
2 1 1
2 3 3
1 3 1
```

the output is:

```
3
-1
```