G. Omg Graph

time limit per test: 2 seconds
memory limit per test: 256 megabytes

You are given an undirected connected weighted graph. Define the cost of a path of length k to be as follows:

- Let the weights of all the edges on the path be $w_1, \ldots, w_k$.
- The cost of the path is $(\min_{i=1}^{k} w_i) + (\max_{i=1}^{k} w_i)$, or in other words, the maximum edge weight + the minimum edge weight.

Across all paths from vertex 1 to n, report the cost of the path with minimum cost. Note that the path is not necessarily simple.

Input

The first line contains an integer t ($1 \le t \le 10^4$) — the number of test cases.

The first line of each test case contains two integers n and m ($2 \le n \le 2 \cdot 10^5, n - 1 \le m \le \min(2 \cdot 10^5, \frac{n(n-1)}{2})$).

The next m lines each contain integers u, v and w ($1 \le u, v \le n, 1 \le w \le 10^9$) representing an edge from vertex u to v with weight w. It is guaranteed that the graph does not contain self-loops or multiple edges and the resulting graph is connected.

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$ and that the sum of m over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output a single integer, the minimum cost path from vertex 1 to n.

Example

input Copy

```
4
3 2
1 2 1
2 3 1
3 2
1 3 13
1 2 5
8 9
1 2 6
2 3 5
3 8 6
1 4 7
4 5 4
5 8 7
1 6 5
6 7 5
7 8 5
3 3
1 3 9
1 2 8
2 3 3
```

output Copy

```
2
18
10
11
```

Note

For the second test case, the optimal path is $1 \to 2 \to 1 \to 3$, the edge weights are $5, 5, 13$ so the cost is $\min(5, 5, 13) + \max(5, 5, 13) = 5 + 13 = 18$. It can be proven that there is no path with lower cost.