

Contest Duration: 2025-05-31(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250531T2100&p1=248>) - 2025-05-31(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250531T2240&p1=248>) (local time) (100 minutes)

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## E - Minimum OR Path

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Time Limit: 3 sec / Memory Limit: 1024 MiB

Score : 450 points

### Problem Statement

You are given a connected undirected graph with  $N$  vertices and  $M$  edges without self-loops, where vertices are numbered from 1 to  $N$  and edges are numbered from 1 to  $M$ . Edge  $i$  connects vertices  $u_i$  and  $v_i$  bidirectionally and has a label  $w_i$ .

Among the simple paths (paths that do not visit the same vertex more than once) from vertex 1 to vertex  $N$ , find the minimum possible value of the bitwise OR of all labels on edges included in the path.

► What is bitwise OR operation?

### Constraints

- $2 \leq N \leq 2 \times 10^5$
- $N - 1 \leq M \leq 2 \times 10^5$
- $1 \leq u_i < v_i \leq N$
- $0 \leq w_i < 2^{30}$
- The given graph is connected.
- All input values are integers.

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# Input

The input is given from Standard Input in the following format:

```
 $N$   $M$   
 $u_1$   $v_1$   $w_1$   
 $u_2$   $v_2$   $w_2$   
 $\vdots$   
 $u_M$   $v_M$   $w_M$ 
```

# Output

Output the answer.

## Sample Input 1

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```
4 5  
1 2 1  
1 3 4  
2 3 2  
2 4 4  
3 4 3
```

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## Sample Output 1

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```
3
```

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By traversing edges 1, 3, 5 in order and visiting vertices 1, 2, 3, 4 in order, the total bitwise OR is  $1 \text{ OR } 2 \text{ OR } 3 = 3$ .

It is impossible to make the total bitwise OR smaller than 3, so output 3.

## Sample Input 2

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```
3 5  
1 2 1  
1 2 2  
1 2 3  
1 2 4  
2 3 4
```

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## Sample Output 2

[Copy](#)

4

[Copy](#)

The graph may contain multi-edges.

## Sample Input 3

[Copy](#)

```
8 12
4 5 16691344
5 7 129642441
2 7 789275447
3 8 335307651
3 5 530163333
5 6 811293773
3 8 333712701
1 2 2909941
2 3 160265478
5 7 465414272
1 3 903373004
6 7 408299562
```

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## Sample Output 3

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468549631

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