Tree Partition

Input file:	`standard input`
Output file:	`standard output`
Time limit:	7 seconds
Memory limit:	1024 megabytes

Busy Beaver has a very large tree with N vertices, where $N = 2^k - 1$ for some integer $k \geq 1$. He wants to cut some of its edges such that the resulting forest has exactly k connected components with $1, 2, 4, 8, \ldots, 2^{k-1}$ vertices, respectively, and each component forms a simple path. Help Busy Beaver count the number of ways to cut edges to satisfy this condition, modulo $10^9 + 7$.

To reduce the size of the input, the tree is given in a compressed format. There are M key vertices labelled $1, \ldots, M$, connected by $M - 1$ paths. The i-th path connects key vertices u_i and v_i and consists of ℓ_i edges, where $1 + \sum_{i=1}^{M-1} \ell_i = N$.

Input

The first line contains two integers N and M ($1 \leq N \leq 2^{60} - 1$, $1 \leq M \leq \min(N, 10^5)$, $N = 2^k - 1$ for some integer $k \geq 1$).

Each of the next $M-1$ lines contains three integers u_i, v_i, and ℓ_i ($1 \leq u_i, v_i \leq M$, $u_i \neq v_i$, $1 \leq \ell_i \leq N-1$), specifying a path between u_i and v_i of length ℓ_i.

The total number of vertices in the tree is equal to N (formally, $1 + \sum_{i=1}^{M-1} \ell_i = N$).

Output

Output a single integer: the number of such partitions modulo $10^9 + 7$.

Scoring

There are three subtasks for this problem.

- (10 points): $N \leq 2^9 - 1$.
- (30 points): $N \leq 2^{17} - 1$.
- (60 points): No additional constraints.

Examples

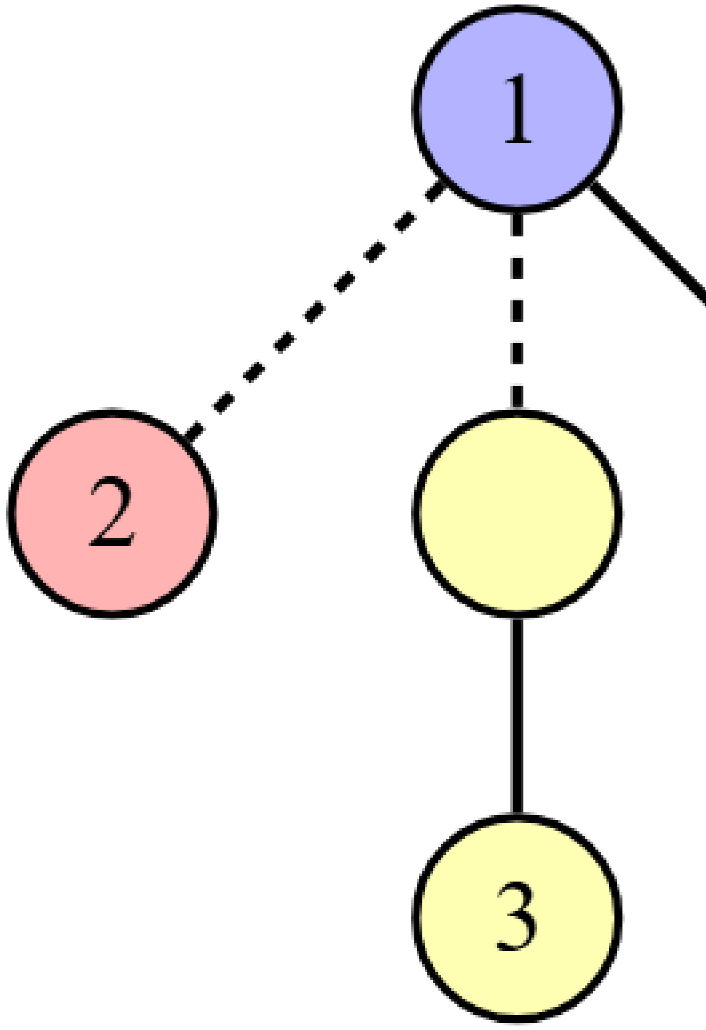
standard input	standard output

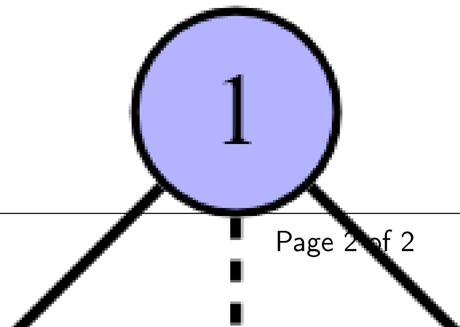
`7 4`
`1 2 1`
`1 3 2`
`1 4 3`
	`5`

`1 1`	`1`

Note

In the first sample test case, the 5 ways to partition the tree are as follows:


1
2
3


1