KM xor M

Time Limit: 2 seconds

Find the value of $\sum_{k=1}^{N}(kM \oplus M)$ modulo $10^9 + 7$, where $\oplus$ denotes the bitwise XOR.

Input Format

The first and only line of input contains two space-separated integers, N, M.

Output Format

Output a single integer, the answer to the problem. Remember to reduce modulo 10^9+7.

Constraints and Subtasks

For all subtasks
$1 \le N \le 10^{18}$ $1 \le M \le 10^{11}$

Subtask	Points	Constraints
1	**4**	$N \le 10^6$
2	**9**	$M \le 10^6$
3	**17**	$M + 1$ is a power of 2.
4	**20**	$M \le 10^8$
5	**20**	$M \le 10^9$
6	**20**	$M \le 10^{10}$
7	**10**	No additional constraints.

Sample I/O

Input	Output
4 6	60

Explanation

The sum is $0 + 10 + 20 + 30 = 60$.