

Problem J. Power of XOR

Input file: *standard input*
Output file: *standard output*
Time limit: 4.5 seconds
Memory limit: 512 mebibytes

bobo has a set of n integers $\{a_1, a_2, \dots, a_n\}$. He randomly picks a subset $\{x_1, x_2, \dots, x_m\}$ (each subset has equal probability to be picked), and would like to know the expectation of $[\text{popcount}(x_1 \oplus x_2 \oplus \dots \oplus x_m)]^k$. Note that $\text{popcount}(x)$ is the number of ones in the binary notation of x , and \oplus denotes bitwise exclusive-or.

Input

The first line contains 2 integers n, k ($1 \leq n \leq 44, 1 \leq k \leq 10^9$).

The second line contains n integers a_1, a_2, \dots, a_n ($0 \leq a_i < 2^{44}$).

Output

If the expectation is E , print a single integer denotes $E \cdot 2^n \bmod (10^9 + 7)$.

Examples

standard input	standard output
3 2 1 2 3	12
2 1000000000 1 2	140625003