Problem D. Bitwise

Time limit	3000 ms
Mem limit	1048576 kB
OS	Linux

Barr the Bear is playing the game *Bits* with Swanky Shen!

Bits is a very simple game. At the start, a circle of N non-negative integers A_1, A_2, A_3, ..., A_N is shown to both players. That is, to the left of the integer A_i is the integer A_{i-1} if $i > 1$; and the integer A_N otherwise. To the right of the integer A_i is the integer A_{i+1} if $i < N$; and the integer A_1 otherwise. Also an integer K is given to both players.

To win this game, one must divide the circle of integers into exactly K contiguous non-empty sections, such that the bitwise `AND` of the *powers* of all sections is maximized. The power of a contiguous section of integers is the bitwise `OR` of all integers in that section.

Barr the Bear is lazy and knows that you are wise with bits. Hence, he has hired you to help him to win the game!

Note: The binary bitwise operators `OR` and `AND` operate on the base-2 representation of the integers and correspond to the operators `|` and `&` respectively in C++ or Java.

Input

The first line contains integers N and K ($1 \leq K \leq N \leq 5 \cdot 10^5$), namely the number of integers and the number of contiguous non-empty sections required.

The next line contains N integers, the i^{th} of which is the integer A_i ($0 \leq A_i \leq 10^9$).

Output

Output a single integer in one line: The maximum bitwise `AND` of the powers of the sections in an optimal division of the circle of integers.

Explanation

In the first sample, the circle is $(2, 3, 4, 1)$. A possible division is $(3, 4)$ and $(1, 2)$. $(3, 4)$ has power 7 and $(1, 2)$ has power 3. The bitwise `AND` of 7 and 3 is 3. Note that a section can possibly wrap around the circle.

In the second sample, a possible division is $(2, 2, 4)$, (4), $(4, 2)$. The sections' powers are 6, 4 and 6 respectively, which have bitwise `AND` of 4. Note that we require the sections to be

contiguous integers, so the division $(2, 4), (2, 4), (2, 4)$ is not permissible.

In the third sample, we can only have one section. This section will have all the integers, and thus have power 3.

Sample 1

Input	Output
4 2 2 3 4 1	3

Sample 2

Input	Output
6 3 2 2 2 4 4 4	4

Sample 3

Input	Output
4 1 0 1 2 3	3