

5844. Minimum Non-Zero Product of the Array Elements

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You are given a positive integer p . Consider an array `nums` (**1-indexed**) that consists of the integers in the **inclusive** range $[1, 2^p - 1]$ in their binary representations. You are allowed to do the following operation **any** number of times:

- Choose two elements x and y from `nums`.
- Choose a bit in x and swap it with its corresponding bit in y . Corresponding bit refers to the bit that is in the **same position** in the other integer.

For example, if $x = 1101$ and $y = 0011$, after swapping the 2^{nd} bit from the right, we have $x = 1111$ and $y = 0001$.

Find the **minimum non-zero** product of `nums` after performing the above operation **any** number of times. Return *this product modulo* $10^9 + 7$.

Note: The answer should be the minimum product **before** the modulo operation is done.

User Accepted:	0
User Tried:	0
Total Accepted:	0
Total Submissions:	0
Difficulty:	Medium

Example 1:

Input: $p = 1$
Output: 1
Explanation: `nums = [1]`.
 There is only one element, so the product equals that element.

Example 2:

Input: $p = 2$
Output: 6
Explanation: `nums = [01, 10, 11]`.
 Any swap would either make the product 0 or stay the same.
 Thus, the array product of $1 * 2 * 3 = 6$ is already minimized.

Example 3:

Input: $p = 3$
Output: 1512
Explanation: `nums = [001, 010, 011, 100, 101, 110, 111]`
 - In the first operation we can swap the leftmost bit of the second and fifth elements.
 - The resulting array is `[001, 110, 011, 100, 001, 110, 111]`.
 - In the second operation we can swap the middle bit of the third and fourth elements.
 - The resulting array is `[001, 110, 001, 110, 001, 110, 111]`.
 The array product is $1 * 6 * 1 * 6 * 1 * 6 * 7 = 1512$, which is the minimum possible product.

Constraints:

- $1 \leq p \leq 60$

JavaScript

```
1 /**
2  * @param {number} p
3  * @return {number}
```

```
4  */
5  ▾ var minNonZeroProduct = function(p) {
6
7  };
```

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