COCI '22 Contest 5 #2 Diskurs

Time limit: 2.0s   **Memory limit:** 512M

You are given n non-negative integers $a_1, a_2, \ldots, a_n$ less than 2^m. For each of them, you are to find the maximum possible *Hamming distance* between it and some other element of the array a.

The *Hamming distance* of two non-negative integers is defined as the number of positions in the binary representation of these numbers in which they differ (we add leading zeros if necessary).

Formally, for each i, calculate:

$$\max_{1 \leq j \leq n} hamming(a_i, a_j)$$
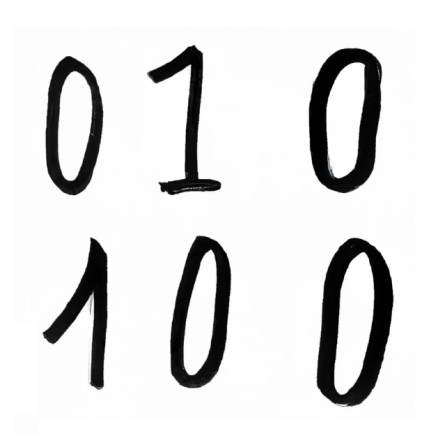
Input Specification

The first line contains two integers, n and m $(1 \leq n \leq 2^m, 1 \leq m \leq 20)$.

The second line contains n integers, a_i $(0 \leq a_i < 2^m)$.

Output Specification

Output n integers separated with spaces, where the i-th integer is the maximum *Hamming distance* between a_i and some other number in a.

Constraints

Subtask	Points	Constraints
1	20	$m \leq 10$
2	25	$m \leq 16$
3	25	No additional constraints.

Sample Input 1

```
4 4
9 12 9 11
```

Sample Output 1

```
2 3 2 3
```

Sample Input 2

```
4 4
5 7 3 9
```

Sample Output 2

```
2 3 2 3
```

Sample Input 3

```
4 4
3 4 6 10
```

Sample Output 3

```
3 3 2 3
```

Explanation for Sample 3

The numbers $3, 4, 6, 10$ can be represented as $0011, 0100, 0110, 1010$ in binary. Numbers 3 and 4 differ at 3 places, same as numbers 4 and 10. On the other hand, the number 6 differs in at most 2 places from all other numbers.