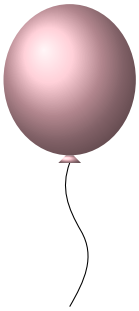
# H Stability



Time limit: 1.0s
Memory limit: 256MB

Noon is planning to launch a revolutionary new product line: quantum-balanced energy storage units. These cutting-edge devices are arranged in warehouse shelves, each unit displaying a specific energy signature value.

However, there's a critical requirement: before Noon can sell these units to customers, each shipment must be perfectly *stable*—meaning all units in a shipment box must have their energy signatures neutralized to zero. This ensures safe transportation and optimal performance.

The warehouse engineers have a special calibration tool that can process any two units simultaneously. When activated on units $i$ and $j$, the tool performs an XOR recalibration: both units instantly update their signatures to $a[i] \oplus a[j]$.

Noon's logistics team receives $Q$ different shipment requests, each specifying a range $[L, R]$ of units from the warehouse. For each shipment, the quality assurance team must determine: what's the minimum number of calibrations needed to stabilize all units in that range?

**Important:** Each shipment is prepared *independently*—the warehouse operates by making copies of units for each shipment order. The calibrations performed while preparing one shipment don't affect the preparation of other shipments. Each shipment's preparation starts fresh with the original warehouse configuration.

Can you help solve this critical challenge?

## Input

The first line contains two integers $N$ and $Q$ ($2 \leq N \leq 2 \times 10^5$), ($1 \leq Q \leq 2 \times 10^5$)

The second line contains $N$ integers $a_1, a_2, \ldots, a_N$ ($0 \leq a_i \leq 10^9$)

Each line of the next $Q$ lines contains two integers $L$ and $R$ ($1 \leq L < R \leq N$)

## Output

For each query, output a single integer—the minimum number of operations needed.

## Samples

| Sample input 1 | Sample output 1 |
|---|---|
| 4 3<br>1 2 3 4<br>1 2<br>2 3<br>1 4 | 2<br>2<br>4 |