



XOR key



Problem

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Xorq has invented an encryption algorithm which uses bitwise XOR operations extensively. This encryption algorithm uses a sequence of non-negative integers x_1, x_2, \dots, x_n as key. To implement this algorithm efficiently, *Xorq* needs to find maximum value of $(a \oplus x_j)$ for given integers a, p and q , such that, $p \leq j \leq q$. Help *Xorq* implement this function.

Input Format

First line of input contains the number of test cases, T ($1 \leq T \leq 6$). T test cases follow.

First line of each test case contains two space separated integers N and Q ($1 \leq N \leq 100,000$; $1 \leq Q \leq 50,000$). Next line contains N space separated integers x_1, x_2, \dots, x_n ($0 \leq x_i < 2^{15}$). Each of next Q lines describes a query which consists of three integers a_i, p_i and q_i ($0 \leq a_i < 2^{15}$, $1 \leq p_i \leq q_i \leq N$).

Output Format

For each query, print in a new line the maximum value for $(a_i \oplus x_j)$, such that, $p_i \leq j \leq q_i$.

Sample Input

```
1
15 8
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
10 6 10
1023 7 7
33 5 8
182 5 10
181 1 13
5 10 15
99 8 9
33 10 14
```

Sample Output

```
13
1016
41
191
191
15
107
47
```

Explanation

- First Query (10 6 10): $x_6 \oplus 10 = 12, x_7 \oplus 10 = 13, x_8 \oplus 10 = 2, x_9 \oplus 10 = 3, x_{10} \oplus 10 = 0$, therefore answer for this query is **13**.
- Second Query (1023 7 7): $x_7 \oplus 1023 = 1016$, therefore answer for this query is **1016**.
- Third Query (33 5 8): $x_5 \oplus 33 = 36, x_6 \oplus 33 = 39, x_7 \oplus 33 = 38, x_8 \oplus 33 = 41$, therefore answer for this query is **41**.
- Fourth Query (182 5 10): $x_5 \oplus 182 = 179, x_6 \oplus 182 = 176, x_7 \oplus 182 = 177, x_8 \oplus 182 = 190, x_9 \oplus 182 = 191, x_{10} \oplus 182 = 188$, therefore answer for this query is **191**.

Submissions: [3173](#)

Max Score: 80

Difficulty: Advanced

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Current Buffer (saved locally, editable)  

Java 7  

```
1 import java.io.*;
2 import java.util.*;
3 import java.text.*;
4 import java.math.*;
5 import java.util.regex.*;
6
7 public class Solution {
8
9     public static void main(String[] args) {
10         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11     }
12 }
```

Line: 1 Col: 1

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