16/11/2017 HackerRank



# Maximizing the Function **■**



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Consider an array of n binary integers (i.e., 0's and 1's) defined as  $A = [a_0, a_1, \ldots, a_{n-1}]$ 

Let f(i,j) be the bitwise XOR of all elements in the inclusive range between index i and index j in array A. In other words,  $f(i,j) = a_i \oplus a_{i+1} \oplus \ldots \oplus a_j$ . Next, we'll define another function, g.

$$g(x,y) = \sum_{i=x}^y \sum_{j=i}^y f(i,j)$$

Given array A and q independent queries, perform each query on A and print the result on a new line. A query consists of three integers, x, y, and k, and you must find the maximum possible g(x, y) you can get by changing at most k elements in the array from 0 to 1 or from 1 to 0.

Note: Each query is independent and considered separately from all other queries, so changes made in one query have no effect on the other queries.

## **Input Format**

The first line contains two space-separated integers denoting the respective values of n (the number of elements in array A) and q (the number of queries).

The second line contains n space-separated integers where element i corresponds to array element  $a_i$  ( $0 \le i < n$ ).

Each line i of the q subsequent lines contains 3 space-separated integers,  $x_i$ ,  $y_i$  and  $k_i$  respectively, describing query  $q_i$  ( $0 \le i < q$ ).

#### **Constraints**

- $1 \le n, q \le 5 \times 10^5$
- $0 \le a_i \le 1$
- $0 \le x_i \le y_i < n$
- $0 \le k_i \le n$

#### Subtask

- $1 \leq n,q \leq 5000$  and  $0 \leq k_i \leq 1$  for 40% of the maximum score
- ullet  $n=5 imes 10^5$  ,  $m=5 imes 10^5$  and  $k_i=0$  for 20% of the maximum score

## **Output Format**

Print q lines where line i contains the answer to query  $q_i$  (i.e., the maximum value of  $g(x_i,y_i)$  if no more than  $k_i$  bits are changed).

# Sample Input

- 3 2
- 0 0 1
- 0 2 1
- 0 1 0

#### **Sample Output**

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4

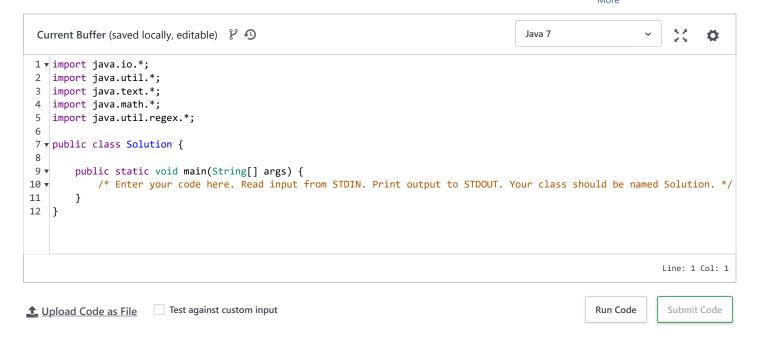
```
Explanation
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Given A = [0, 0, 1], we perform the following q = 2 queries:
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1. If we change  $a_0=0$  to 1, then we get A'=[1,0,1] and g(x=0,y=2)=4.

2. In this query, g(x = 0, y = 1) = 0.

Submissions:<u>58</u>
Max Score:70
Difficulty: Hard
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