Lazy Susan

Input file:	`standard input`
Output file:	`standard output`
Time limit:	6 seconds
Memory limit:	1024 megabytes

A lazy Susan is a rotating round tray placed on a dining table to hold food or utensils, making it easier for everyone seated around the table to share and serve themselves.

There are n people sitting around a round table enjoying dinner, with each person numbered from 0 to $n-1$ in clockwise order, and the distance between each of the n people is the same. Note that the person next to the $(n-1)$-th person in the clockwise direction is the 0-th person.

The dinner consists of n dishes, each numbered from 0 to $n-1$ in the order they are served. The waiter will start from the x-th person and serve each dish on the lazy susan in front of each person in clockwise order. Specifically, the i-th dish will be placed in front of the $[(x+i) \bmod n]$-th person.

Each time the lazy susan is rotated, all dishes can be rotated either clockwise or counterclockwise to the next person's position. More precisely, the dish originally in front of the i-th person will move to the $[(i+1) \bmod n]$-th person's position after one clockwise rotation, and to the $[(i+n-1) \bmod n]$-th person's position after one counterclockwise rotation. Each operation takes 1 second.

Each person has a reach distance r_i. The i-th person can enjoy the dish that is currently in front of the j-th person if there exist an integer k that satisfies the following conditions:

- $-r_i \le k \le r_i$
- $(i+k+n) \bmod n = j$

The person can enjoy the dish instantaneously once the conditions above are satisfied.

There are m preferences among the n people. The i-th preference is that the p_i-th person wants to enjoy the d_i-th dish before t_i seconds after all dishes are served. Please determine whether all preferences can be satisfied if the waiter starts serving from the x-th person for all x between 0 and $n-1$.

Input

The first line contains the number of test cases T $(1 \le T \le 2500)$. The description of the test cases follows.

The first line of each test case contains two integers n, m $(2 \le n \le 5000, 0 \le m \le \min(n^2, 10^5))$, indicating the number of people and the number of preferences.

The second line of each test case contains n non-negative integer $r_0, r_1, \ldots, r_{n-1}$ $(0 \le r_i \le n)$, indicating the reach distance of the i-th person.

The next m lines of each test case contains three integers p_i, d_i, t_i $(0 \le p_i < n, 0 \le d_i < n, 1 \le t_i \le 10^9)$, indicating the information of the i-th preference. It is guaranteed that for every $1 \le i < j \le m$, $p_i \ne p_j$ or $d_i \ne d_j$.

It is guaranteed that the sum of n over all test cases does not exceed 5000.

It is guaranteed that the sum of m over all test cases does not exceed 10^5.

Output

For each test case, output a 01 string s of length n. If the waiter starts can serve from the x-th person, $s_x = 1$. Otherwise $s_x = 0$.

Example

standard input	standard output
4 5 6 0 0 1 2 1 3 2 2 0 0 2 4 4 4 1 1 3 4 3 5 0 3 2 8 10 2 2 2 0 3 0 0 1 4 3 1 1 0 1 0 7 6 4 4 1 1 7 5 0 4 2 5 3 4 4 6 1 7 7 3 0 2 4 4 4 0 0 0 0 1 0 2 2 0 2 0 0 2 3 0 2 13 0 1 1 4 5 1 4 1 9 1 9 8 1 0	10100 11111010 0000 1111111111111