Forum Management (forum)

Edoardo is having an hard time maintaining the forum. In particular, the component responsible of sending to the users the notifications about new comments is very slow, so he would like to make it better. The forum can be described as a tree of directories, where each directory may contain other directories and zero or more posts. There are D directories, identified by integers from 0 to $D-1$, and P posts in total, identified by integers from D to $D+P-1$. The directory with identifier zero is the root of the tree; this means that every other directory and post is (directly or indirectly) contained in that directory. Edoardo knows that every directory or post with identifier i is directly contained inside the directory with identifier A_i. Since the root directory is not contained in any other directory, we define A_0 to be equal to -1.

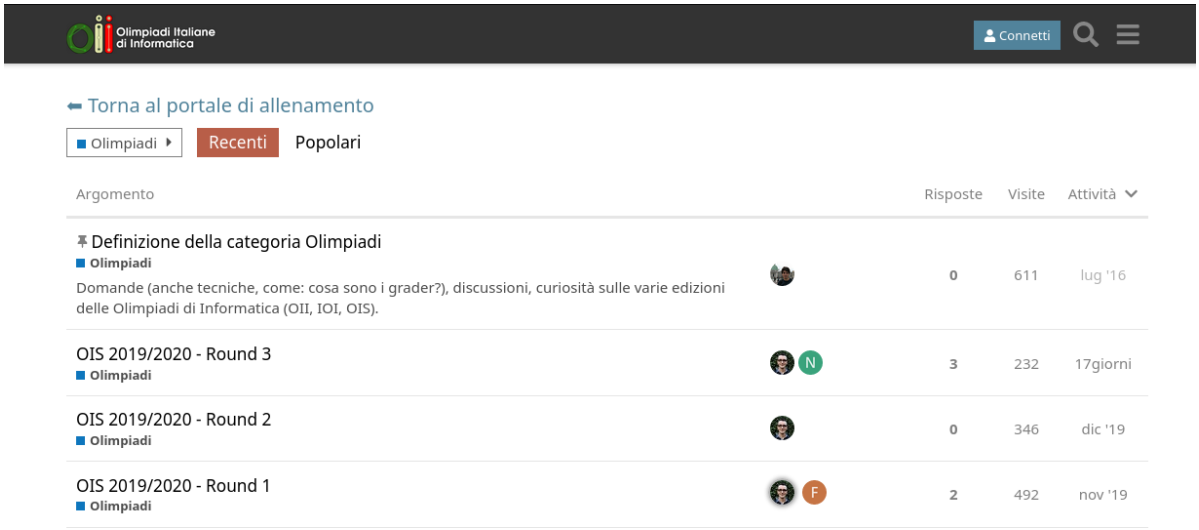


Figure 1: Our forum!

To make things easier, Edoardo considers only the E events triggered by one user. The j-th event has a type T_j and an identifier ID_j. The j-th event can be one out of three types:

- If $T_j = 0$, it means that the user unsubscribed from the directory or post with identifier ID_j. When a user unsubscribes from a directory, he unsubscribes recursively from all the directories and posts contained in it.
- If $T_j = 1$, then the user subscribed to the directory or post with identifier ID_j. Just like the previous case, when a user subscribes to a directory, he subscribes recursively to all the directories and posts contained in it.
- If $T_j = 2$, then a new comment has been published on post with identifier ID_j.

Edoardo has the list of all the events in chronological order, and he also knows that initially the user is not subscribed to any directory or post. Help Edoardo find out, for every event with $T_j = 2$, if the user is subscribed or not to the post with identifier ID_j, in order to decide whether to send the user a notification or not.

☞ Among the attachments of this task you may find a template file `forum.*` with a sample incomplete implementation.

Input

The first line contains three integers D, P and E, the number of directories, the number of posts and the number of events. The second line contains $D + P$ integers A_i, the i-th beign the parent directory of directory or post with identifier i. The following E lines contain the description of the various events, in chronological order. The j-th event is described by two integers T_j and ID_j, the type and identifier associated to the j-th event.

Output

You need to write a line with an integer for each event with $T_j = 2$: you have to write one if the user is subscribed to the post with identifier ID_j, zero otherwise.

Constraints

- $1 \leq D, P, E \leq 500\,000$.
- $A_0 = -1$.
- $0 \leq A_i < D$, for each $i = 1 \dots D + P - 1$.
- $0 \leq T_j \leq 2$, for each $j = 0 \dots E - 1$.
- $0 \leq ID_j < D + P$ if $T_j \neq 2$, otherwise $D \leq ID_j < D + P$.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.

– **Subtask 2** (10 points) $D, E \leq 100\,000$, $P = 1$ and $A[i] = i - 1$ for each $i = 0 \dots D + P - 1$

– **Subtask 3** (10 points) $P, E \leq 100\,000$, $D = 1$

– **Subtask 4** (15 points) $D, E \leq 100\,000$, $P = 1$

– **Subtask 5** (20 points) $D, P, E \leq 1000$

– **Subtask 6** (15 points) $D, P, E \leq 100\,000$ and there are at most 10 events with $T_j = 2$

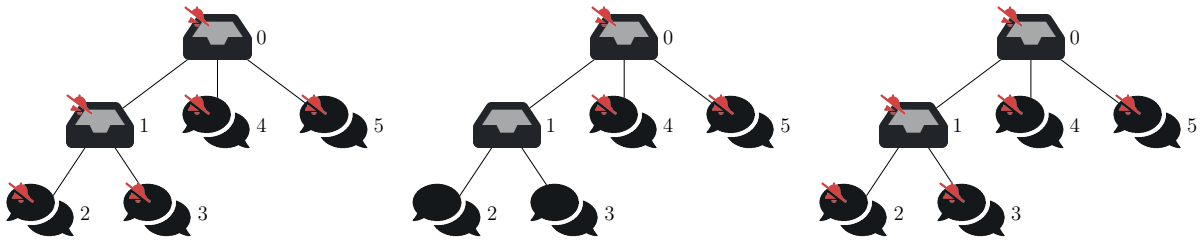
– **Subtask 7** (30 points) No additional limitations.

Examples

input	output
2 4 6 -1 0 1 1 0 0 1 1 2 3 2 4 0 0 2 2 2 5	1 0 0 0
3 2 7 -1 0 0 1 2 1 1 2 3 2 4 0 0 1 4 2 3 2 4	1 0 0 1

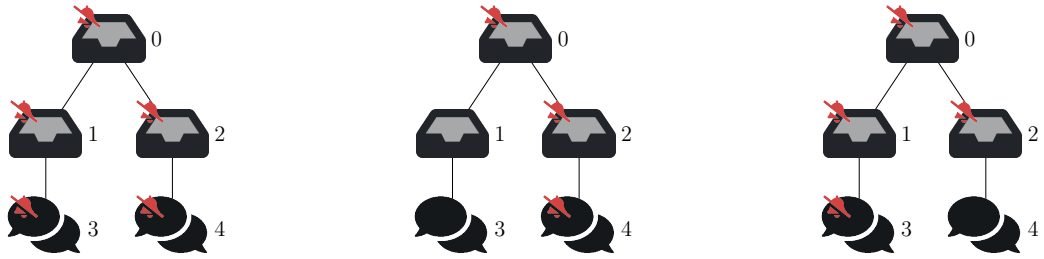
Explanation

In the **first sample case** the first update subscribes to the directory 1 and the posts 2 and 3. The second update unsubscribes from everything.



Initial situation. After the first update. After the second update.

In the **second sample case** the first update subscribes to directory 1 and post 3, the second update unsubscribes from everything and the third subscribes to post 4.



Initial situation. After the first update. After the second and third update.