**First element at least X - 2**

**Problem**

You are given an array of size n. You will be given m range queries and point updates on the array. Queries and updates on the array will be of the type given below

1 i v: Update a[i] to v

2 x l: Find the minimum index j such that j>=l and a[j]>=x.

**Constraints**

*1 <= n, m <= 105*

*0 <= x <= 109*

*0 <= l < n*

Example input

5 7

1 3 2 4 3

2 3 0

2 3 2

1 2 5

2 4 1

2 5 4

1 3 7

2 6 1

Output

1

3

2

-1

3

**Approach**

Main idea: Segment Tree + Binary Search.

1. Make a segment tree of max queries and update.
2. Binary Search on the interval [0,n-1], starting from lo=l and hi=n-1 and keep updating the ans index (i.e. the minimum mid such that a[mid] >= x).

**Code**

#include "bits/stdc++.h"

using namespace std;

#define int long long

const int N = 1e5+2, MOD = 1e9+7;

int tree[4\*N], a[N];

void build(int node, int st, int en)

{

if(st == en){

tree[node] = a[st];

return;

}

int mid = (st + en)/2;

build(2\*node, st, mid);

build(2\*node+1, mid+1, en);

tree[node] = max(tree[2\*node], tree[2\*node+1]);

}

int query(int node, int st, int en, int l, int r){

if(st>r || en<l)

return -MOD;

if(l<=st && en<=r)

return tree[node];

int mid = (st + en)/2;

int q1 = query(2\*node, st, mid, l, r);

int q2 = query(2\*node+1, mid+1, en, l, r);

return max(q1, q2);

}

void update(int node, int st, int en, int idx, int val){

if(st == en){

a[st] = val;

tree[node] = val;

return;

}

int mid = (st+en)/2;

if(idx <= mid){

update(2\*node, st, mid, idx, val);

}

else {

update(2\*node+1, mid+1, en, idx, val);

}

tree[node] = max(tree[2\*node], tree[2\*node+1]);

}

signed main()

{

int n,m;

cin >> n >> m;

for(int i=0; i<n; i++){

cin >> a[i];

}

build(1,0,n-1);

while(m--){

int type;

cin >> type;

if(type == 1){

int idx,val;

cin >> idx >>val;

update(1,0,n-1,idx,val);

}

else if(type == 2){

int x,l;

cin >> x >> l;

int lo = l, hi = n-1;

int ans = n;

while(lo<=hi){

int mid = (lo+hi)/2;

if(query(1,0,n-1,lo,mid) < x){

lo = mid+1;

}

else {

hi = mid-1;

ans = min(ans, mid);

}

}

if(ans == n){

cout << "-1" << endl;

}

else{

cout << ans << endl;

}

}

}

return 0;

}