Tree in graph theory refers to any connected graph (of nodes and edges) which has no simple cycle, while forest corresponds to a collection of one or more trees. In this problem, you are given a forest of $N$ nodes (of rooted trees) and $K$ queries. Each query is in the form of:

- $C x$ : remove the edge connecting node and its parent. If node has no parent, then ignore this query.
- $Q a b$ : output "YES" if there is a path from node to node in the forest; otherwise, "NO".

For example, let the initial forest is shown by Figure 1.

Let’s consider the following queries (in order):

1) $Q 5 7$ : output YES.
2) $C 2$ : remove edge (2, 1) | the resulting forest is shown in Figure 2.
3) $Q 5 7$ : output NO, as there is no path from node 5 to node 7 in Figure 2.
4) $Q 4 6$ : output YES.

**Input**

The first line of input contains an integer $T$ ($T \leq 50$) denoting the number of cases. Each case begins with two integers: $N$ and $K$ ($1 \leq N \leq 20,000; 0 \leq K \leq 5,000$) denoting the number of nodes in the forest and the number of queries respectively. The nodes are numbered from 1 to $N$. The next line contains $N$ integers $P_i$ ($0 \leq P_i \leq N$) denoting the parent of $i$-th node respectively. $P_i = 0$ means that node $i$ does not have any parent (i.e. it’s a root of a tree). You are guaranteed that the given input corresponds to a valid forest. The next $K$ lines represent the queries. Each query is in the form of `$C x$' or `$Q a b$' (1 $\leq x, a, b \leq N$), as described in the problem statement above.

**Output**

For each case, output Case #X: in a line, where X is the case number starts from 1. For each `$Q a b$' query in the input, output either "YES" or "NO" (without quotes) in a line whether there is a path from node $a$ to node $b$ in the forest.

**Explanation for 2nd sample case:**

The initial forest is shown in Figure 3 below.

1) $C 3$ : remove edge (3, 2) | the resulting forest is shown in Figure 4.
2) $Q 1 2$ : output YES.
3) $C 1$ : remove edge (1, 2) | the resulting forest is shown in Figure 5.
4) $Q 1 2$ : output NO as there is no path from node 1 to node 2 in Figure 5.

**Sample Input**

```
4
7 4
0 1 1 2 2 2 3
Q 5 7
C 2
Q 5 7
Q 4 6
Q 4 2 3
C 3
Q 1 2
C 1
Q 1 2
3 5
C 0 3
C 1
Q 1 2
C 3
Q 2 3
1 1
Q 1 1
```

**Sample Output**

```
Case #1:
YES
NO
YES
Case #2:
YES
NO
Case #3:
NO
YES
Case #4:
YES
```