



All Contests > APL-2017-L6 > Union of Sets

Union of Sets

locked

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Problem

Submissions

Leaderboard

Discussions

You are expected to maintain a family of disjoint nonempty subsets. Initially, each set contains a single element from $\{1 \dots N\}$ and is named by the element it contains. At any point of time, we need to perform the following operations with the sets.

1. UNION A B

Modify the family by replacing two sets, the one containing A and the one containing B, by a single set that is the union of these two sets. Nothing changes if a and b are already in the same set. Implementation : You are expected to implement union by rank. If rank of the both sets containing A and B are same then the name of the resulting set of the union would be that of the set containing B (the second argument).

2. FIND A

Return the name of the set containing the element A.

3. CC

Find the number of sets at current instant.

Note : You are expected to implement the above using trees (union by rank). This will also get used in the weekend assignment.

Input Format

First Line contains **N** and **Q** denotes the Number of vertices and Number of Queries.

Next **Q** Lines contains either of the queries **UNION**, **FIND** or **CC**

Constraints

$1 \leq N \leq 10^5$

$1 \leq Q \leq 3N$

$1 \leq A \leq N$

$1 \leq B \leq N$

Output Format

Print the parent of the set containing the element of FIND command

Print the number of sets at current instant for CC command

Sample Input 0

```
4 8
UNION 4 2
FIND 4
FIND 2
CC
UNION 1 4
UNION 4 3
FIND 4
CC
```

Sample Output 0

2
2
3
2
1

Explanation 0**UNION 4 2:**

As both sets containing 4 and 2 have rank zero, union of set containing 4 and the set containing 2 is done and the name of the result set is made 2. The rank of the result set is increased by one.

FIND 4:

The name of set containing vertex 4 is 2 because the set name has been changed in the above query.

FIND 2:

The name of the set containing vertex 2 is 2 itself.

CC:

The number of connected components are 3 now because 2 and 4 vertices are in the same set.

UNION of 1 4:

As set containing 1 has rank 0 and set containing 4 has rank 1, union of the set containing 1 and the set containing 4 is done and the name of the new set is kept 2.

UNION of 4 3:

As the set containing 4 has rank 1 and set containing 3 has rank 0, union of the set containing 3 and the set containing 4 is done and the name of the new set is kept 2.

FIND 4:

The name of the set containing vertex 4 is 2.

CC:

The number of connected components are 1 now because in each previous **UNION** query one set is merged with another set.

[f](#) [t](#) [in](#)

Submissions: 64

Max Score: 60

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C++  

```
1 #include <cmath>
2 #include <cstdio>
3 #include <vector>
4 #include <iostream>
5 #include <algorithm>
6 using namespace std;
7
8
9 int main() {
10     /* Enter your code here. Read input from STDIN. Print output to STDOUT */
11     return 0;
12 }
13
```

Line: 1 Col: 1

 [Upload Code as File](#)

Run Code

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