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Rooted Tree 🔖

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You are given a rooted tree with N nodes and the root of the tree, R, is also given. Each node of the tree contains a value, that is initially empty. You have to mantain the tree under two operations:

1. Update Operation

2. Report Operation

Update Operation
Each Update Operation begins with the character U. Character U is followed by 3 integers T, V and K. For every node which is the descendent of the node T, update it's value by adding $V + d*K$, where V and K are the parameters of the query and d is the distance of the node from T. Note that V is added to node T.

Report Operation
Each Report Operation begins with the character Q. Character Q is followed by 2 integers, A and B. Output the sum of values of nodes in the path from A to B modulo $(10^9 + 7)$

Input Format
The first Line consists of 3 space separated integers, N E R, where N is the number of nodes present, E is the total number of queries (update + report), and R is root of the tree.

Each of the next N-1 lines contains 2 space separated integers, X and Y (X and Y are connected by an edge).

Thereafter, E lines follows: each line can represent either the Update Operation or the Report Operation.

- *Update Operation* is of the form : *U T V K*.

- *Report Operation* is of the form : *Q A B*.

Output Format
Output the answer for every given report operation.

Constraints

$1 \leq N, E \leq 10^5$
$1 \leq E \leq 10^5$
$1 \leq R, X, Y, T, A, B \leq N$
$1 \leq V, K \leq 10^9$
$X \neq Y$

Sample Input

```
7 7 1
1 2
2 3
2 4
2 5
5 6
6 7
U 5 10 2
```

```
U 4 5 3
Q 1 7
U 6 7 4
Q 2 7
Q 1 4
Q 2 4
```

Sample Output

```
36
54
5
5
```

Explanation

- Values of Nodes after `U 5 10 2`: `[0 0 0 0 10 12 14]`.

- Values of Nodes after `U 4 5 3`: `[0 0 0 5 10 12 14]`.

- Sum of the Nodes from 1 to 7: 0 + 0 + 10 + 12 + 14 = 36.

- Values of Nodes after `U 6 7 4`: [0 0 0 5 10 19 25].

- Sum of the Nodes from 2 to 7: 0 + 10 + 19 + 25 = 54.

- Sum of the Nodes from 1 to 4: 0 + 0 + 5 = 5.

- Sum of the Nodes from 2 to 4: 0 + 5 = 5.

f   ⦁   in

Submissions:199

Max Score:150
Difficulty: Hard

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More

Current Buffer (saved locally, editable)   ⑂ ⟳   Java 7 ⌄   ⤢ ⚙

```java
1  import java.io.*;
2  import java.util.*;
3  import java.text.*;
4  import java.math.*;
5  import java.util.regex.*;
6
7  public class Solution {
8
9      public static void main(String[] args) {
10         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11     }
12 }
```

Line: 1 Col: 1

⬆ Upload Code as File   ☐ Test against custom input   Run Code   Submit Code

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