608. Tree Node

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SQL Schema ›

Table: `Tree`

```
+-------------+------+
| Column Name | Type |
+-------------+------+
| id          | int  |
| p_id        | int  |
+-------------+------+
id is the primary key column for this table.
Each row of this table contains information about the id of a node and the id of
its parent node in a tree.
The given structure is always a valid tree.
```

Each node in the tree can be one of three types:

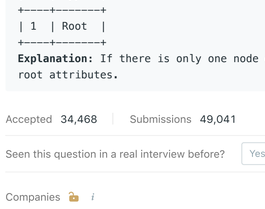
- **"Leaf"**: if the node is a leaf node.
- **"Root"**: if the node is the root of the tree.
- **"Inner"**: If the node is neither a leaf node nor a root node.

Write an SQL query to report the type of each node in the tree.

Return the result table **ordered** by `id` **in ascending order**.

The query result format is in the following example.

Example 1:




```
Input:
Tree table:
+----+------+
| id | p_id |
+----+------+
| 1  | null |
| 2  | 1    |
| 3  | 1    |
| 4  | 2    |
| 5  | 2    |
+----+------+
Output:
+----+-------+
| id | type  |
+----+-------+
| 1  | Root  |
| 2  | Inner |
| 3  | Leaf  |
| 4  | Leaf  |
| 5  | Leaf  |
+----+-------+
Explanation:
Node 1 is the root node because its parent node is null and it has child nodes 2
and 3.
Node 2 is an inner node because it has parent node 1 and child node 4 and 5.
Nodes 3, 4, and 5 are leaf nodes because they have parent nodes and they do not
have child nodes.
```

Example 2:


```
Input:
Tree table:
+----+------+
| id | p_id |
+----+------+
| 1  | null |
+----+------+
Output:
+----+-------+
| id | type  |
+----+-------+
| 1  | Root  |
+----+-------+
Explanation: If there is only one node on the tree, you only need to output its
root attributes.
```

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You can judge the node type by querying whether the node's id shows up in p_id column and whether the node's p_id is null.

```sql
# Write your MySQL query statement below
SELECT
    atree.id,
    IF(ISNULL(atree.p_id),
        'Root',
        IF(atree.id IN (SELECT p_id FROM tree), 'Inner','Leaf')) Type
FROM
    tree atree
ORDER BY atree.id
```