login to PC²click once on the Name b
which is teamxxxxxxxx, where
the TAB key or click on the P
same as your login na
Login button. Th

[redacted]

Reminder:

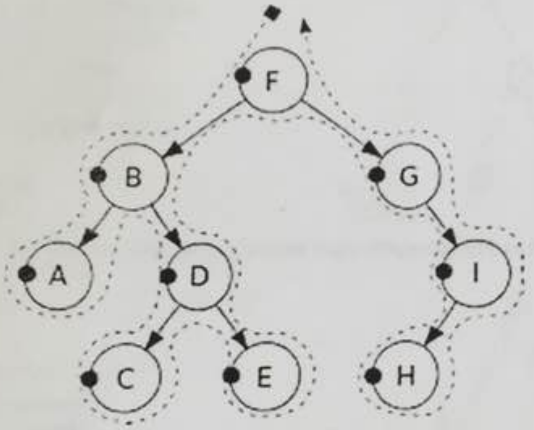
When submitting your solution to the lab system, make sure there is no package statement at the top of your .java file as this will result in a grade of 0 (restriction of this system).

Family Tree Relationship (Advanced Problem)

Problem Statement:

A family tree is a chart representing family relationships in a conventional hierarchical tree structure with nodes and branches connecting to other nodes. Family trees are often presented with the oldest generations at the top and the newer generations at the bottom.

Family tree can have many relations. Given the family tree and a relation among two family members you need to write a program to print whether the relation is true or false, and nodes traversed in a pre-order.



Pre-order: F, B, A, D, C, E, G, I, H.

Pre-order traversal is defined as follows:

1. Check if the current node is empty / null.
2. If not null display the data part of the root (or current node).
3. Traverse the left subtree by recursively calling the pre-order function.
4. Traverse the right subtree by recursively calling the pre-order function.

heap

Definitions:

1. **Parent:** Node B is parent of A, if B and A are directly connected and A is exactly one level below B in the family tree. Node A is **child** of Node B.
2. **Sibling:** Siblings are members that have the same immediate parent.
3. **Descendant:** Node A is a descendant of Node B, if A is connected to B either directly or through any other node but is at least one level below B in the family tree.
4. **Ancestor:** Node B is an ancestor of Node A, if B is connected to A either directly or through any other node but is at least one level above A in the family tree.

Input Specification:

1. The first line contains an integer n (0 < n < 100) followed by 'n' data sets.
2. Each data set consists of two strings, separated by space. The first string indicates the parent of the second string. Each string in the data set won't exceed more than 25 characters. Strings are NOT case sensitive.
3. An integer m (0 < m < 100) indicating number of relations for the family.
4. The following 'm' lines describe the relation in the family (**child, parent, sibling, ancestor, descendant**).

Assumptions:

1. No name appears more than once in the family tree.
2. Each parent can have at most 2 children. ✓
3. If a person has only one child then the child will be the left child of that node in the family tree.
4. The first string in the data set will be the root element.
5. Except for the root, nodes can only be added to the tree if the parent is already present in the tree.

Output Specification:

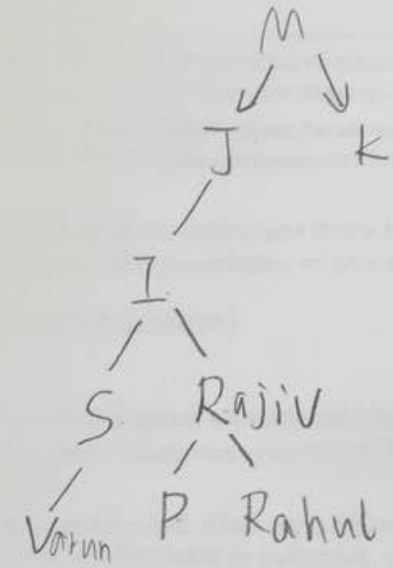
1. For each relation in the data set, your program should output T or F indicating whether the relation is true or false respectively. There should be no space at the beginning of any line and there should be a single space between relations. The output should be terminated by a new line character without any space before it.
2. Any relation with names not appearing in the family tree should result in F.
3. Print the preorder traversal of the tree on the next line with a single space separating each name.
4. The output should be terminated by a new line character without any space before it.

...once on the **Name** box on the login screen, enter your login
...amXXXXXXXX, where XXXXXXXX is the 8 digits of your
the TAB key or click on the **Password** box, to enter your passw...
same as your login name. After entering your login name
Login button. The **Main Menu** screen will appear.

Sample Input Output:

Input A:

```
8
Motilal Jawahar
Jawahar Indira
Motilal Kamala
Indira Sanjay
Sanjay Varun
Indira Rajiv
Rajiv Priyanka
Rajiv Rahul
6
Motilal child Jawahar
Varun descendant Indira
Priyanka sibling Varun
Sanjay child Indira
Sanjay ancestor Varun
Kamala ancestor Rahul
```



Lin

Hash Set
Tree Set

linkedlist
Array list

Linkedlist

Heap

key

~~链表~~

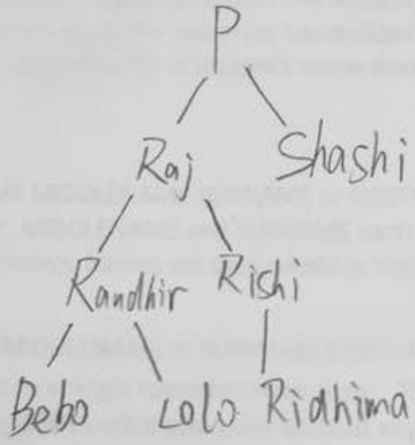
Linkedlist

Output A:

```
F T F T T F
Motilal Jawahar Indira Sanjay Varun Rajiv Priyanka Rahul Kamala
```

Input B:

```
9
Prithviraj Raj
Shashi Sanjana
Prithviraj Shashi
Raj Randhir
Rishi Ranveer
Randhir Bebo
Randhir Lolo
Raj Rishi
Rishi Ridhima
7
Bebo descendant Shashi
Raj sibling Shashi
Prithviraj ancestor Ridhima
Lolo sibling Ridhima
Bebo ancestor Shashi
Prithviraj ancestor Raj
Rishi descendant Raj
```



Output B:

```
F T T F F T T
Prithviraj Raj Randhir Bebo Lolo Rishi Ridhima Shashi
```

Note: There are 8 test cases named A to H for this problem. The first two, A and B are revealed to you above. You submit your program for each test case separately, as Problem 2 (A), Problem 2 (B), ..., Problem 2 (H). If your pr succeeds for all 8 cases, you have succeeded in solving this programming question.