Check if two Nodes are Cousins

Submissions: 112044 (/problems/submissions-for-check-if-two-nodes-are-cousins/7006B4) Accuracy: 42.37%
Difficulty: Easy (https://practice.geeksforgeeks.org/Easy/1/0/) Marks: 2

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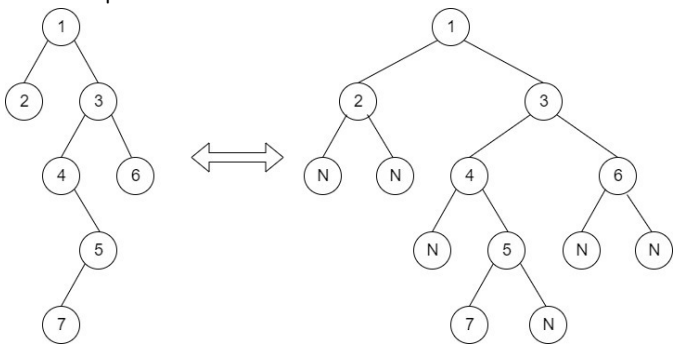
Problems

Given the binary Tree of and two-node values. Check whether the two-node values are cousins of each other or not.

Input:
The first line of input contains the number of test cases **T**. For each test case, there will be two lines of input, First input is a string representing the tree as described below and the second line contains two space-separated integers denoting node values:

1. The values in the string are in the order of **level order** traversal of the tree where, numbers denote node values, and a character “N” denotes **NULL** child.
2. For example:



For the above tree, the string will be: 1 2 3 N N 4 6 N 5 N N 7 N

Output:
Single line output, print "1" if they are cousins else "0".
Your Task:
You don't need to read input or print anything. Your task is to complete the function **isCousins()** that takes

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the root node of the tree (having all nodes distinct), and two integers 'a' and 'b' as inputs. It returns true if the nodes with given values 'a' and 'b' are Cousins of each other and returns false otherwise.
Two nodes value are cousins of each other if they are at the same level and have different parents.

Expected Time Complexity: O(N).
Expected Auxiliary Space: O(Height of the Tree).

Constraints:
1<=T<=1000
1<=N<=1000

Example:
Input:
2
1 2 3
2 3
1 2 3 5 N N 4
4 5
Output:
0
1

Explanation:
Test Case 1: The given Tree is:

```
   1
  /  \
 2    3
```

Here, nodes 2 and 3 have the same parent node. Thus, they are not cousins of each other.
Test Case 2: The given Tree is:

```
      1
    /   \
   2     3
  /       \
 5         4
```

Here, nodes 5 and 4 are at the same level and have different parent nodes. Hence, they both are cousins.
Note: The **Input/Ouput** format and **Example** given are used for system's internal purpose, and should be used by a user for **Expected Output** only. As it is a function problem, hence a user should not read any input from stdin/console. The task is to complete the function specified, and not to write the full code.

** For More Input/Output Examples Use 'Expected Output' option **

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Author: saksham seth (https://auth.geeksforgeeks.org/user/saksham seth/practice/)

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Monokai C++ (g++ 5.4)

```
120  int isBrother(Node *root,int a,int b)
121  {
122      if(!root)
123      return 0;
124      if(root->left&&root->right)
125      return ((root->left->data==a &&root->right->data==b)||
126      (root->left->data==b &&root->right->data==a)||
127      (isBrother(root->left,a,b))||(isBrother(root->right,a,b)));
128  }
129
130  int level(Node *root,int a,int l)
131  {
132      if(!root)
133      return 0;
134
135      if(root->data==a)
136      return l;
137
138      int x = level(root->left,a,l+1);
139      if(x!=0)
140      return x;
141
142      return level(root->right,a,l+1);
143  }
```

Test against custom input

Expected Outcome | See Hints | Compile & Test | Submit

Correct Answer.
Execution Time:0.28

Next Suggested Problem: Leaf at same level (/problems/leaf-at-same-level/1/)

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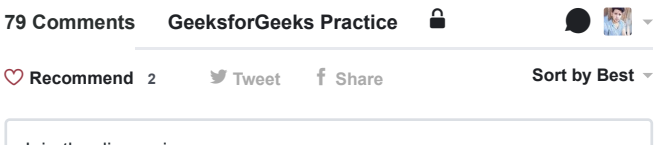

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Join the discussion…

Ankit Jain • 2 years ago

The code from the editorial itself doesn't work with the above problem.

@saksham raj seth Kindly check the editorial, for mistakes if any.

Also my approach which was similar to the editorial doesn't produce the right output.

17 ▲ | ▼ • Reply • Share ›

shiwang ➚ Ankit Jain • 2 years ago

You have to compare the values of a&b instead of comparing the pointers. a and b are not present in the tree. You have to check nodes with those values of a and b are cousins or not.

6 ▲ | ▼ • Reply • Share ›

Biswajit Pramanik ➚ shiwang • 2 years ago

told u they remain high most of the time

9 ▲ | ▼ • Reply • Share ›

Dev Dixit ➚ Biswajit Pramanik • 2 years ago

well, that's true.

▲ | ▼ • Reply • Share ›

Bhaskar Kumar Das ➚ Ankit Jain • 25 days ago

stop copy pasting the code...just understand the logic and try on your own
In interviews you will hardly get the same problems, problems will be lot twisted.
this poblem can be easily solved by comparing the values instead of pointers
here's my solution
https://ide.geeksforgeeks.o...

▲ | ▼ • Reply • Share ›

Quandray • 3 years ago

Clarification (or my understanding of the problem)

It says "Given the binary Tree and the two nodes say ‘a’ and ‘b’, determine whether the two nodes are cousins of each other or not."

The parameters to the function are a pointer to the root of the tree and pointers to a & b.

However, the pointers to a & b, point at nodes which are not part of the tree

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part of the tree.

It doesn't want to know if node a and b are cousins. They can't be, as they are not in the tree.

It wants to know if the node in the tree with the data value equal to node a, is a cousin of the node in the tree with a data value equal to node b.

15 | • Reply • Share ›

Akash Jain ➚ Quandray • 10 months ago

@geeksforgeeks add this background song while framing questions..

5 | • Reply • Share ›

vik007 ➚ Quandray • 2 years ago

Thank u for your clarification

| • Reply • Share ›

saksham raj seth ➚ Quandray • 3 years ago • edited

Yeah, thanks corrected the problem statement

| • Reply • Share ›

Dev Dixit ➚ saksham raj seth • 2 years ago

You should pass integers in the function problem, not nodes. I mean who passes integers after making nodes of the same. That's confusing + senseless.

1 | • Reply • Share ›

Ritik Sunita Jain • 7 months ago

iterative with queue

7 | • Reply • Share ›

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manthan fursule ➚ Ritik Sunita Jain • 7 months ago

How does this code assure that both the cousin nodes wont be on same level? Because even if nodes are at different level count will become 2 as nodes are found...but by definition those 2 nodes wont be siblings...

3 ^ | v • Reply • Share ›

Ritik Sunita Jain ➚ manthan fursule • 7 months ago

temp contains nodes of same level. therefore child node of temps will always be on same level. its a level order traversal where on every level i check the child of that level

3 ^ | v • Reply • Share ›

Akash kumar ➚ Ritik Sunita Jain • 5 months ago

bro its showing seg fault

2 ^ | v • Reply • Share ›

Ritik Sunita Jain ➚ Akash kumar • 5 months ago

running fine on my side bro

^ | v • Reply • Share ›

Akash kumar ➚ Ritik Sunita Jain • 5 months ago

written the exact code

1 ^ | v • Reply • Share ›

Ritik Sunita Jain ➚ Akash kumar • 5 months ago

```
#include <queue>

bool isCousins(Node *root, int x, int y){
queue<node*> q;
Node *temp = nullptr;
int size, count;
```

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```
q.push(root);
while(!q.empty()){
count = 0;
size = q.size();
while(size--){
temp = q.front();
q.pop();
if(temp->left && (temp->left->data == x ||
temp->left->data == y))
count++;
else if(temp->right && (temp->right->data
```

see more

• Reply • Share ›

Akash kumar ➚ Ritik Sunita Jain
• 5 months ago

got it thankzz

2 • Reply • Share ›

Prateek Dubey ➚ Ritik Sunita Jain
• a month ago

how your code assure that values are from different parents ?

1 • Reply • Share ›

Kritagya Chaturvedi ➚ Prateek Dubey
• 13 days ago

In the code "else if" statement is used.Hence same parent will not be checked while checking for cousins.

• Reply • Share ›

Biswajit Pramanik • 2 years ago

gfg admins stay high most of the time,another problem to prove that...

7 • Reply • Share ›

Bharath V • 2 years ago

Good One!

6 • Reply • Share ›

bhaskar kumar • 2 years ago • edited

Attentions:-
Read this statement carefully :- "determine whether the two node VALUES are cousins of each other or not."
So compare "VALUES" not "nodes" on seeing nodes as parameters...
Happy Coding..

2 • Reply • Share ›

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Abhishek Jain ➚ bhaskar kumar • a year ago
thanks veere
^ | v • Reply • Share ›

Aritro Banerjee ➚ bhaskar kumar • a year ago
ok bhai
^ | v • Reply • Share ›

Jordan • 2 years ago
Here is Solution which is similar to Editorial
https://ide.geeksforgeeks.o...
2 ^ | v • Reply • Share ›

ferb ➚ Jordan • 7 months ago
very neat and clean.
^ | v • Reply • Share ›

Sundram Sharan • a month ago • edited
Wrong test cases!!
I don't know why i am unable to upload the pic(I am logged in).
Plz see into it.
288 834 180 376 275 971 600 6 787 664 389 786 418 178 216
65 30 708 879 202 309 738 964 105 690 626 257 149 5 497
800 869 417 453 311 931 473 466 575 814 547 889 929 144
678 982 822 518 449 986 240 445 238 101 531 978 782 203
524 67 602 131 112 336 381 256 732 876 646 44 687 209 736
642 447 884 526 851 540 1000 163 988 968 49 577 890 943
672 726 428 75 19 297 807 861 659 912 40 397 997 965 60
409 756 661 306 368 388 924 587 188 278 26 759 154 956 840
635 618 962 820 920 206 830 366 717 21 377 225 270 767 700
713 641 615 519 198 944 505 926 993 970 328 422 715 905
427 648 551 143 166 126 776 763 550 436 352 589 382 190
475 241 411 276 387 426 303 874 597 564 698 392 114 156
923 116 689 446 628 863 779 727 484 88 958 293 523 980 23
12 706 253 598 271 265 359 511 735 93 612 742 84 391 123
887 893 576 413 393 371 27 696 546 219 627 640 520 647 301
334 233 174 204 177 314 555 621 421 14 720 251 483 197 76
471 892 80 867 115 723 872 725 844 71 29 1006 583 953 788
938 429 435 420 4 255 242 61.....
No node value specified for checking
1 ^ | v • Reply • Share ›

Aman Jain • 4 months ago
bool isCousins(Node *root, int x, int y)
{int cousin1=0,cousin2=0;
Node *parent1,*parent;

if(!root)
return false;

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```
queue<pair<node*,int>> que;
int level =0;
map <node *,node="" *=""> m;
que.push(make_pair(root,level));

while(!que.empty())
{
pair<node*,int> temp =que.front();

que.pop();
level=temp.second;
Node *node=temp.first;
```

see more

1 ^ | v • Reply • Share ›

stay_away • 5 months ago

only recursion (java) :
https://ide.geeksforgeeks.o...

1 ^ | v • Reply • Share ›

G Vishal • 5 months ago

using level order traversal

see more

1 ^ | v • Reply • Share ›

A Fluky Warrior • a year ago

Using level order traversal!!!!

```
bool ifCousin(Node *root,Node *a,Node *b)
{
queue<node*>q;
q.push(root);
int l=1;
```

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```
int la, lb;
int para, parb;
while(!q.empty()){
int k=q.size();
while(k--){
Node* t=q.front();
q.pop();
if(t->left){
if(t->left->data==a->data){
la=l+1;
para=t->data;
```

see more

1 ^ | v • Reply • Share ›

akash Garg • a year ago

the question can be solved, but it has some problem:
The nodes passed as arguments are not actually part of the actual tree.
So, we need to check for node.data each time. we can't compare nodes. it would have been good if the parameters would also be integers except for the root.
According to the parameters passed, given a and b nodes are not even part of the same tree, so they are surely nor cousins.

1 ^ | v • Reply • Share ›

Hodor • 2 years ago

```
//Is this level determining way wrong?
int level(Node* root, Node* ptr, int lev)
{
if (!root) return 0;
if (root->data == ptr->data) return lev;
int l = level(root->left, ptr, lev+1);
if (l) return l;
return level(root->right, ptr, lev+1);
}
```

1 ^ | v • Reply • Share ›

ujjwal gupta ➚ Hodor • 2 years ago

just make sure they are not siblings

^ | v • Reply • Share ›

Pranoy Mukherjee • 7 days ago

Did with lca concept and level order traversal

```
#define pb(i) push_back(i)
Node* lca(Node* root ,int n1 ,int n2 )
{

if(!root)
return NULL;
```

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```
if(root->data==n1 || root->data==n2)
return root;
Node *l,*r;
l=lca(root->left,n1,n2);
r=lca(root->right,n1,n2);
if(l && r)
return root;
return !l?r:l;
}
bool isCousins(Node *root, int x, int y)
```

see more

Reply • Share ›

Amrit Vats • 8 days ago • edited

```
bool isCousins(Node *root, int x, int y)
{
if(!root) return 0;
queue<node *=""> q;
q.push(root);
while(!q.empty()){
int s=q.size();
int sum=0;
while(s--){

Node* temp=q.front();
if(temp->left)
q.push(temp->left);
if(temp->right)
q.push(temp->right);
if(temp->left&&temp->right){
if(temp->left->data==x&&temp->right->data==y)
```

see more

Reply • Share ›

jaydip • 21 days ago

In custom input my answer is right , but while submitting why it is showing wrong?
test case:
1
20 22 7 28 13
10 22

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Bhaskar Kumar Das • 25 days ago

simplest c++
https://ide.geeksforgeeks.o...

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Vaibhav Maurya • a month ago

level order traversal

```
bool isCousins(Node *root, int x, int y)
{
//add code here.
queue<node*> q;
q.push(root);
q.push(NULL);
int l=0,l1=0,l2=0;
while(q.size()!=1)
{
Node*front=q.front();
q.pop();
if(front==NULL)
{
l++;
q.push(NULL);
}
else
```

see more

Reply • Share ›

Ajay Kumar • a month ago

easy and simple approach Execution Time:0.31:

```
int isBrother(Node *root,int a,int b)
{
if(!root)
return 0;
if(root->left&&root->right)
return ((root->left->data==a &&root->right->data==b)||
(root->left->data==b &&root->right->data==a)||
(isBrother(root->left,a,b))||(isBrother(root->right,a,b)));
}

int level(Node *root,int a,int l)
{
if(!root)
return 0;

if(root->data==a)
return l;
```

see more

Reply • Share ›

Anant • a month ago

With O(1) extra-memory (apart from recursion)

```
void traverse(Node * root, int & parX, int & parY, int x, int y,
int &levelX,
int &levelY, int level) {
```

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```
if (root) {
if ( (root->left && root->left->data == x) ||
(root->right && root->right->data == x)) {
parX = root->data;
}

if ( (root->left && root->left->data == y) ||
(root->right && root->right->data == y)) {
parY = root->data;
}
```

see more

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Rahul Gupta • a month ago

JAVA SOLUTION

https://ide.geeksforgeeks.org/MqfvPbIg2o

Reply • Share ›

Adamya Mishra • 2 months ago

```
int issibling(Node* a,Node* b,Node* root)
{
if(root==NULL)
return 0;

return((root->left==a && root->right==b)||(root->left==b &&
root->right==a)||issibling(a,b,root->left)||issibling(a,b,root-
>right));
}


int level(Node* root,Node* ptr,int lev)
{
if(root==NULL)
return 0;

if(root==ptr)
```

see more

Reply • Share ›

immukul • 2 months ago • edited

```
public boolean isCousins(Node root, int x, int y) {
        if(root == null) return false;
        Queue<node> queue = new LinkedList<>();
        queue.offer(root);
        while(!queue.isEmpty()){
```

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```
            int size = queue.size();
            boolean isAPresent = false;
            boolean isBPresent = false;
            for(int i=0;i<size;i++){ node="" curr="queue.poll(
This code works fine on leetcode, what am I missing or is the
```

• Reply • Share ›

vikram • 2 months ago

Why this one is giving wrong answer for one of the testcase can any one help?

```
class Solution {

// Function to complete
public boolean isCousins(Node root, int x, int y) {
if(root==null) return false;
return height(root,x,1)==height(root,y,1) && !subling(root,x,y);
}
private int height(Node root,int x,int height){
if(root==null)return 0;
if(root.data==x)return height;
int l= height(root.left,x,height+1);
if(l!=0)
return l;
return height(root.right,x,height+1);

}
```

see more

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Bicky • 2 months ago

simple cpp soln 0.2 s using level Order traversal

https://ide.geeksforgeeks.o...

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Meikandanathan Pandian • 2 months ago

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