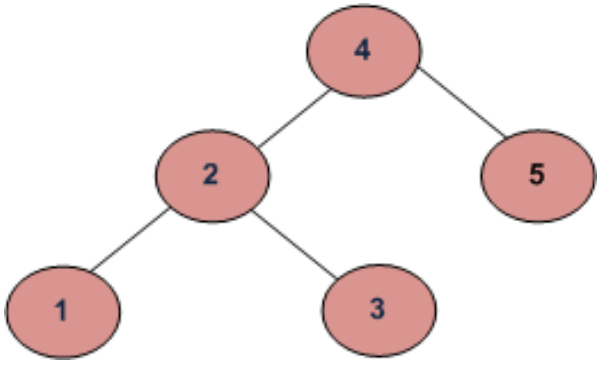
Sorted order printing of a given array that represents a BST

Given an array that stores a complete Binary Search Tree, write a function that efficiently prints the given array in ascending order.

For example, given an array [4, 2, 5, 1, 3], the function should print 1, 2, 3, 4, 5

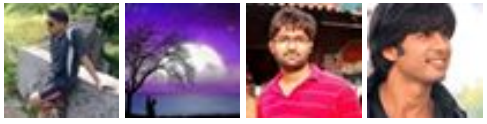


Solution:
Inorder traversal of BST prints it in ascending order. The only trick is to modify recursion termination condition in standard Inorder Tree Traversal.

Implementation:

```
#include<stdio.h>

void printSorted(int arr[], int start, int end)
{
  if(start > end)
    return;
```

```
  // print left subtree
  printSorted(arr, start*2 + 1, end);

  // print root
  printf("%d  ", arr[start]);

  // print right subtree
  printSorted(arr, start*2 + 2, end);
}

int main()
{
  int arr[] = {4, 2, 5, 1, 3};
  int arr_size = sizeof(arr)/sizeof(int);
  printSorted(arr, 0, arr_size-1);
  getchar();
  return 0;
}
```

Time Complexity: O(n)

Please write comments if you find the above solution incorrect, or find better ways to solve the same problem.

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simple_mind • 6 months ago

The above solution doesn't work for the input ={4, 2, 5, 3, 6}

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Babaji simple_mind • 2 months ago

Cause an array can only represent a complete binary tree as most noc
right (2i + 2) child.

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Karan Verma • 9 months ago

This is only applicable when the array is actually a level order traversal of the t

Karan Verma • 9 months ago

This is only applicable when the array is actually a level order traversal of the t

sonali gupta • 10 months ago

```
#include<stdio.h>
#include<conio.h>
void printSorted(int arr[],int root, int size)
{if(root<=size)
{
printSorted(arr,2*root+1,size);
printf("%d ",arr[root]);
printSorted(arr,2*root+2,size);}

}
int main()
{
int arr[] = {4, 2, 5, 1, 3};
int arr_size = sizeof(arr)/sizeof(int);
printSorted(arr, 0, arr_size-1);
getchar();
return 0;
}
```


abhishek08aug • a year ago

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affiszerv Your example has two 4s on row 3, that's why it...

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Neha I think that is what it should return as, in...

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a
\
b

[a, NULL, b]

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Purushotham • a year ago

In the above code, it is implemented that children of the node 'n' will be stored considering the case how to derive the parent when index of child is given.

for (2n+1)/2 gives n
but (2n+2)/2 gives n+1. Both the children nodes are giving different parent indi

Hence the correct approach is leave the '0' index null. Put the root at 1. And ch

```
/* Paste your code here (You may delete these lines if not writing co
```

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syang • a year ago

```
static void inorder(int[] a, int idx) {

        if (idx >= a.length) return;

        inorder(a, 2*idx+1);
        System.out.print(a[idx] + " ");
        inorder(a, 2*idx+2);
}

public static void main(String[] args) {
```

```
        int[] a = {4, 2, 5, 1, 3};

        inorder(a, 0);
        System.out.println();
    }
```

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neelverma • 2 years ago

Can't we directly sort this array by using merge sort or quick sort? I mean both same thing

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kartik ➚ neelverma • 2 years ago

Direct sorting is definitely an option. The time complexity of sorting will given above takes O(n) time. So the given solution is more efficient.

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shiv • 2 years ago

can anyone tell me wats d logic behind this implementation?????

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Ashu ➚ shiv • 2 years ago

if we do inorder traversal of a binary search tree than we get the nodes implementation does the same. it is slightly modified version of the inor is given. Hope you got it.

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rocky • 2 years ago

```
 int n;
vector<int> arr;
```

```
void printSorted(int x) {
    if( x > n) return;
    printSorted(2*x);
    print arr[x];
    printSorted(2*x + 1);
    return;
}

int main(void) {
    cin >> n;
    int tmp;
    arr.push_back(-1) ; // dummy value.
    for (int i = 0; i < n; i++)
       cin >> tmp;
       arr.push_back(tmp);
    printSorted(1);
    return 0;
}
```

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Agniswar • 3 years ago

Then this is a great sorting algorithm..as far i am seeing we are sorting an arra
better than counting sort..Isnt it ??

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bansal ➦ Agniswar • 2 years ago

but cost of creating a BST is O(nlogn) and can be O(n^2) in worst case

```
/* Paste your code here (You may delete these lines if not wri
```

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ashish • 3 years ago

I think output will be reversed printed..

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GeeksforGeeks ashish • 3 years ago

@ashish: The above program prints the output in ascending order only

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anomynous • 3 years ago

i think in order traversal is the answer if we consider the node of tree to be

int data;
node *left,*right;

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bala • 3 years ago

What if the array of interest starts from index other than "0"(Zero) ? Something the array starts only from index 4.

I am not sure if such a condition will arise. Will it ?

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Akp • 3 years ago

Is the array here zero based or 1 based array (index) ?

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GeeksforGeeks Akp • 3 years ago

Array indexes start from 0. For array arr[] = {4, 2, 5, 1, 3}, arr[0] = 4, arı

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gunjan • 3 years ago

Tree:

```
  5
/   \
4   6
/
2
/
1
```

Array:[5,4,6,2,1]
But it is not giving correct result
is input array represents BST?

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Nikhil gunjan • 3 years ago

that tree will be represented as:
Array: [5 4 6 2 0 0 0 1]

0 is for nodes with no value. And u can make a check in algo to print or
answer then.

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GeeksforGeeks gunjan • 3 years ago

@gunjan: The given solution works only for Complete Binary Search T
every level, except possibly the last, is completely filled, and all nodes a
http://en.wikipedia.org/wiki/B...

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rahul GeeksforGeeks • a year ago

So we can apply the same method for the question like "constr
level order traversal"..correct me if i m wrong

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Sandeep ➦ GeeksforGeeks • 3 years ago

It would be good if we can add these kind of conditions in/after

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