

Problem 199: Binary Tree Right Side View

Problem Information

Difficulty: Medium

Acceptance Rate: 0.00%

Paid Only: No

Problem Description

Given the

root

of a binary tree, imagine yourself standing on the

right side

of it, return

the values of the nodes you can see ordered from top to bottom

Example 1:

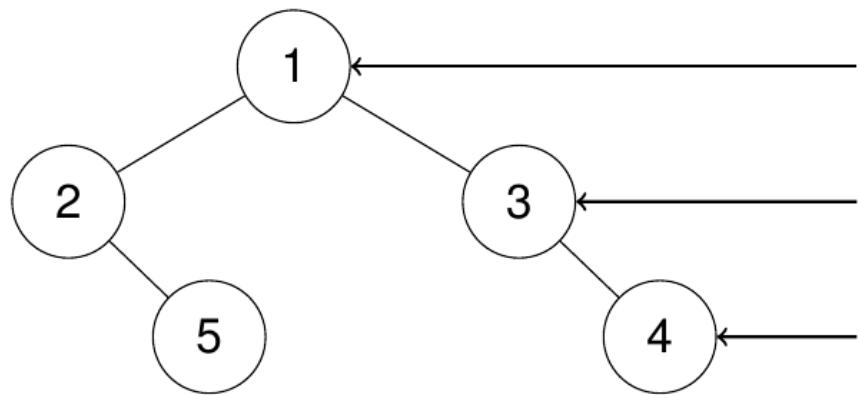
Input:

root = [1,2,3,null,5,null,4]

Output:

[1,3,4]

Explanation:



Example 2:

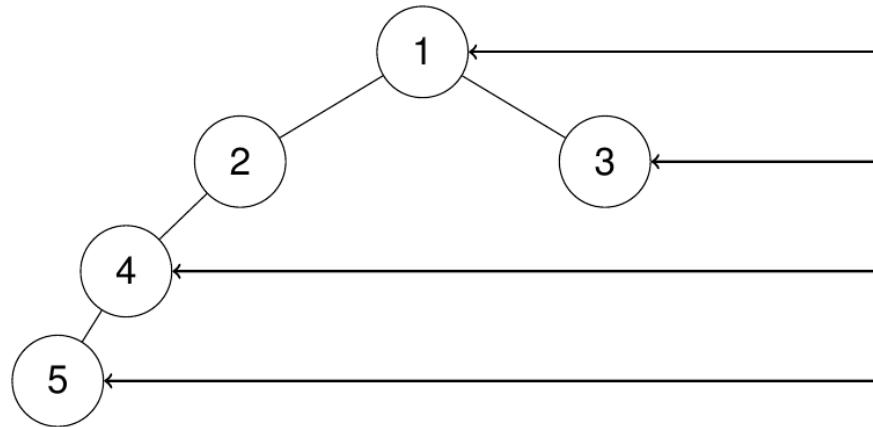
Input:

```
root = [1,2,3,4,null,null,null,5]
```

Output:

```
[1,3,4,5]
```

Explanation:



Example 3:

Input:

root = [1,null,3]

Output:

[1,3]

Example 4:

Input:

root = []

Output:

[]

Constraints:

The number of nodes in the tree is in the range

[0, 100]

-100 <= Node.val <= 100

Code Snippets

C++:

```
/*
 * Definition for a binary tree node.
 * struct TreeNode {
 *     int val;
 *     TreeNode *left;
 *     TreeNode *right;
 *     TreeNode() : val(0), left(nullptr), right(nullptr) {}
 *     TreeNode(int x) : val(x), left(nullptr), right(nullptr) {}
 *     TreeNode(int x, TreeNode *left, TreeNode *right) : val(x), left(left),
 *
```

```

    right(right) {}
* };
*/
class Solution {
public:
vector<int> rightSideView(TreeNode* root) {

}
};


```

Java:

```

/**
 * Definition for a binary tree node.
 * public class TreeNode {
 * int val;
 * TreeNode left;
 * TreeNode right;
 * TreeNode() {}
 * TreeNode(int val) { this.val = val; }
 * TreeNode(int val, TreeNode left, TreeNode right) {
 * this.val = val;
 * this.left = left;
 * this.right = right;
 * }
 * }
 */
class Solution {
public List<Integer> rightSideView(TreeNode root) {

}
}


```

Python3:

```

# Definition for a binary tree node.
# class TreeNode:
#     def __init__(self, val=0, left=None, right=None):
#         self.val = val
#         self.left = left
#         self.right = right
class Solution:

    def rightSideView(self, root: Optional[TreeNode]) -> List[int]:

```

Python:

```
# Definition for a binary tree node.
# class TreeNode(object):
#     def __init__(self, val=0, left=None, right=None):
#         self.val = val
#         self.left = left
#         self.right = right
class Solution(object):
    def rightSideView(self, root):
        """
:type root: Optional[TreeNode]
:rtype: List[int]
"""

```

JavaScript:

```
/**
 * Definition for a binary tree node.
 * function TreeNode(val, left, right) {
 *     this.val = (val===undefined ? 0 : val)
 *     this.left = (left===undefined ? null : left)
 *     this.right = (right===undefined ? null : right)
 * }
 */
/**
 * @param {TreeNode} root
 * @return {number[]}
 */
var rightSideView = function(root) {

};


```

TypeScript:

```
/**
 * Definition for a binary tree node.
 * class TreeNode {
 *     val: number
 *     left: TreeNode | null
 *     right: TreeNode | null
 *     constructor(val?: number, left?: TreeNode | null, right?: TreeNode | null) {

```

```

* this.val = (val==undefined ? 0 : val)
* this.left = (left==undefined ? null : left)
* this.right = (right==undefined ? null : right)
* }
* }
*/
function rightSideView(root: TreeNode | null): number[] {
}

```

C#:

```

/**
* Definition for a binary tree node.
* public class TreeNode {
*     public int val;
*     public TreeNode left;
*     public TreeNode right;
*     public TreeNode(int val=0, TreeNode left=null, TreeNode right=null) {
*         this.val = val;
*         this.left = left;
*         this.right = right;
*     }
* }
*/
public class Solution {
    public IList<int> RightSideView(TreeNode root) {
        }
    }
}

```

C:

```

/**
* Definition for a binary tree node.
* struct TreeNode {
*     int val;
*     struct TreeNode *left;
*     struct TreeNode *right;
* };
*/

```

```

/**
 * Note: The returned array must be malloced, assume caller calls free().
 */
int* rightSideView(struct TreeNode* root, int* returnSize) {

}

```

Go:

```

/**
 * Definition for a binary tree node.
 * type TreeNode struct {
 *     Val int
 *     Left *TreeNode
 *     Right *TreeNode
 * }
 */
func rightSideView(root *TreeNode) []int {

}

```

Kotlin:

```

/**
 * Example:
 * var ti = TreeNode(5)
 * var v = ti.`val`
 *
 * Definition for a binary tree node.
 * class TreeNode(var `val`: Int) {
 *     var left: TreeNode? = null
 *     var right: TreeNode? = null
 * }
 */
class Solution {
    fun rightSideView(root: TreeNode?): List<Int> {

    }
}

```

Swift:

```

/**
 * Definition for a binary tree node.
 * public class TreeNode {
 *     public var val: Int
 *     public var left: TreeNode?
 *     public var right: TreeNode?
 *     public init() { self.val = 0; self.left = nil; self.right = nil; }
 *     public init(_ val: Int) { self.val = val; self.left = nil; self.right = nil; }
 *     public init(_ val: Int, _ left: TreeNode?, _ right: TreeNode?) {
 *         self.val = val
 *         self.left = left
 *         self.right = right
 *     }
 * }
 */
class Solution {
    func rightSideView(_ root: TreeNode?) -> [Int] {
        }
    }
}

```

Rust:

```

// Definition for a binary tree node.
// #[derive(Debug, PartialEq, Eq)]
// pub struct TreeNode {
//     pub val: i32,
//     pub left: Option<Rc<RefCell<TreeNode>>,
//     pub right: Option<Rc<RefCell<TreeNode>>,
// }
//
// impl TreeNode {
//     #[inline]
//     pub fn new(val: i32) -> Self {
//         TreeNode {
//             val,
//             left: None,
//             right: None
//         }
//     }
// }
use std::rc::Rc;

```

```

use std::cell::RefCell;
impl Solution {
    pub fn right_side_view(root: Option<Rc<RefCell<TreeNode>>>) -> Vec<i32> {
        ...
    }
}

```

Ruby:

```

# Definition for a binary tree node.
# class TreeNode
# attr_accessor :val, :left, :right
# def initialize(val = 0, left = nil, right = nil)
#   @val = val
#   @left = left
#   @right = right
# end
# end
# @param {TreeNode} root
# @return {Integer[]}
def right_side_view(root)

end

```

PHP:

```

/**
 * Definition for a binary tree node.
 * class TreeNode {
 *     public $val = null;
 *     public $left = null;
 *     public $right = null;
 *     function __construct($val = 0, $left = null, $right = null) {
 *         $this->val = $val;
 *         $this->left = $left;
 *         $this->right = $right;
 *     }
 * }
 */
class Solution {

/**

```

```

* @param TreeNode $root
* @return Integer[]
*/
function rightSideView($root) {

}
}

```

Dart:

```

/**
 * Definition for a binary tree node.
 * class TreeNode {
 * int val;
 * TreeNode? left;
 * TreeNode? right;
 * TreeNode([this.val = 0, this.left, this.right]);
 * }
 */
class Solution {
List<int> rightSideView(TreeNode? root) {

}
}

```

Scala:

```

/**
 * Definition for a binary tree node.
 * class TreeNode(_value: Int = 0, _left: TreeNode = null, _right: TreeNode =
null) {
 * var value: Int = _value
 * var left: TreeNode = _left
 * var right: TreeNode = _right
 * }
 */
object Solution {
def rightSideView(root: TreeNode): List[Int] = {

}
}

```

Elixir:

```
# Definition for a binary tree node.  
#  
# defmodule TreeNode do  
#   @type t :: %__MODULE__{  
#     val: integer,  
#     left: TreeNode.t() | nil,  
#     right: TreeNode.t() | nil  
#   }  
#   defstruct val: 0, left: nil, right: nil  
# end  
  
defmodule Solution do  
  @spec right_side_view(root :: TreeNode.t | nil) :: [integer]  
  def right_side_view(root) do  
  
  end  
end
```

Erlang:

```
%% Definition for a binary tree node.  
%%  
%% -record(tree_node, {val = 0 :: integer(),  
%%   left = null :: 'null' | #tree_node{},  
%%   right = null :: 'null' | #tree_node{}}).  
  
-spec right_side_view(Root :: #tree_node{} | null) -> [integer()].  
right_side_view(Root) ->  
.
```

Racket:

```
; Definition for a binary tree node.  
#|  
  
; val : integer?  
; left : (or/c tree-node? #f)  
; right : (or/c tree-node? #f)  
(struct tree-node  
  (val left right) #:mutable #:transparent)
```

```

; constructor
(define (make-tree-node [val 0])
  (tree-node val #f #f))

|#

(define/contract (right-side-view root)
  (-> (or/c tree-node? #f) (listof exact-integer?)))
)

```

Solutions

C++ Solution:

```

/*
 * Problem: Binary Tree Right Side View
 * Difficulty: Medium
 * Tags: tree, search
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
 * Space Complexity: O(h) for recursion stack where h is height
 */

/**
 * Definition for a binary tree node.
 */
struct TreeNode {
    int val;
    TreeNode *left;
    TreeNode *right;
    TreeNode() : val(0), left(nullptr), right(nullptr) {}
    TreeNode(int x) : val(x), left(nullptr), right(nullptr) {}
    TreeNode(int x, TreeNode *left, TreeNode *right) : val(x), left(left),
        right(right) {}
};

class Solution {
public:
    vector<int> rightSideView(TreeNode* root) {

```

```
}
```

```
};
```

Java Solution:

```
/**  
 * Problem: Binary Tree Right Side View  
 * Difficulty: Medium  
 * Tags: tree, search  
 *  
 * Approach: DFS or BFS traversal  
 * Time Complexity: O(n) where n is number of nodes  
 * Space Complexity: O(h) for recursion stack where h is height  
 */  
  
/**  
 * Definition for a binary tree node.  
 *  
 * public class TreeNode {  
 *     int val;  
 *     TreeNode left;  
 *     TreeNode right;  
 *     TreeNode() {}  
 *     TreeNode(int val) { this.val = val; }  
 *     TreeNode(int val, TreeNode left, TreeNode right) {  
 *         this.val = val;  
 *         this.left = left;  
 *         this.right = right;  
 *     }  
 * }  
 */  
  
class Solution {  
    public List<Integer> rightSideView(TreeNode root) {  
  
    }  
}
```

Python3 Solution:

```
"""  
Problem: Binary Tree Right Side View  
Difficulty: Medium
```

```
Tags: tree, search
```

```
Approach: DFS or BFS traversal
Time Complexity: O(n) where n is number of nodes
Space Complexity: O(h) for recursion stack where h is height
"""

# Definition for a binary tree node.
# class TreeNode:
#     def __init__(self, val=0, left=None, right=None):
#         self.val = val
#         self.left = left
#         self.right = right
class Solution:
    def rightSideView(self, root: Optional[TreeNode]) -> List[int]:
        # TODO: Implement optimized solution
        pass
```

Python Solution:

```
# Definition for a binary tree node.
# class TreeNode(object):
#     def __init__(self, val=0, left=None, right=None):
#         self.val = val
#         self.left = left
#         self.right = right
class Solution(object):
    def rightSideView(self, root):
        """
:type root: Optional[TreeNode]
:rtype: List[int]
"""


```

JavaScript Solution:

```
/**
 * Problem: Binary Tree Right Side View
 * Difficulty: Medium
 * Tags: tree, search
 *
 * Approach: DFS or BFS traversal

```

```

* Time Complexity: O(n) where n is number of nodes
* Space Complexity: O(h) for recursion stack where h is height
*/

```

```

/**
 * Definition for a binary tree node.
 * function TreeNode(val, left, right) {
 *   this.val = (val===undefined ? 0 : val)
 *   this.left = (left===undefined ? null : left)
 *   this.right = (right===undefined ? null : right)
 * }
*/

```

```

/**
 * @param {TreeNode} root
 * @return {number[]}
 */

```

```

var rightSideView = function(root) {
}

```

TypeScript Solution:

```

/**
 * Problem: Binary Tree Right Side View
 * Difficulty: Medium
 * Tags: tree, search
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
 * Space Complexity: O(h) for recursion stack where h is height
*/

```

```

/**
 * Definition for a binary tree node.
 * class TreeNode {
 *   val: number
 *   left: TreeNode | null
 *   right: TreeNode | null
 *   constructor(val?: number, left?: TreeNode | null, right?: TreeNode | null) {
 *     this.val = (val===undefined ? 0 : val)
 *   }
 * }

```

```

        * this.left = (left === undefined ? null : left)
        * this.right = (right === undefined ? null : right)
        *
        *
    */

function rightSideView(root: TreeNode | null): number[] {
}

```

C# Solution:

```

/*
 * Problem: Binary Tree Right Side View
 * Difficulty: Medium
 * Tags: tree, search
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
 * Space Complexity: O(h) for recursion stack where h is height
 */

/**
 * Definition for a binary tree node.
 * public class TreeNode {
 *     public int val;
 *     public TreeNode left;
 *     public TreeNode right;
 *     public TreeNode(int val=0, TreeNode left=null, TreeNode right=null) {
 *         this.val = val;
 *         this.left = left;
 *         this.right = right;
 *     }
 * }
 *
 * public class Solution {
 *     public IList<int> RightSideView(TreeNode root) {
 *
 *     }
 * }

```

C Solution:

```
/*
 * Problem: Binary Tree Right Side View
 * Difficulty: Medium
 * Tags: tree, search
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
 * Space Complexity: O(h) for recursion stack where h is height
 */

/**
 * Definition for a binary tree node.
 * struct TreeNode {
 *     int val;
 *     struct TreeNode *left;
 *     struct TreeNode *right;
 * };
 */
/**
 * Note: The returned array must be malloced, assume caller calls free().
 */
int* rightSideView(struct TreeNode* root, int* returnSize) {

}
```

Go Solution:

```
// Problem: Binary Tree Right Side View
// Difficulty: Medium
// Tags: tree, search
//
// Approach: DFS or BFS traversal
// Time Complexity: O(n) where n is number of nodes
// Space Complexity: O(h) for recursion stack where h is height

/**
 * Definition for a binary tree node.
 * type TreeNode struct {
 *     Val int
 *     Left *TreeNode
 *     Right *TreeNode
 }
```

```

* }
*/
func rightSideView(root *TreeNode) []int {
}

```

Kotlin Solution:

```

/**
 * Example:
 * var ti = TreeNode(5)
 * var v = ti.`val`
 * Definition for a binary tree node.
 * class TreeNode(var `val`: Int) {
 *     var left: TreeNode? = null
 *     var right: TreeNode? = null
 * }
 */
class Solution {
    fun rightSideView(root: TreeNode?): List<Int> {
        }
    }
}

```

Swift Solution:

```

/**
 * Definition for a binary tree node.
 * public class TreeNode {
 *     public var val: Int
 *     public var left: TreeNode?
 *     public var right: TreeNode?
 *     public init() { self.val = 0; self.left = nil; self.right = nil; }
 *     public init(_ val: Int) { self.val = val; self.left = nil; self.right = nil; }
 *     public init(_ val: Int, _ left: TreeNode?, _ right: TreeNode?) {
 *         self.val = val
 *         self.left = left
 *         self.right = right
 *     }
 * }

```

```

*/
class Solution {
func rightSideView(_ root: TreeNode?) -> [Int] {

}
}

```

Rust Solution:

```

// Problem: Binary Tree Right Side View
// Difficulty: Medium
// Tags: tree, search
//
// Approach: DFS or BFS traversal
// Time Complexity: O(n) where n is number of nodes
// Space Complexity: O(h) for recursion stack where h is height

// Definition for a binary tree node.
// #[derive(Debug, PartialEq, Eq)]
// pub struct TreeNode {
// pub val: i32,
// pub left: Option<Rc<RefCell<TreeNode>>,
// pub right: Option<Rc<RefCell<TreeNode>>,
// }
//
// impl TreeNode {
// #[inline]
// pub fn new(val: i32) -> Self {
// TreeNode {
// val,
// left: None,
// right: None
// }
// }
// }

use std::rc::Rc;
use std::cell::RefCell;
impl Solution {
pub fn right_side_view(root: Option<Rc<RefCell<TreeNode>>>) -> Vec<i32> {
}
}
```

```
}
```

Ruby Solution:

```
# Definition for a binary tree node.
# class TreeNode
# attr_accessor :val, :left, :right
# def initialize(val = 0, left = nil, right = nil)
#   @val = val
#   @left = left
#   @right = right
# end
# end

# @param {TreeNode} root
# @return {Integer[]}
def right_side_view(root)

end
```

PHP Solution:

```
/**
 * Definition for a binary tree node.
 * class TreeNode {
 *     public $val = null;
 *     public $left = null;
 *     public $right = null;
 *     function __construct($val = 0, $left = null, $right = null) {
 *         $this->val = $val;
 *         $this->left = $left;
 *         $this->right = $right;
 *     }
 * }
 */
class Solution {

/**
 * @param TreeNode $root
 * @return Integer[]
 */
function rightSideView($root) {
```

```
}
```

```
}
```

Dart Solution:

```
/**  
 * Definition for a binary tree node.  
 * class TreeNode {  
 * int val;  
 * TreeNode? left;  
 * TreeNode? right;  
 * TreeNode([this.val = 0, this.left, this.right]);  
 * }  
 */  
class Solution {  
List<int> rightSideView(TreeNode? root) {  
  
}  
}
```

Scala Solution:

```
/**  
 * Definition for a binary tree node.  
 * class TreeNode(_value: Int = 0, _left: TreeNode = null, _right: TreeNode =  
 * null) {  
 * var value: Int = _value  
 * var left: TreeNode = _left  
 * var right: TreeNode = _right  
 * }  
 */  
object Solution {  
def rightSideView(root: TreeNode): List[Int] = {  
  
}  
}
```

Elixir Solution:

```

# Definition for a binary tree node.

#
# defmodule TreeNode do
# @type t :: %__MODULE__{
#   val: integer,
#   left: TreeNode.t() | nil,
#   right: TreeNode.t() | nil
# }
# defstruct val: 0, left: nil, right: nil
# end

defmodule Solution do
@spec right_side_view(root :: TreeNode.t() | nil) :: [integer]
def right_side_view(root) do

end
end

```

Erlang Solution:

```

%% Definition for a binary tree node.

%%
%% -record(tree_node, {val = 0 :: integer(),
%% left = null :: 'null' | #tree_node{},
%% right = null :: 'null' | #tree_node{}}).

-spec right_side_view(Root :: #tree_node{} | null) -> [integer()].
right_side_view(Root) ->
.
```

Racket Solution:

```

; Definition for a binary tree node.

;|
;

; val : integer?
; left : (or/c tree-node? #f)
; right : (or/c tree-node? #f)
(struct tree-node
  (val left right) #:mutable #:transparent)

; constructor

```

```
(define (make-tree-node [val 0])
  (tree-node val #f #f))

| #

(define/contract (right-side-view root)
  (-> (or/c tree-node? #f) (listof exact-integer?)))
)
```