

Problem 328: Odd Even Linked List

Problem Information

Difficulty: Medium

Acceptance Rate: 0.00%

Paid Only: No

Problem Description

Given the

head

of a singly linked list, group all the nodes with odd indices together followed by the nodes with even indices, and return

the reordered list

.

The

first

node is considered

odd

, and the

second

node is

even

, and so on.

Note that the relative order inside both the even and odd groups should remain as it was in the input.

You must solve the problem in

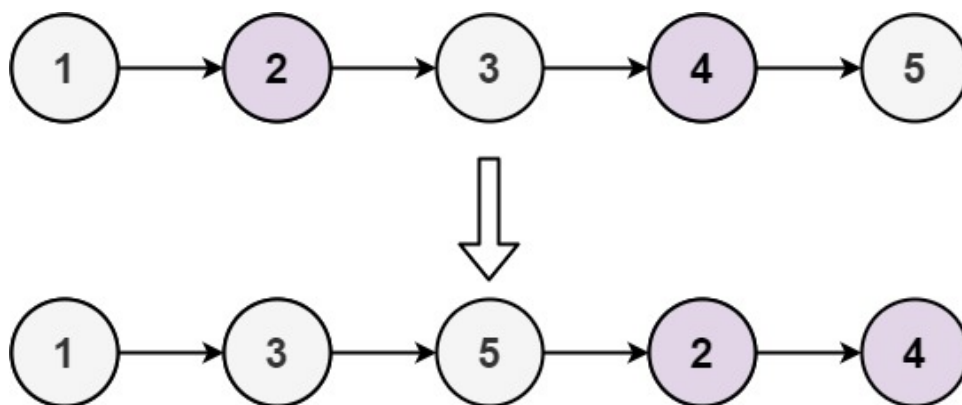
$O(1)$

extra space complexity and

$O(n)$

time complexity.

Example 1:



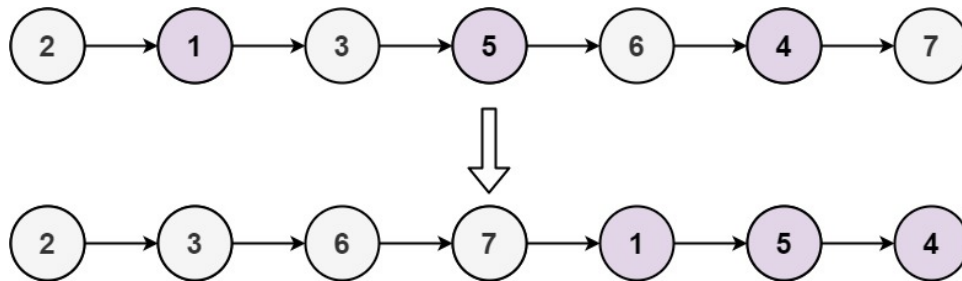
Input:

head = [1,2,3,4,5]

Output:

[1,3,5,2,4]

Example 2:



Input:

head = [2,1,3,5,6,4,7]

Output:

[2,3,6,7,1,5,4]

Constraints:

The number of nodes in the linked list is in the range

[0, 10

4

]

.

-10

6

$\leq \text{Node.val} \leq 10$

6

Code Snippets

C++:

```

/**
 * Definition for singly-linked list.
 * struct ListNode {
 *   int val;
 *   ListNode *next;
 *   ListNode() : val(0), next(nullptr) {}
 *   ListNode(int x) : val(x), next(nullptr) {}
 *   ListNode(int x, ListNode *next) : val(x), next(next) {}
 * };
 */
class Solution {
public:
    ListNode* oddEvenList(ListNode* head) {

    }
};

```

Java:

```

/**
 * Definition for singly-linked list.
 * public class ListNode {
 *   int val;
 *   ListNode next;
 *   ListNode() {}
 *   ListNode(int val) { this.val = val; }
 *   ListNode(int val, ListNode next) { this.val = val; this.next = next; }
 * }
 */
class Solution {
    public ListNode oddEvenList(ListNode head) {

    }
}

```

Python3:

```

# Definition for singly-linked list.
# class ListNode:
#     def __init__(self, val=0, next=None):
#         self.val = val
#         self.next = next
class Solution:

```

```
def oddEvenList(self, head: Optional[ListNode]) -> Optional[ListNode]:
```

Python:

```
# Definition for singly-linked list.
# class ListNode(object):
#     def __init__(self, val=0, next=None):
#         self.val = val
#         self.next = next
class Solution(object):
    def oddEvenList(self, head):
        """
        :type head: Optional[ListNode]
        :rtype: Optional[ListNode]
        """
```

JavaScript:

```
/**
 * Definition for singly-linked list.
 * function ListNode(val, next) {
 *   this.val = (val===undefined ? 0 : val)
 *   this.next = (next===undefined ? null : next)
 * }
 */
/**
 * @param {ListNode} head
 * @return {ListNode}
 */
var oddEvenList = function(head) {

};
```

TypeScript:

```
/**
 * Definition for singly-linked list.
 * class ListNode {
 *   val: number
 *   next: ListNode | null
 *   constructor(val?: number, next?: ListNode | null) {
 *     this.val = (val===undefined ? 0 : val)
 *     this.next = next
 *   }
 * }
```

```

* this.next = (next===undefined ? null : next)
* }
* }
*/

function oddEvenList(head: ListNode | null): ListNode | null {

};

```

C#:

```

/**
 * Definition for singly-linked list.
 * public class ListNode {
 *     public int val;
 *     public ListNode next;
 *     public ListNode(int val=0, ListNode next=null) {
 *         this.val = val;
 *         this.next = next;
 *     }
 * }
 */
public class Solution {
    public ListNode OddEvenList(ListNode head) {

    }
}

```

C:

```

/**
 * Definition for singly-linked list.
 * struct ListNode {
 *     int val;
 *     struct ListNode *next;
 * };
 */
struct ListNode* oddEvenList(struct ListNode* head) {

}

```

Go:

```

/**
 * Definition for singly-linked list.
 * type ListNode struct {
 *     Val int
 *     Next *ListNode
 * }
 */
func oddEvenList(head *ListNode) *ListNode {

}

```

Kotlin:

```

/**
 * Example:
 * var li = ListNode(5)
 * var v = li.`val`
 * Definition for singly-linked list.
 * class ListNode(var `val`: Int) {
 *     var next: ListNode? = null
 * }
 */
class Solution {
    fun oddEvenList(head: ListNode?): ListNode? {

    }
}

```

Swift:

```

/**
 * Definition for singly-linked list.
 * public class ListNode {
 *     public var val: Int
 *     public var next: ListNode?
 *     public init() { self.val = 0; self.next = nil; }
 *     public init(_ val: Int) { self.val = val; self.next = nil; }
 *     public init(_ val: Int, _ next: ListNode?) { self.val = val; self.next =
next; }
 * }
 */
class Solution {
    func oddEvenList(_ head: ListNode?) -> ListNode? {

```

```
}  
}
```

Rust:

```
// Definition for singly-linked list.  
// #[derive(PartialEq, Eq, Clone, Debug)]  
// pub struct ListNode {  
//   pub val: i32,  
//   pub next: Option<Box<ListNode>>  
// }  
//  
// impl ListNode {  
//   #[inline]  
//   fn new(val: i32) -> Self {  
//     ListNode {  
//       next: None,  
//       val  
//     }  
//   }  
// }  
impl Solution {  
  pub fn odd_even_list(head: Option<Box<ListNode>>) -> Option<Box<ListNode>> {  
  
  }  
}
```

Ruby:

```
# Definition for singly-linked list.  
# class ListNode  
#   attr_accessor :val, :next  
#   def initialize(val = 0, _next = nil)  
#     @val = val  
#     @next = _next  
#   end  
# end  
#  
# @param {ListNode} head  
# @return {ListNode}  
def odd_even_list(head)
```



```
end
```

PHP:

```
/**
 * Definition for a singly-linked list.
 * class ListNode {
 * public $val = 0;
 * public $next = null;
 * function __construct($val = 0, $next = null) {
 * $this->val = $val;
 * $this->next = $next;
 * }
 * }
 */
class Solution {

/**
 * @param ListNode $head
 * @return ListNode
 */
function oddEvenList($head) {

}

}
```

Dart:

```
/**
 * Definition for singly-linked list.
 * class ListNode {
 * int val;
 * ListNode? next;
 * ListNode([this.val = 0, this.next]);
 * }
 */
class Solution {
  ListNode? oddEvenList(ListNode? head) {

}

}
```

Scala:

```
/**
 * Definition for singly-linked list.
 * class ListNode(_x: Int = 0, _next: ListNode = null) {
 *   var next: ListNode = _next
 *   var x: Int = _x
 * }
 */
object Solution {
  def oddEvenList(head: ListNode): ListNode = {

  }
}
```

Elixir:

```
# Definition for singly-linked list.
#
# defmodule ListNode do
#   @type t :: %__MODULE__{
#     val: integer,
#     next: ListNode.t() | nil
#   }
#   defstruct val: 0, next: nil
# end

defmodule Solution do
  @spec odd_even_list(head :: ListNode.t | nil) :: ListNode.t | nil
  def odd_even_list(head) do

  end
end
```

Erlang:

```
% Definition for singly-linked list.
%
% -record(list_node, {val = 0 :: integer(),
%   next = null :: 'null' | #list_node{}}).

-spec odd_even_list(Head :: #list_node{} | null) -> #list_node{} | null.
odd_even_list(Head) ->
```

.

Racket:

```
; Definition for singly-linked list:
#|

; val : integer?
; next : (or/c list-node? #f)
(struct list-node
  (val next) #:mutable #:transparent)

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

|#

(define/contract (odd-even-list head)
  (-> (or/c list-node? #f) (or/c list-node? #f))
  )
```

Solutions

C++ Solution:

```
/*
 * Problem: Odd Even Linked List
 * Difficulty: Medium
 * Tags: linked_list
 *
 * Approach: Optimized algorithm based on problem constraints
 * Time Complexity: O(n) to O(n^2) depending on approach
 * Space Complexity: O(1) to O(n) depending on approach
 */

/**
 * Definition for singly-linked list.
 * struct ListNode {
 *   int val;
```

```

* ListNode *next;
* ListNode() : val(0), next(nullptr) {}
* ListNode(int x) : val(x), next(nullptr) {}
* ListNode(int x, ListNode *next) : val(x), next(next) {}
* };
*/

class Solution {
public:
    ListNode* oddEvenList(ListNode* head) {

    }
};

```

Java Solution:

```

/**
 * Problem: Odd Even Linked List
 * Difficulty: Medium
 * Tags: linked_list
 *
 * Approach: Optimized algorithm based on problem constraints
 * Time Complexity: O(n) to O(n^2) depending on approach
 * Space Complexity: O(1) to O(n) depending on approach
 */

/**
 * Definition for singly-linked list.
 * public class ListNode {
 *     int val;
 *     ListNode next;
 *     ListNode() {
 *         // TODO: Implement optimized solution
 *     }
 *     return 0;
 * }
 *
 * ListNode(int val) { this.val = val; }
 * ListNode(int val, ListNode next) { this.val = val; this.next = next; }
 * }
 */

class Solution {
    public ListNode oddEvenList(ListNode head) {

```

```
}  
}
```

Python3 Solution:

```
"""  
Problem: Odd Even Linked List  
Difficulty: Medium  
Tags: linked_list  
  
Approach: Optimized algorithm based on problem constraints  
Time Complexity: O(n) to O(n^2) depending on approach  
Space Complexity: O(1) to O(n) depending on approach  
"""  
  
# Definition for singly-linked list.  
# class ListNode:  
#     def __init__(self, val=0, next=None):  
#         self.val = val  
#         self.next = next  
class Solution:  
    def oddEvenList(self, head: Optional[ListNode]) -> Optional[ListNode]:  
        # TODO: Implement optimized solution  
        pass
```

Python Solution:

```
# Definition for singly-linked list.  
# class ListNode(object):  
#     def __init__(self, val=0, next=None):  
#         self.val = val  
#         self.next = next  
class Solution(object):  
    def oddEvenList(self, head):  
        """  
        :type head: Optional[ListNode]  
        :rtype: Optional[ListNode]  
        """
```

JavaScript Solution:

```

/**
 * Problem: Odd Even Linked List
 * Difficulty: Medium
 * Tags: linked_list
 *
 * Approach: Optimized algorithm based on problem constraints
 * Time Complexity: O(n) to O(n^2) depending on approach
 * Space Complexity: O(1) to O(n) depending on approach
 */

/**
 * Definition for singly-linked list.
 * function ListNode(val, next) {
 *   this.val = (val===undefined ? 0 : val)
 *   this.next = (next===undefined ? null : next)
 * }
 */
/**
 * @param {ListNode} head
 * @return {ListNode}
 */
var oddEvenList = function(head) {

};

```

TypeScript Solution:

```

/**
 * Problem: Odd Even Linked List
 * Difficulty: Medium
 * Tags: linked_list
 *
 * Approach: Optimized algorithm based on problem constraints
 * Time Complexity: O(n) to O(n^2) depending on approach
 * Space Complexity: O(1) to O(n) depending on approach
 */

/**
 * Definition for singly-linked list.
 * class ListNode {
 *   val: number
 *   next: ListNode | null

```

```

* constructor(val?: number, next?: ListNode | null) {
* this.val = (val===undefined ? 0 : val)
* this.next = (next===undefined ? null : next)
* }
* }
*/

function oddEvenList(head: ListNode | null): ListNode | null {

};

```

C# Solution:

```

/*
* Problem: Odd Even Linked List
* Difficulty: Medium
* Tags: linked_list
*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
* Space Complexity: O(1) to O(n) depending on approach
*/

/**
* Definition for singly-linked list.
* public class ListNode {
* public int val;
* public ListNode next;
* public ListNode(int val=0, ListNode next=null) {
* this.val = val;
* this.next = next;
* }
* }
*/

public class Solution {
public ListNode OddEvenList(ListNode head) {

}

}

```

C Solution:

```

/*
 * Problem: Odd Even Linked List
 * Difficulty: Medium
 * Tags: linked_list
 *
 * Approach: Optimized algorithm based on problem constraints
 * Time Complexity: O(n) to O(n^2) depending on approach
 * Space Complexity: O(1) to O(n) depending on approach
 */

/**
 * Definition for singly-linked list.
 * struct ListNode {
 *     int val;
 *     struct ListNode *next;
 * };
 */
struct ListNode* oddEvenList(struct ListNode* head) {

}

```

Go Solution:

```

// Problem: Odd Even Linked List
// Difficulty: Medium
// Tags: linked_list
//
// Approach: Optimized algorithm based on problem constraints
// Time Complexity: O(n) to O(n^2) depending on approach
// Space Complexity: O(1) to O(n) depending on approach

/**
 * Definition for singly-linked list.
 * type ListNode struct {
 *     Val int
 *     Next *ListNode
 * }
 */
func oddEvenList(head *ListNode) *ListNode {

}

```


Kotlin Solution:

```
/**
 * Example:
 * var li = ListNode(5)
 * var v = li.`val`
 * Definition for singly-linked list.
 * class ListNode(var `val`: Int) {
 *   var next: ListNode? = null
 * }
 */
class Solution {
    fun oddEvenList(head: ListNode?): ListNode? {

    }
}
```

Swift Solution:

```
/**
 * Definition for singly-linked list.
 * public class ListNode {
 *   public var val: Int
 *   public var next: ListNode?
 *   public init() { self.val = 0; self.next = nil; }
 *   public init(_ val: Int) { self.val = val; self.next = nil; }
 *   public init(_ val: Int, _ next: ListNode?) { self.val = val; self.next =
next; }
 * }
 */
class Solution {
    func oddEvenList(_ head: ListNode?) -> ListNode? {

    }
}
```

Rust Solution:

```
// Problem: Odd Even Linked List
// Difficulty: Medium
// Tags: linked_list
//
// Approach: Optimized algorithm based on problem constraints
```

```

// Time Complexity: O(n) to O(n^2) depending on approach
// Space Complexity: O(1) to O(n) depending on approach

// Definition for singly-linked list.
// #[derive(PartialEq, Eq, Clone, Debug)]
// pub struct ListNode {
//     pub val: i32,
//     pub next: Option<Box<ListNode>>
// }
//
// impl ListNode {
//     #[inline]
//     fn new(val: i32) -> Self {
//         ListNode {
//             next: None,
//             val
//         }
//     }
// }
impl Solution {
    pub fn odd_even_list(head: Option<Box<ListNode>>) -> Option<Box<ListNode>> {

    }
}

```

Ruby Solution:

```

# Definition for singly-linked list.
# class ListNode
#   attr_accessor :val, :next
#   def initialize(val = 0, _next = nil)
#     @val = val
#     @next = _next
#   end
# end
# @param {ListNode} head
# @return {ListNode}
def odd_even_list(head)

end

```

PHP Solution:

```
/**
 * Definition for a singly-linked list.
 * class ListNode {
 * public $val = 0;
 * public $next = null;
 * function __construct($val = 0, $next = null) {
 * $this->val = $val;
 * $this->next = $next;
 * }
 * }
 */
class Solution {

/**
 * @param ListNode $head
 * @return ListNode
 */
function oddEvenList($head) {

}

}
```

Dart Solution:

```
/**
 * Definition for singly-linked list.
 * class ListNode {
 * int val;
 * ListNode? next;
 * ListNode([this.val = 0, this.next]);
 * }
 */
class Solution {
  ListNode? oddEvenList(ListNode? head) {

  }

}
```

Scala Solution:

```

/**
 * Definition for singly-linked list.
 * class ListNode(_x: Int = 0, _next: ListNode = null) {
 *   var next: ListNode = _next
 *   var x: Int = _x
 * }
 */
object Solution {
  def oddEvenList(head: ListNode): ListNode = {

  }
}

```

Elixir Solution:

```

# Definition for singly-linked list.
#
# defmodule ListNode do
#   @type t :: %__MODULE__{
#     val: integer,
#     next: ListNode.t() | nil
#   }
#   defstruct val: 0, next: nil
# end

defmodule Solution do
  @spec odd_even_list(head :: ListNode.t | nil) :: ListNode.t | nil
  def odd_even_list(head) do

  end
end

```

Erlang Solution:

```

%% Definition for singly-linked list.
%%
%% -record(list_node, {val = 0 :: integer(),
%%   next = null :: 'null' | #list_node{}}).

-spec odd_even_list(Head :: #list_node{} | null) -> #list_node{} | null.
odd_even_list(Head) ->
.

```

Racket Solution:

```
; Definition for singly-linked list:
#|

; val : integer?
; next : (or/c list-node? #f)
(struct list-node
  (val next) #:mutable #:transparent)

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

|#

(define/contract (odd-even-list head)
  (-> (or/c list-node? #f) (or/c list-node? #f))
  )
```