 Data Structures and Algorithm | Jan 2021​

# Assignment 4 | 21st January 2021

**For any doubts regarding the assignment, ask questions in the** [**Dat**](https://community.letsupgrade.in/group/dsaes0121b2)​ [**a**](https://community.letsupgrade.in/group/dsaes0121b2)

[**Structures and Algorithms**](https://community.letsupgrade.in/group/dsaes0121b2) **Group**​ ​ **in the Community.**​

**Submit Assignments by** ​ **26**​ **th January 2021 11:59 PM**

## Assignment Submit Form: [https://forms.gle/bJBQwoRVk4P8SR4T](https://forms.gle/bJBQwoRVk4P8SR4T8)​ [8](https://forms.gle/bJBQwoRVk4P8SR4T8)

**Submit assignments in Appropriate Dropdowns.**

**Question 1**

Implement deletion operation from the end of the linked list and Insertion operation from the beginning of the linked list

**Answer:**

class Node:

def \_\_init\_\_(self, data):

self.item = data

self.ref = None

class LinkedList:

def \_\_init\_\_(self):

self.start\_node = None

def traverse\_list(self):

if self.start\_node is None:

print("List has no element")

return

else:

n = self.start\_node

while n is not None:

print(n.item , " ")

n = n.ref

def insert\_at\_start(self, data):

new\_node = Node(data)

new\_node.ref = self.start\_node

self.start\_node= new\_node

def delete\_at\_end(self):

if self.start\_node is None:

print("The list has no element to delete")

return

n = self.start\_node

while n.ref.ref is not None:

n = n.ref

n.ref = None

new\_linked\_list = LinkedList()

print("Insertion operation from the beginning of the linked list:")

new\_linked\_list.insert\_at\_start(20)

new\_linked\_list.insert\_at\_start(30)

new\_linked\_list.insert\_at\_start(40)

new\_linked\_list.traverse\_list()

print("deletion operation from the end of the linked list:")

new\_linked\_list.delete\_at\_end()

new\_linked\_list.traverse\_list()

**Output:**

Insertion operation from the beginning of the linked list:

40

30

20

deletion operation from the end of the linked list:

40

30

**Question 2**

Implement binary search using python language.

(Write a function which returns the index of x in given array arr if present, else returns -1)

**Answer:**

def binary\_search(arr, low, high, x):

if high >= low:

mid = (high + low) // 2

if arr[mid] == x:

return mid

elif arr[mid] > x:

return binary\_search(arr, low, mid - 1, x)

else:

return binary\_search(arr, mid + 1, high, x)

else:

return -1

arr = [ 2, 3, 4, 10, 40 ]

x = 10

result = binary\_search(arr, 0, len(arr)-1, x)

if result != -1:

print("Element is present at index", str(result))

else:

print("Element is not present in array")

**Output:**

Element is present at index 3

**Question 3**

Write a Python program to find the middle of a linked list.

**Answer:**

class Node:

def \_\_init\_\_(self, data):

self.data = data

self.next = None

class LinkedList:

def \_\_init\_\_(self):

self.head = None

def push(self, new\_data):

new\_node = Node(new\_data)

new\_node.next = self.head

self.head = new\_node

def printMiddle(self):

slow\_ptr = self.head

fast\_ptr = self.head

if self.head is not None:

while (fast\_ptr is not None and fast\_ptr.next is not None):

fast\_ptr = fast\_ptr.next.next

slow\_ptr = slow\_ptr.next

print("The middle element is: ", slow\_ptr.data)

list1 = LinkedList()

list1.push(5)

list1.push(4)

list1.push(2)

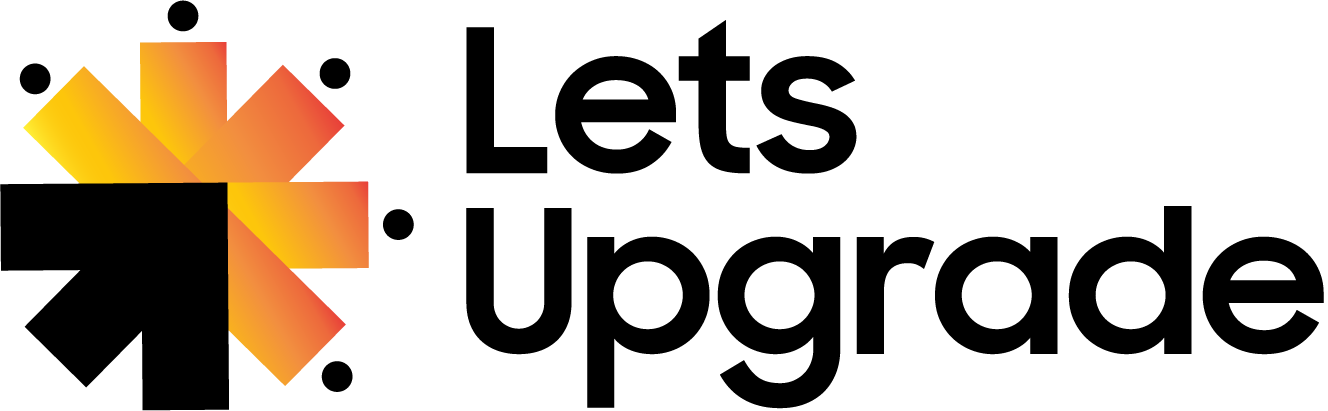
list1.push(3)

list1.push(1)

list1.printMiddle()

**Output:**

The middle element is: 2

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## FAQs

**Q. When do I submit the Assignments and how?**

1. The assignments for the week should be submitted by 26th January 2021 i.e.Tuesday 11:59 PM IST.
2. You need to submit the answers in Document Format

**Q. Where do I get class links for the next session?**

1. All sessions will be Live on our Youtube Channel. Subscribe to LetsUpgrade​​[YouTube Channel](https://www.youtube.com/channel/UCWUDiLzQZr4VDHNyMsVYn-g)​[.](https://www.youtube.com/channel/UCWUDiLzQZr4VDHNyMsVYn-g)

You'll also get an email with the link to the live session.

1. It will be also updated in the Community Group in the pinned post.

**Q. I have some doubt, who do I ask?**

A. Post your Queries on the community, someone will help you out.

**Q. How can we know if my assignment is verified or not? And is it successfully submitted or not?**

A. You will receive a mail for your successful submission.