

## FINAL EXAM PROFESSIONAL ELECTIVE 2 VISUALIZING LINKED LISTS

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SECTION: UCOS 4-1

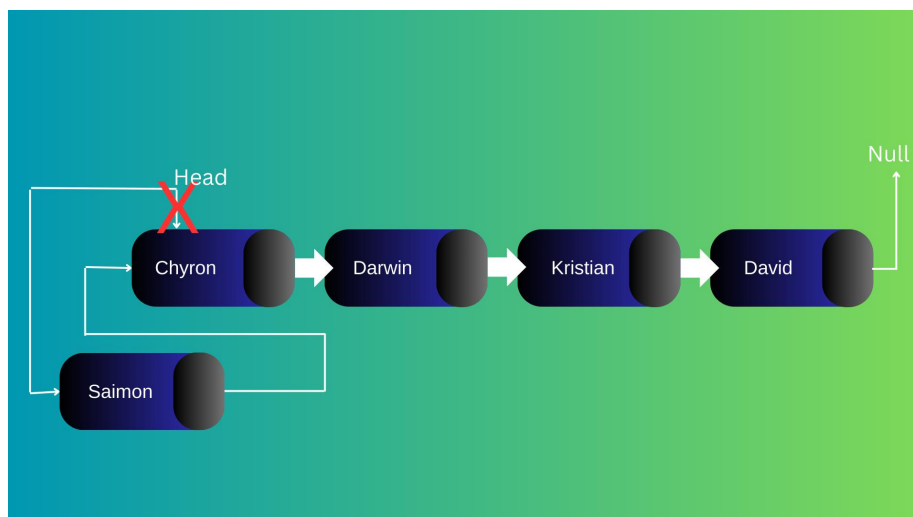
### INSTRUCTIONS

- The goal of this final exam project is to **VISUALIZE HOW LINKED LISTS WORK**. Write first a Linked List implementation using Python OOP with insertion, deletion, updating, and displaying methods. The linked list you'll show in the diagram should contain a minimum of **FIVE ELEMENTS**. You are tasked to **CREATE DIAGRAMS** showing the following:
  - INSERTION** of a new element to linked list.
  - DELETION** of a given element inside a linked list.
  - UPDATING** of an element from the linked list.
  - DISPLAYING** of all elements from the linked list.
- Please follow the format of this document and **REFER TO THE CRITERIA** on the last page of this document.

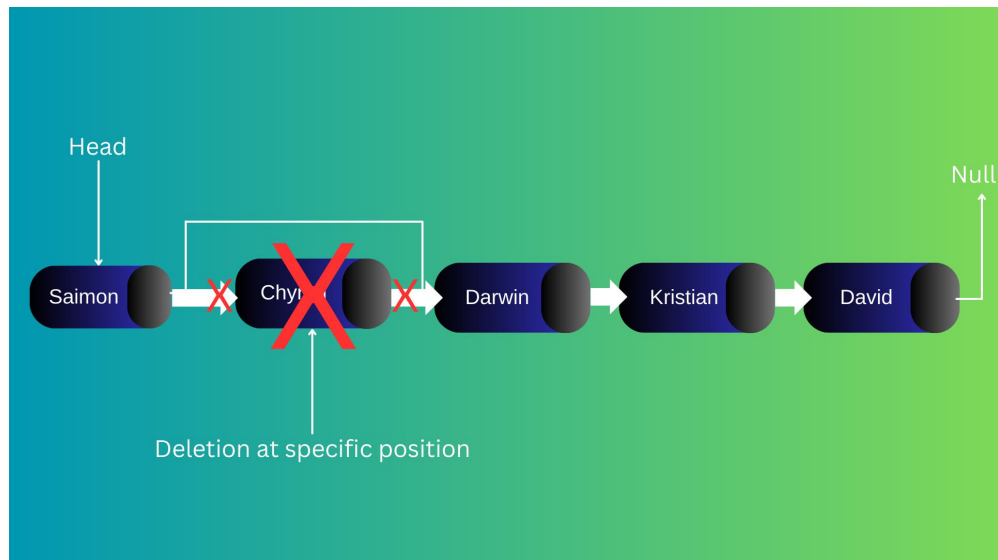
### ELEMENTS TO ADD IN LINKED LIST:

Five random names: Saimon, Chyron, Darwin, Kristian, David

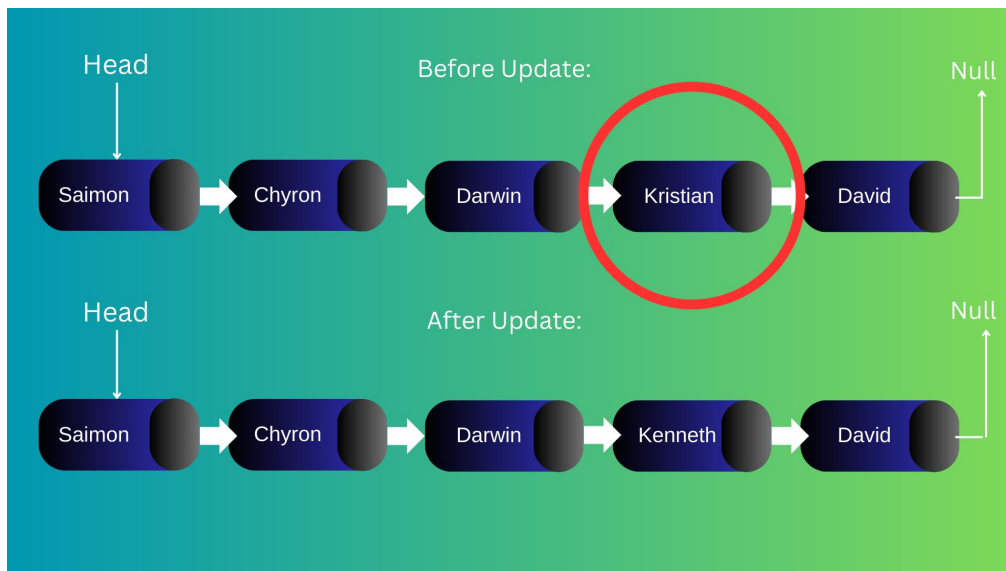
### INSERTION OF ELEMENT:



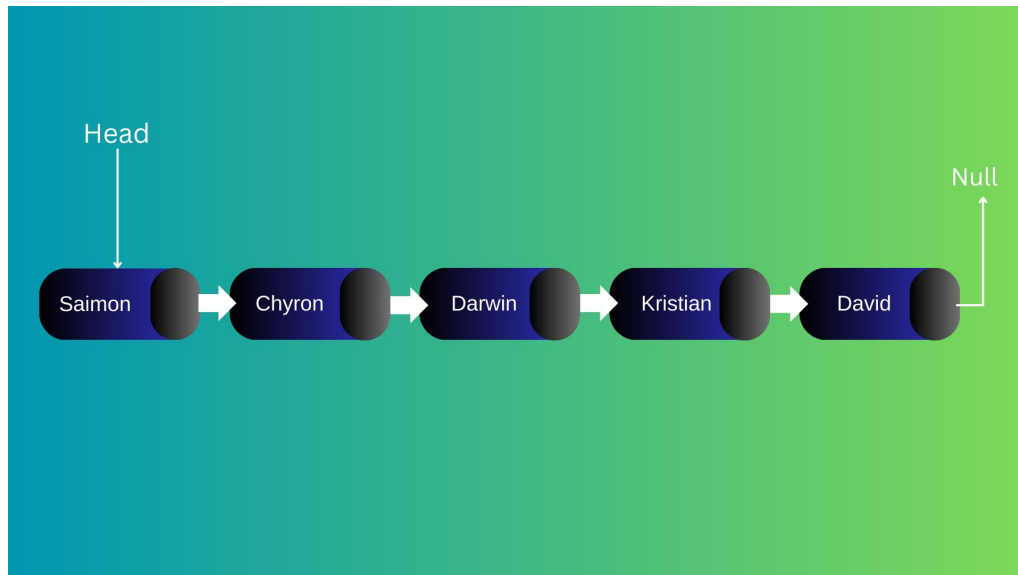
## DELETION OF ELEMENT:



## UPDATING OF ELEMENT:



## DELETION OF ELEMENT:



## LINKED LIST IMPLEMENTATION USING PYTHON OOP (INSERTION, DELETION, UPDATING, AND DISPLAYING)

### INSERTION

```
main.py  Run  Output
1. class Node:
2.     def __init__(self, new_data):
3.         self.data = new_data
4.         self.next = None
5.
6. def insert_at_front(head, new_data):
7.
8.     new_node = Node(new_data)
9.
10.    new_node.next = head
11.
12.    return new_node
13.
14.
15. def print_list(head):
16.     curr = head
17.     while curr is not None:
18.         print(f"{curr.data}", end=" ")
19.         curr = curr.next
20.     print()
21.
22.
23. if __name__ == "__main__":
24.
25.     head = Node('Chyron')
26.     head.next = Node('Darwin')
27.     head.next.next = Node('Kristian')
28.     head.next.next.next = Node('David')
29.
30.     data = 'Saimon'
31.     head = insert_at_front(head, data)
32.
33.     print_list(head)
```

Saimon Chyron Darwin Kristian David  
=== Code Execution Successful ===

## DELETION

```
main.py
1 class Node:
2     def __init__(self, data):
3         self.data = data
4         self.next = None
5
6 def deleteNode(head, position):
7     temp = head
8     prev = None
9
10    if temp is None:
11        return head
12
13    if position == 1:
14        head = temp.next
15        return head
16
17    for i in range(1, position):
18        prev = temp
19        temp = temp.next
20        if temp is None:
21            print("Data not present")
22            return head
23
24    if temp is not None:
25        prev.next = temp.next
26
27    return head
28
29 def printList(head):
30     while head:
31         print(head.data -> ", end=")
32         head = head.next
33     print("None")
34
35
36 if __name__ == "__main__":
37     head = Node("Simon")
38     head.next = Node("Chyron")
39     head.next.next = Node("Darwin")
40     head.next.next.next = Node("Kristian")
41     head.next.next.next.next = Node("David")
42
43     print("Original list: ", end="")
44     printList(head)
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46     position = 2
47     head = deleteNode(head, position)
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```
main.py
def update(self, old_value, new_value):
    current = self.head
    while current:
        if current.data == old_value:
            current.data = new_value
            return
        current = current.next
    return "Node not found."

def display(self):
    elements = []
    current = self.head
    while current:
        elements.append(current.data)
        current = current.next
    return elements

ll = LinkedList()
ll.insert('Saimon')
ll.insert('Chyrom')
ll.insert('Darwin')
ll.insert('Kristian')
ll.insert('David')

# Display elements
print("Original list:", ll.display())

# Update an element
ll.update('Kristian', 'Kenneth')
print("After updating:", ll.display())
```

Original list: ['Saimon', 'Chyrom', 'Darwin', 'Kristian', 'David']  
After updating: ['Saimon', 'Chyrom', 'Darwin', 'Kenneth', 'David']  
=== Code Execution Successful ===

## DISPLAYING

```
main.py
class Node:
    def __init__(self, data):
        self.data = data
        self.next = None

class LinkedList:
    def __init__(self):
        self.head = None

    def insert(self, data):
        new_node = Node(data)
        if not self.head:
            self.head = new_node
            return
        current = self.head
        while current.next:
            current = current.next
        current.next = new_node

    def display(self):
        elements = []
        current = self.head
        while current:
            elements.append(current.data)
            current = current.next
        return elements

ll = LinkedList()
ll.insert('Saimon')
ll.insert('Chyrom')
ll.insert('Darwin')
ll.insert('Kristian')
ll.insert('David')

# Display elements
print("Original list:", ll.display())
```

Original list: ['Saimon', 'Chyrom', 'Darwin', 'Kristian', 'David']  
--- Code Execution Successful ---

**CRITERIA:**

<b>CATEGORY</b>	<b>PERCENTAGE</b>
Technical concepts about Linked Lists are made easier because of the diagram. Diagram clearly represents what takes place in the operations stated.	40%
The diagram created is based on the linked list implementation source code that you provided.	30%
Labels were shown to communicate ideas.	20%
The diagram is done neatly. Color combination is considered carefully.	10%
<b>TOTAL</b>	<b>100%</b>