Midterm No.1 (Skill Test)	
Course Code: CPE 201L	**Program: BSCpE**
Course Title: Data Structure and Algorithm	**Date Performed: 09/06/2025**
Section: 2A	**Date Submitted: 09/06/2025**
Name: Bron, Jhustine A.	**Instructor: Engr. Maria Rizette Sayo**

1.Objectives

Choose only one(1):

1. Implement an array of even integers less than 50 but not less than 20 and do the following operations:

- Display the elements
- Find the maximum element
- Reverse the array

2. Implement a singly-linked list of odd integers from 1 to 30 and do the following operations:

- Display all data
- Append a Node
- Delete a Node

2. Discussion

I chose **Singly-Linked list** as my data structure. A linked list is a sequence of nodes in which each node stores data along with a pointer that links it to the next node in the chain. I created a python program that shows a list of odd integers from 1 to 30 and did 3 methods to display, append a node, and delete a node.

With a linked list, each piece of data is kept in its own node while still following the correct order. The program shows each value with an arrow (->) that represents the connection between nodes and ends with None to indicate the list's termination. It also allows the user to insert a new node at the end or delete a node by entering its value. This gave me a better understanding of how linked lists manage storing, adding, and removing data in sequence, unlike arrays that occupy fixed memory spaces.

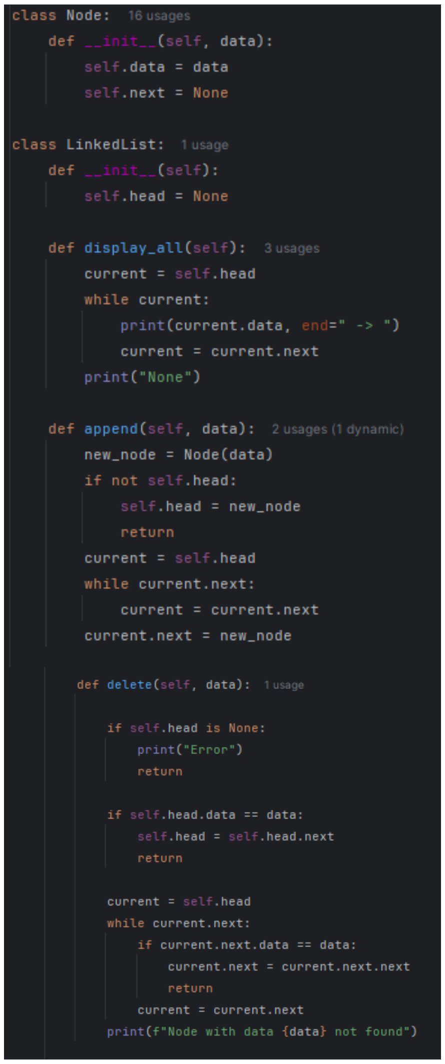
3. Materials and Equipment

- Google Colab
- Github
- Pycharm

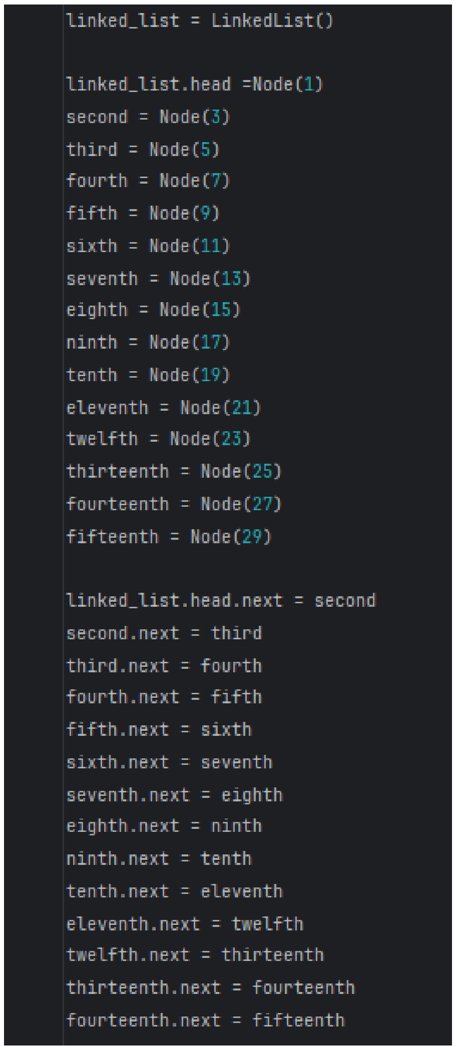
4. Procedure

The program creates a linked list with nodes connected in sequence and provides functions to display, append, and delete data. It first shows the initial list, then lets the user add a new node at the end or remove a chosen node, and finally displays the updated list after each action.

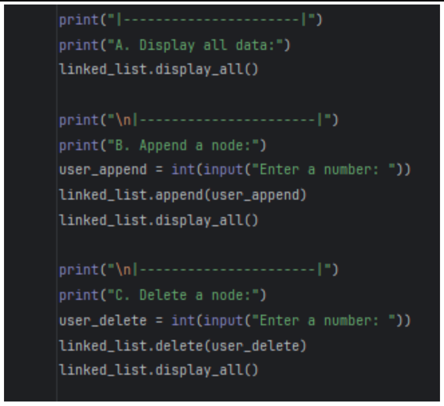
Source Code:



```python
class Node:  16 usages
    def __init__(self, data):
        self.data = data
        self.next = None

class LinkedList:  1 usage
    def __init__(self):
        self.head = None

    def display_all(self):  3 usages
        current = self.head
        while current:
            print(current.data, end=" -> ")
            current = current.next
        print("None")

    def append(self, data):  2 usages (1 dynamic)
        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 delete(self, data):  1 usage

        if self.head is None:
            print("Error")
            return

        if self.head.data == data:
            self.head = self.head.next
            return

        current = self.head
        while current.next:
            if current.next.data == data:
                current.next = current.next.next
                return
            current = current.next
        print(f"Node with data {data} not found")
```

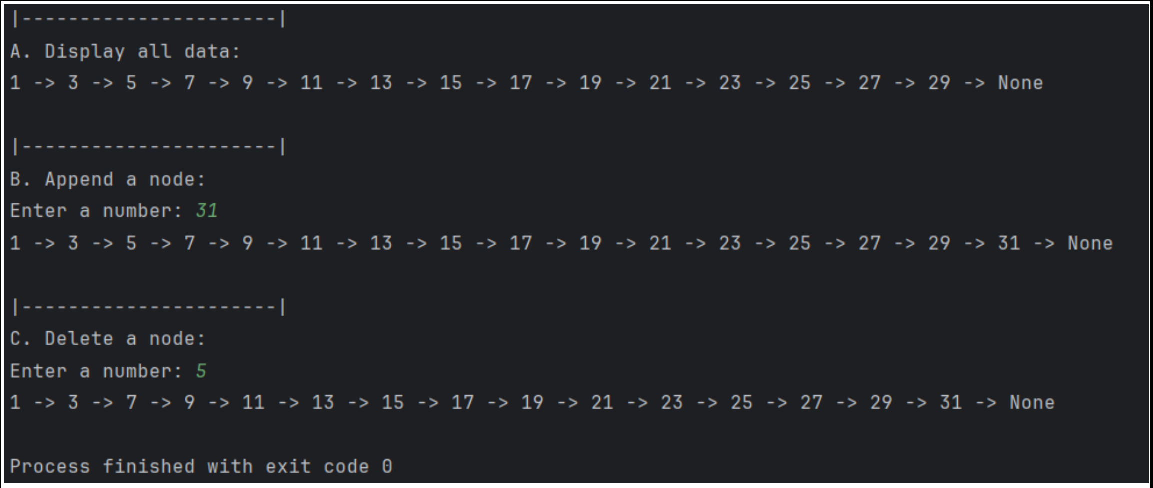


```python
linked_list = LinkedList()

linked_list.head =Node(1)
second = Node(3)
third = Node(5)
fourth = Node(7)
fifth = Node(9)
sixth = Node(11)
seventh = Node(13)
eighth = Node(15)
ninth = Node(17)
tenth = Node(19)
eleventh = Node(21)
twelfth = Node(23)
thirteenth = Node(25)
fourteenth = Node(27)
fifteenth = Node(29)

linked_list.head.next = second
second.next = third
third.next = fourth
fourth.next = fifth
fifth.next = sixth
sixth.next = seventh
seventh.next = eighth
eighth.next = ninth
ninth.next = tenth
tenth.next = eleventh
eleventh.next = twelfth
twelfth.next = thirteenth
thirteenth.next = fourteenth
fourteenth.next = fifteenth
```



```
print("|---------------------|")
print("A. Display all data:")
linked_list.display_all()

print("\n|---------------------|")
print("B. Append a node:")
user_append = int(input("Enter a number: "))
linked_list.append(user_append)
linked_list.display_all()

print("\n|---------------------|")
print("C. Delete a node:")
user_delete = int(input("Enter a number: "))
linked_list.delete(user_delete)
linked_list.display_all()
```

5. Output

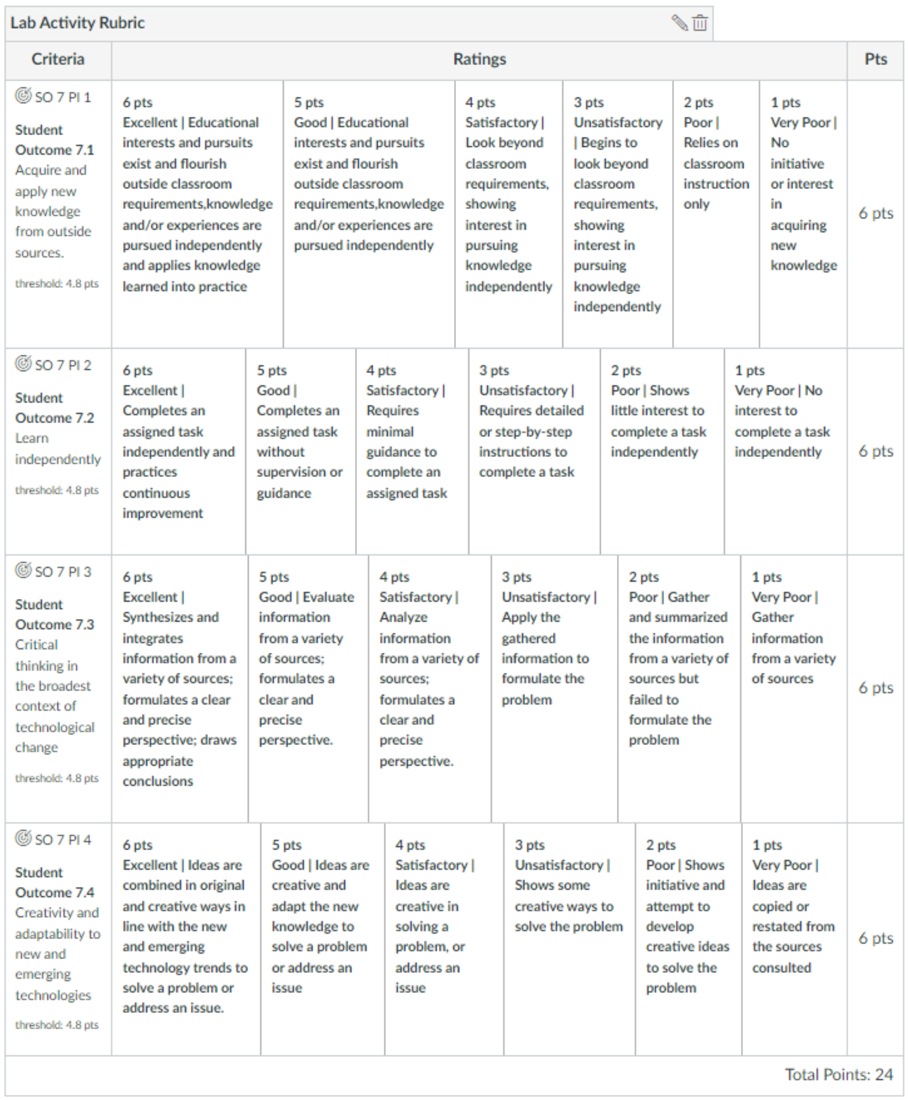


```
|----------------------|
A. Display all data:
1 -> 3 -> 5 -> 7 -> 9 -> 11 -> 13 -> 15 -> 17 -> 19 -> 21 -> 23 -> 25 -> 27 -> 29 -> None

|----------------------|
B. Append a node:
Enter a number: 31
1 -> 3 -> 5 -> 7 -> 9 -> 11 -> 13 -> 15 -> 17 -> 19 -> 21 -> 23 -> 25 -> 27 -> 29 -> 31 -> None

|----------------------|
C. Delete a node:
Enter a number: 5
1 -> 3 -> 7 -> 9 -> 11 -> 13 -> 15 -> 17 -> 19 -> 21 -> 23 -> 25 -> 27 -> 29 -> 31 -> None

Process finished with exit code 0
```

The output shows the linked list displaying its initial sequence of numbers, then appending a new node with the value 31 at the end, and finally deleting the node with the value 5. This demonstrates how the program can traverse, add, and remove nodes while keeping the correct order of the list.

6. Conclusion

In conclusion, this midterm skill test effectively demonstrates the use of a linked list in storing and managing data. The program shows how nodes can be displayed in sequence, appended with new values, and deleted when specified by the user, all while preserving the correct order of the list. This activity shows the flexibility Of linked lists compared to arrays, because it allows dynamic insertion and deletion.



Lab Activity Rubric

Criteria	Ratings						Pts
SO 7 PI 1 **Student Outcome 7.1** Acquire and apply new knowledge from outside sources. threshold: 4.8 pts	6 pts Excellent | Educational interests and pursuits exist and flourish outside classroom requirements,knowledge and/or experiences are pursued independently and applies knowledge learned into practice	5 pts Good | Educational interests and pursuits exist and flourish outside classroom requirements,knowledge and/or experiences are pursued independently	4 pts Satisfactory | Look beyond classroom requirements, showing interest in pursuing knowledge independently	3 pts Unsatisfactory | Begins to look beyond classroom requirements, showing interest in pursuing knowledge independently	2 pts Poor | Relies on classroom instruction only	1 pts Very Poor | No initiative or interest in acquiring new knowledge	6 pts
SO 7 PI 2 **Student Outcome 7.2** Learn independently threshold: 4.8 pts	6 pts Excellent | Completes an assigned task independently and practices continuous improvement	5 pts Good | Completes an assigned task without supervision or guidance	4 pts Satisfactory | Requires minimal guidance to complete an assigned task	3 pts Unsatisfactory | Requires detailed or step-by-step instructions to complete a task	2 pts Poor | Shows little interest to complete a task independently	1 pts Very Poor | No interest to complete a task independently	6 pts
SO 7 PI 3 **Student Outcome 7.3** Critical thinking in the broadest context of technological change threshold: 4.8 pts	6 pts Excellent | Synthesizes and integrates information from a variety of sources; formulates a clear and precise perspective; draws appropriate conclusions	5 pts Good | Evaluate information from a variety of sources; formulates a clear and precise perspective.	4 pts Satisfactory | Analyze information from a variety of sources; formulates a clear and precise perspective.	3 pts Unsatisfactory | Apply the gathered information to formulate the problem	2 pts Poor | Gather and summarized the information from a variety of sources but failed to formulate the problem	1 pts Very Poor | Gather information from a variety of sources	6 pts
SO 7 PI 4 **Student Outcome 7.4** Creativity and adaptability to new and emerging technologies threshold: 4.8 pts	6 pts Excellent | Ideas are combined in original and creative ways in line with the new and emerging technology trends to solve a problem or address an issue.	5 pts Good | Ideas are creative and adapt the new knowledge to solve a problem or address an issue	4 pts Satisfactory | Ideas are creative in solving a problem, or address an issue	3 pts Unsatisfactory | Shows some creative ways to solve the problem	2 pts Poor | Shows initiative and attempt to develop creative ideas to solve the problem	1 pts Very Poor | Ideas are copied or restated from the sources consulted	6 pts

Total Points: 24