Data Structure Course
Lab 3

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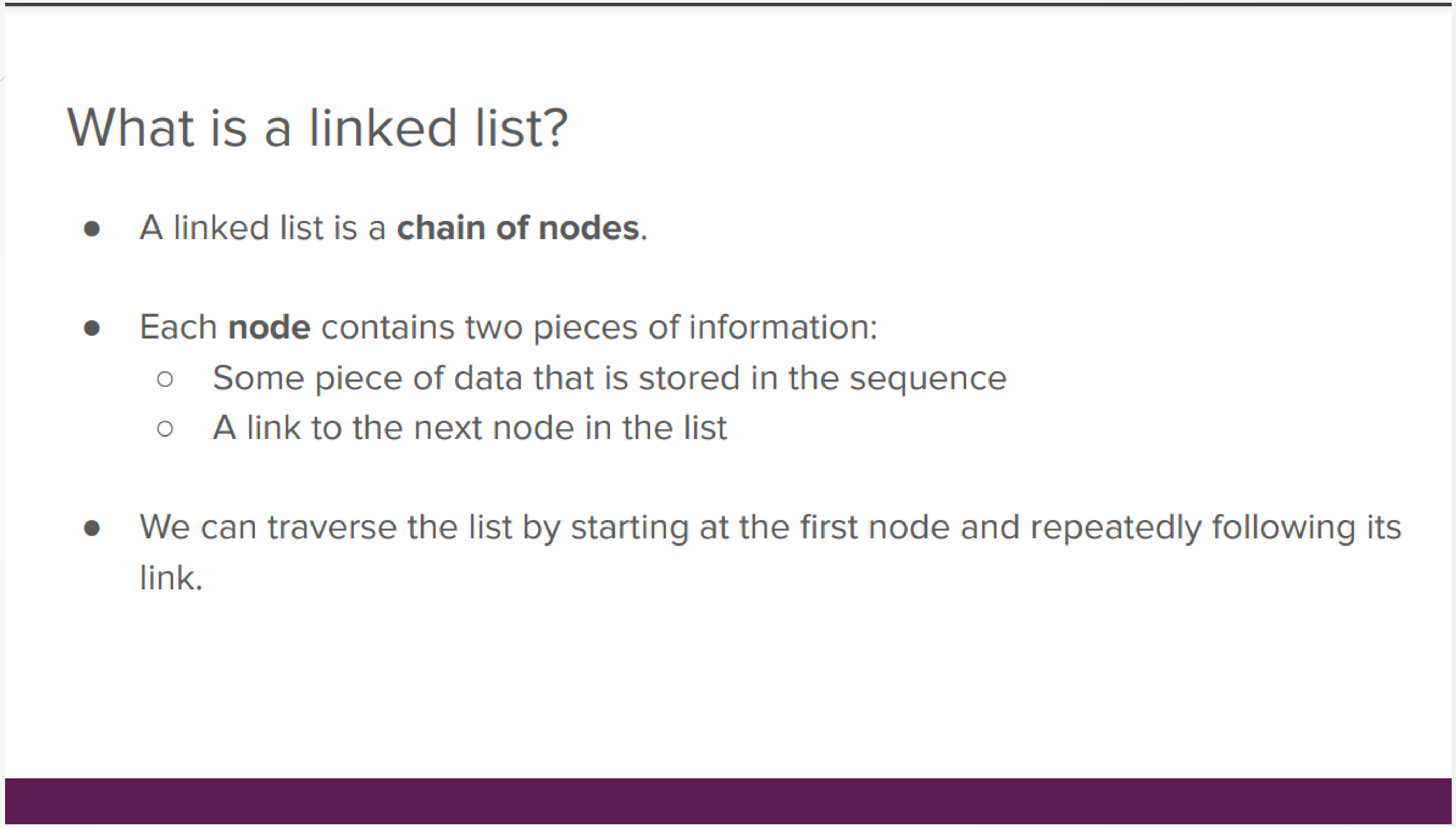
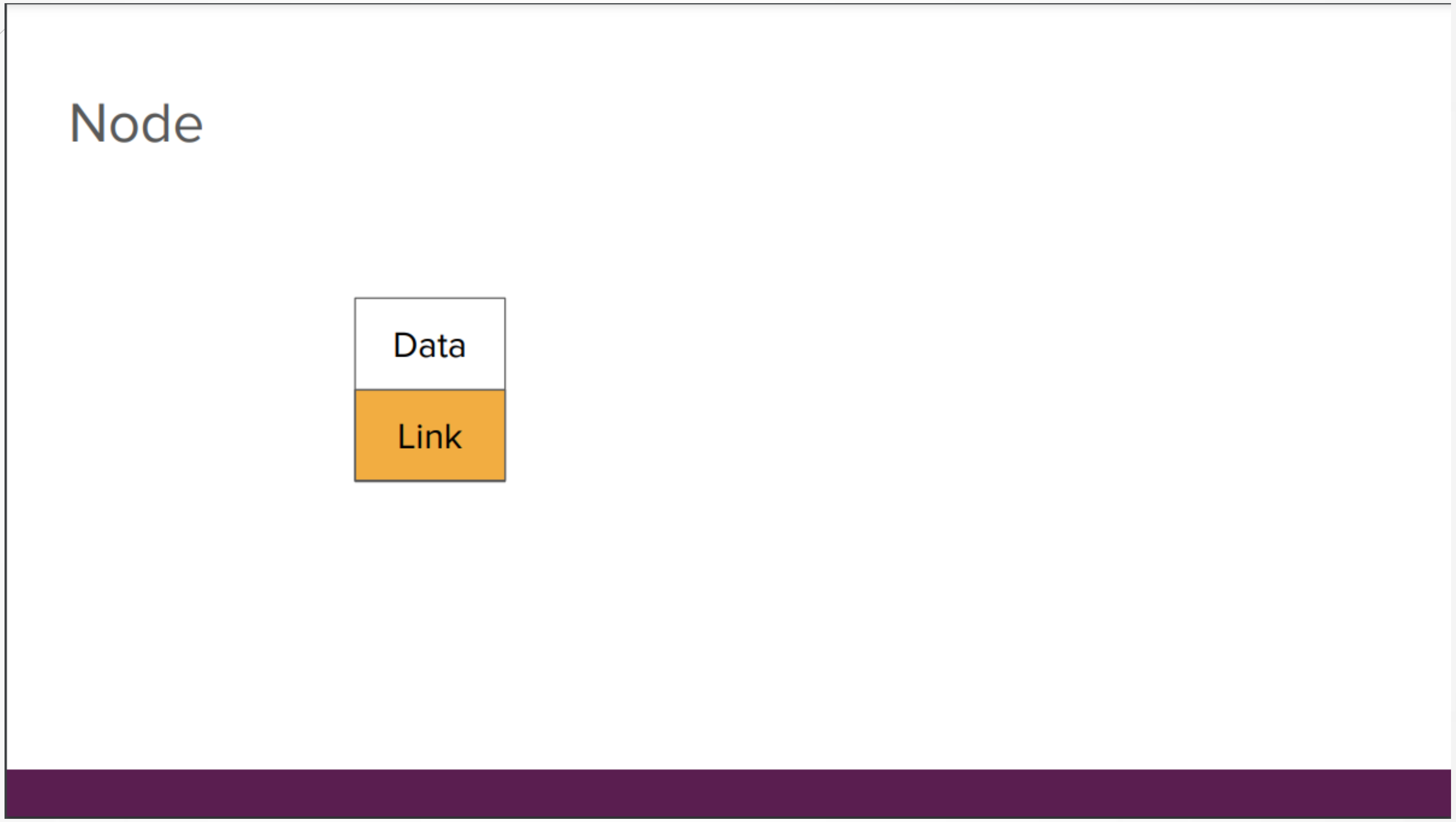


What is a linked list?

- A linked list is a **chain of nodes**.

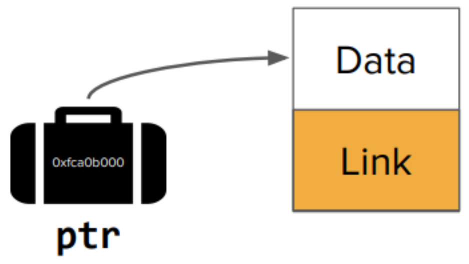
- Each **node** contains two pieces of information:
  - Some piece of data that is stored in the sequence
  - A link to the next node in the list

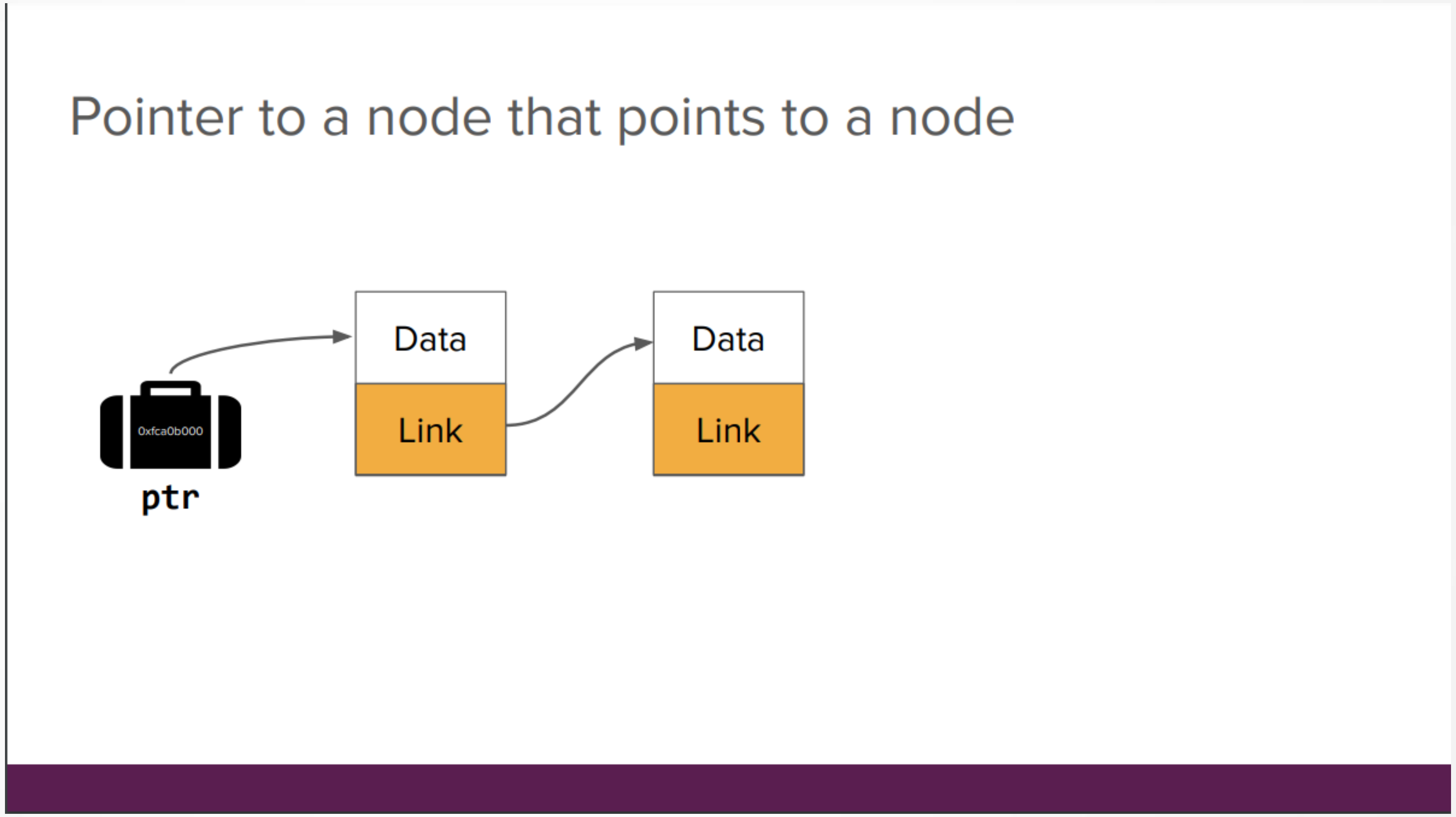
- We can traverse the list by starting at the first node and repeatedly following its link.



Node

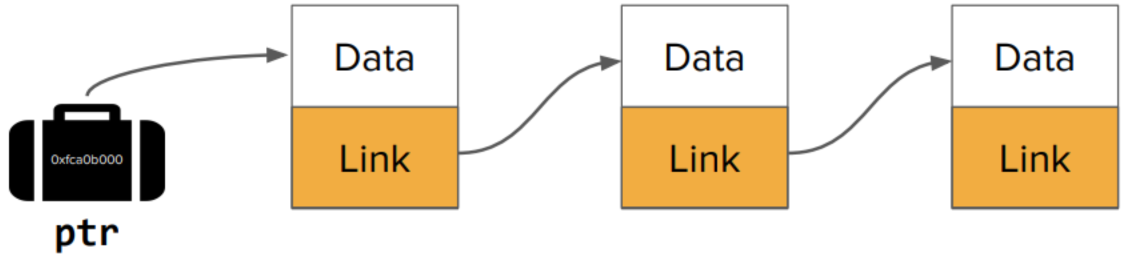
Pointer to a node



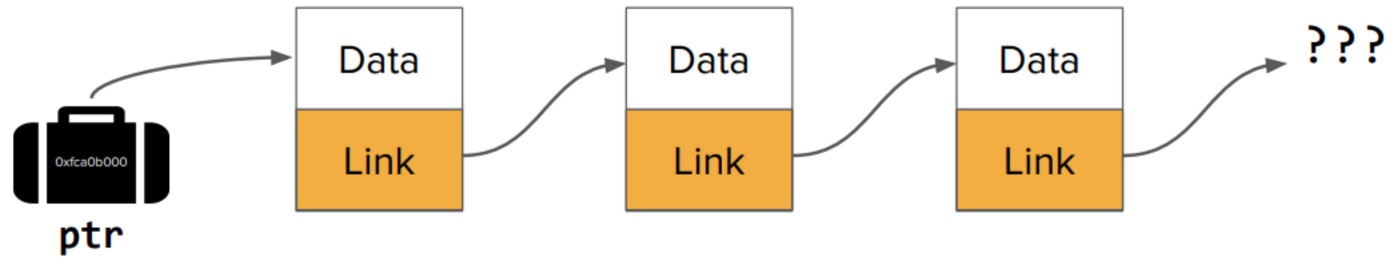


Pointer to a node that points to a node

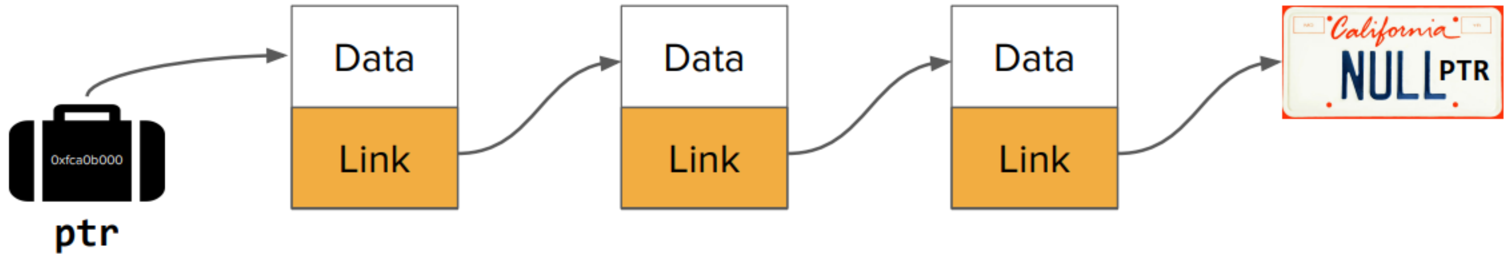
Pointer to a node that points to a node that points to a node



Pointer to a node that points to a node that points to a node



A linked list!



Advantages of Linked list over arrays:

- Size is dynamic
- Ease of insertion & deletion
- Dynamic memory allocation

Disadvantages of Linked list:

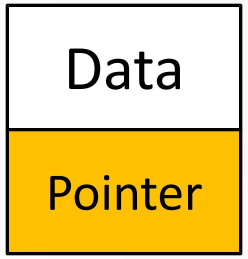
- Random access not allowed (traversing all elements)
- Extra memory space for pointers

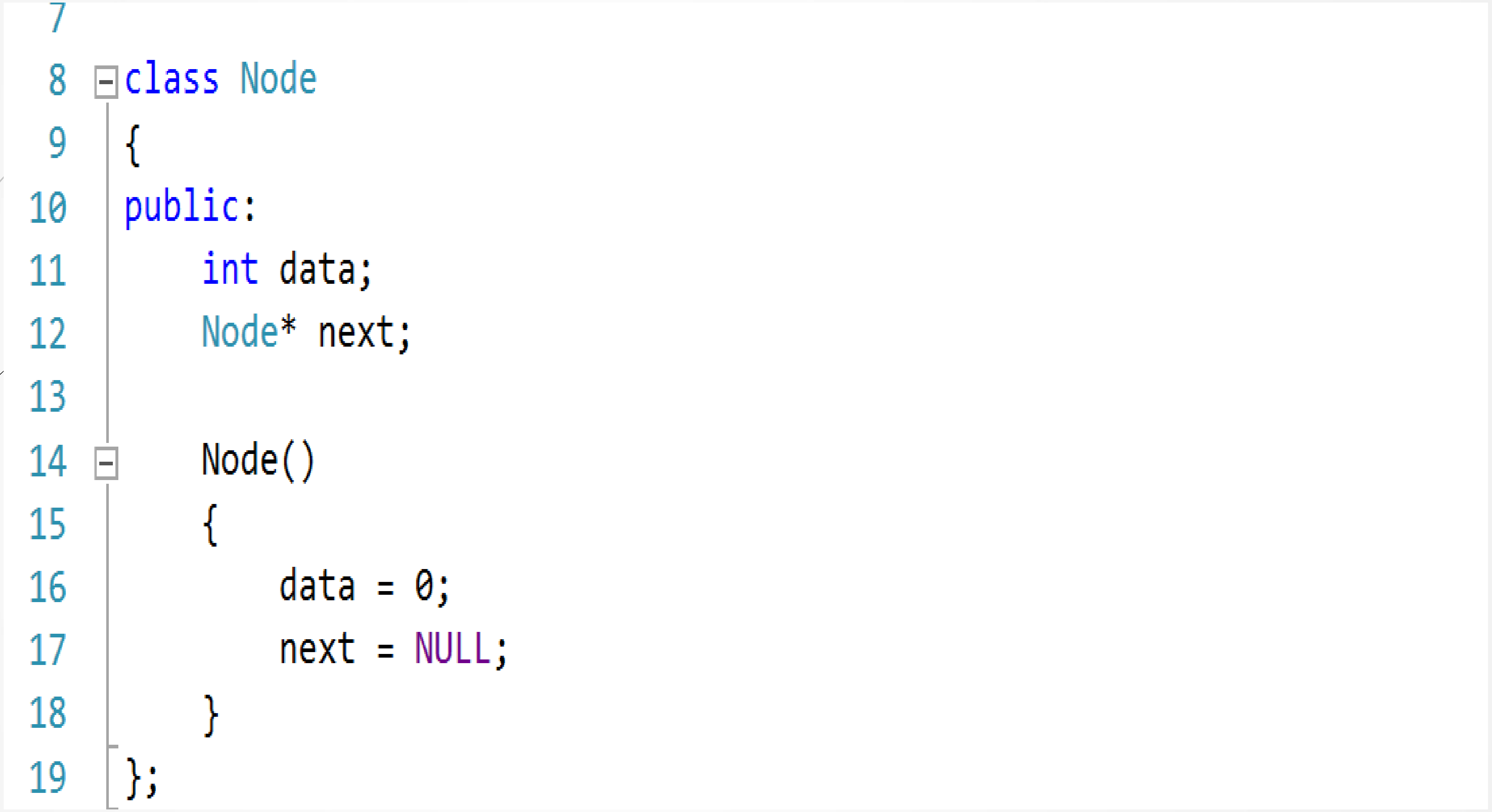
Operations of linked-list:

- Create()
- Traverse() , Display()
- Count()
- Search()
- Insert() { first – last (Append) – before specific item }
- Delete() { first – last – specific item }
- Replace()

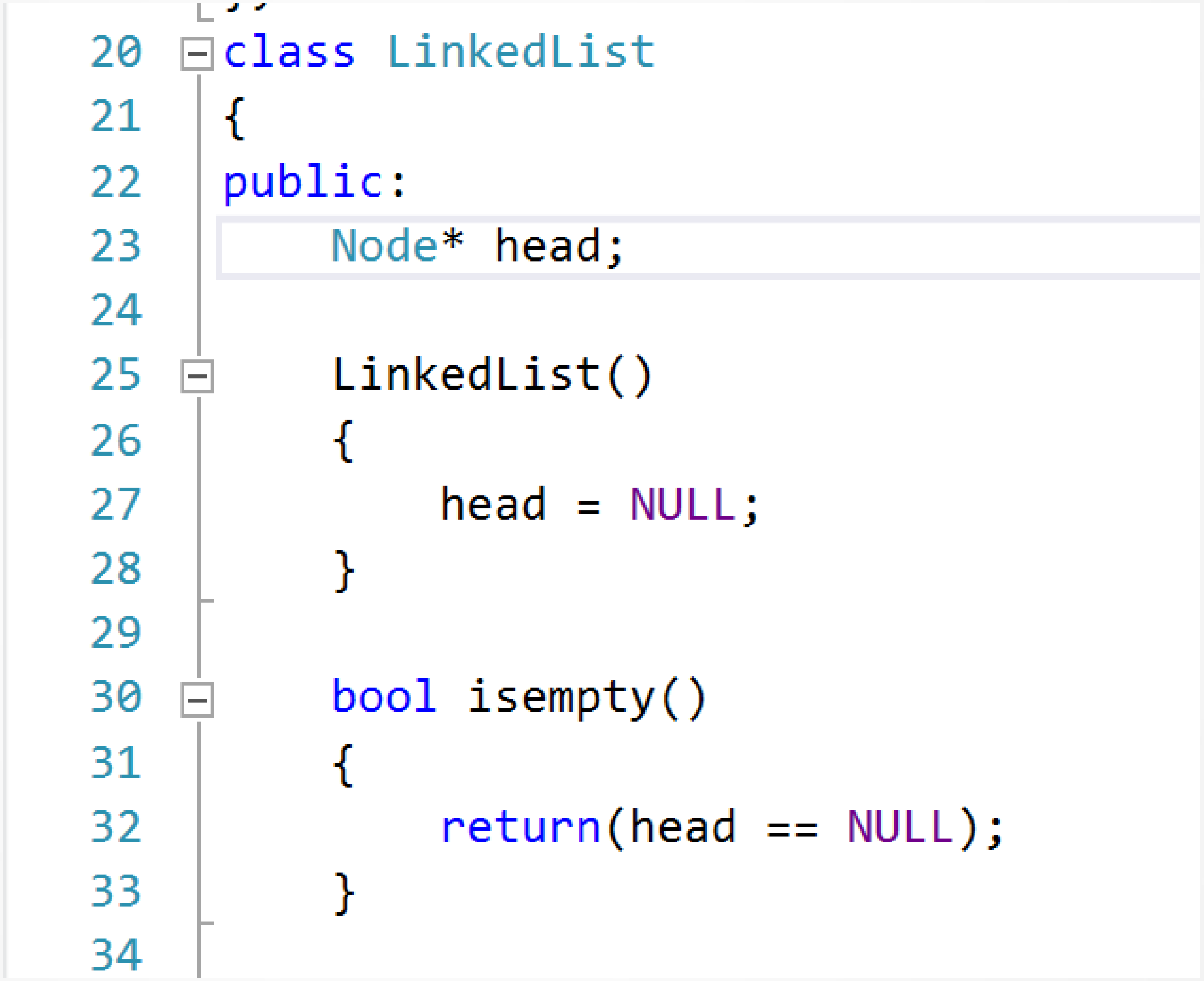
Create()

```
Class Node
        int data
        Node* next
Class Linkedlist
        Node* head
        def constructor()
                set head to Null
        isempty()
                to check the header is null or not
```





```
class Node
{
public:
    int data;
    Node* next;

    Node()
    {
        data = 0;
        next = NULL;
    }
};
```

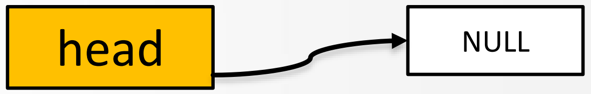


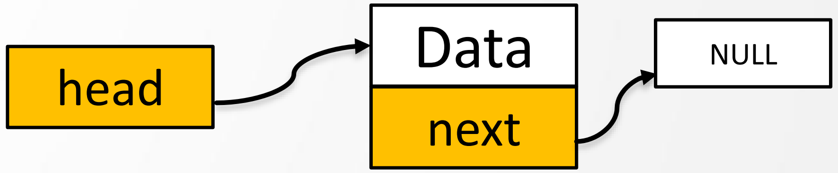
```
class LinkedList
{
public:
    Node* head;

    LinkedList()
    {
        head = NULL;
    }

    bool isempty()
    {
        return(head == NULL);
    }

```

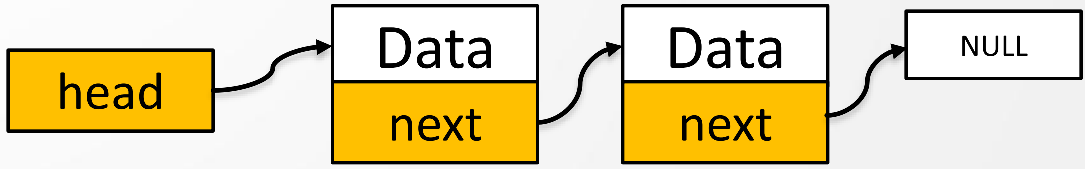
insertFirst()

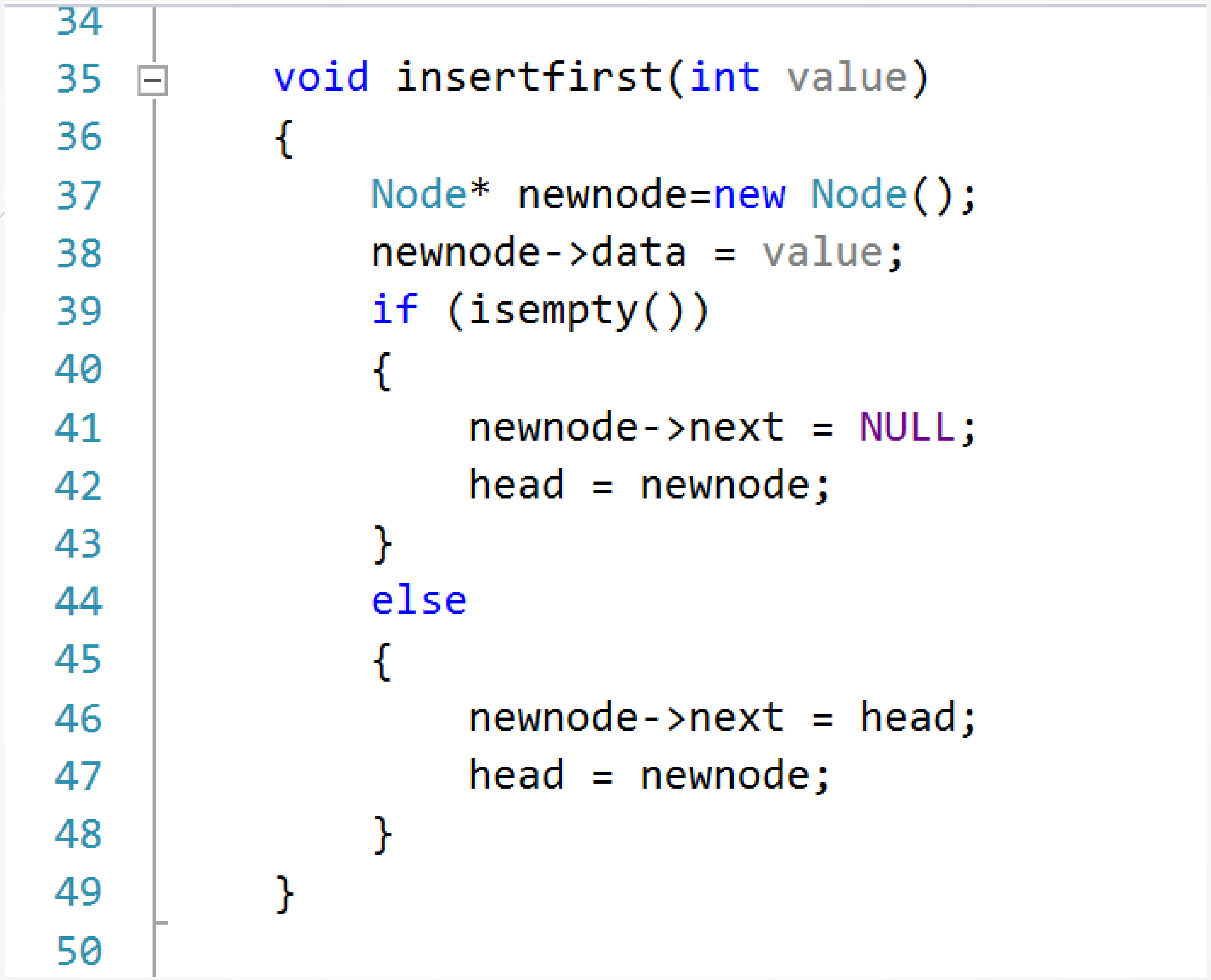
Class Linkedlist

- **void insertFirst(int value)**
  - ➢ **to insert node at the first of linked list**
  - ➢ **Create new node**
  - ➢ **Set value to the data of node**
  - ➢ **Check if the list is empty or not**
  - ➢ **If empty**
    - ➢ **node.next=null**
    - ➢ **head = node**
  - ➢ **If not empty**
    - ➢ **Node.next=head**
    - ➢ **Head=node**









```
void insertfirst(int value)
{
    Node* newnode=new Node();
    newnode->data = value;
    if (isempty())
    {
        newnode->next = NULL;
        head = newnode;
    }
    else
    {
        newnode->next = head;
        head = newnode;
    }
}
```

Thank You