

# North Western University, Khulna



## Report

**Course Code: CSE -2104**

**Course Title: Data structure Laboratory**

### **Special Thanks to:**

Md. Shymon Islam

Lecturer

Department Of CSE

North Western University Khulna, Bangladesh

### **Developed by:**

Jabunnesa Eva

Student ID:20221121010

Sourave Mondal

Student ID: 20221147010

S Rijvi Ratul

Student ID: 20221146010

Department of CSE

North Western University,

Khulna , Bangladesh.

## Table of contents

1.Introduction.....	3
2.Objectives.....	3
3.Description.....	3
.Project	
a. Home page.....	3
b. Array	
*Create Array.....	4
*Array Operation.....	5
*Search.....	6
*Insertion.....	6
*Deletion.....	8
*Update.....	9
c. Linked List	
*Create Linked List.....	11
*Search.....	13
*Insertion.....	13
*Deletion.....	16
*Update.....	17
4.Dependencies.....	18

## Introduction

A simple implementation of a data structure project that involves array and linkedlist operations using the Tkinter module for creating a graphical user interface(GUI).

- An array is a finite set of the same type of data items. In other words, it is a collection of homogeneous data items. The elements of an array are stored in successive memory locations.
- Linked list is a list or collection of data items that can be stored in scattered locations in computer's memory. To store in scattered locations in memory we have to make the link between one data item and another.

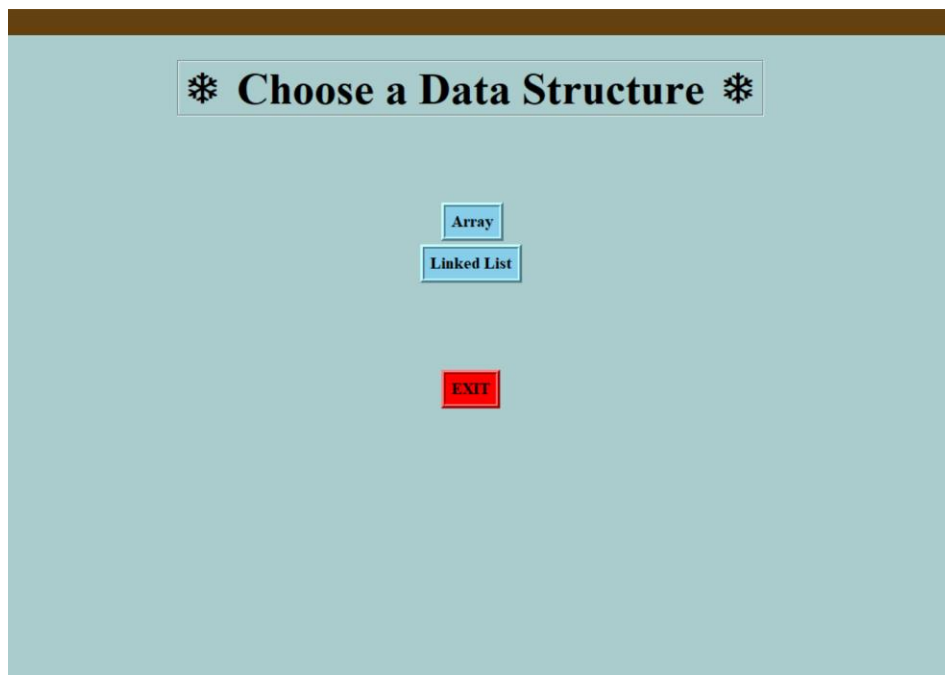
## Objectives

The project aims to demonstrate basic data structure operations such as insertion, deletion, searching, and updating elements in both arrays and linked lists.

## Description

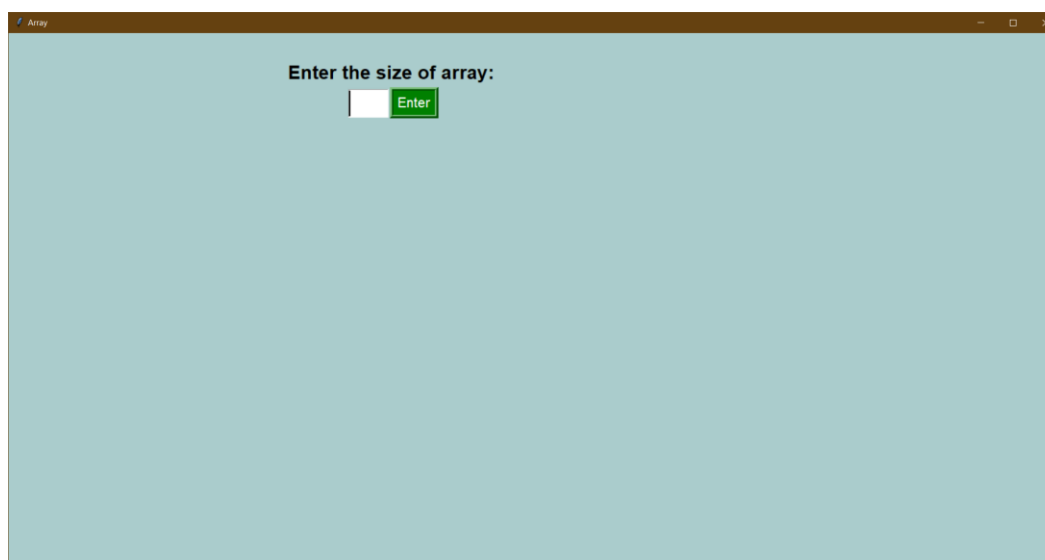
### **Home page:**

This is the home page of the data structure project. There is two buttons. To perform array operation press “Array” button and, press the “Linked list” button to perform the linked list operation. And “Exit” button perform to exit this page.

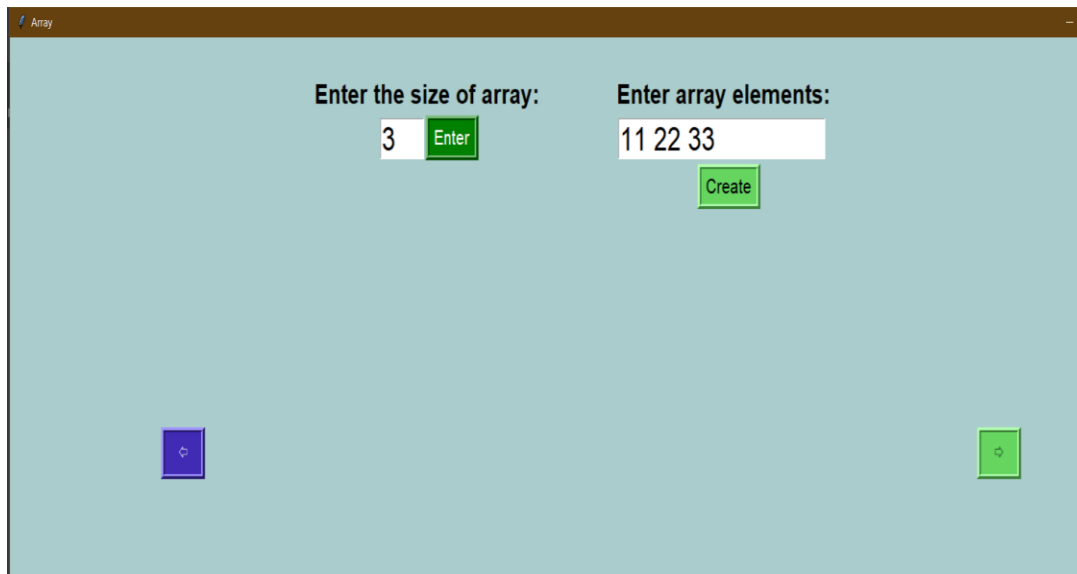


## Array

By clicking the “array” button, go to the array page.



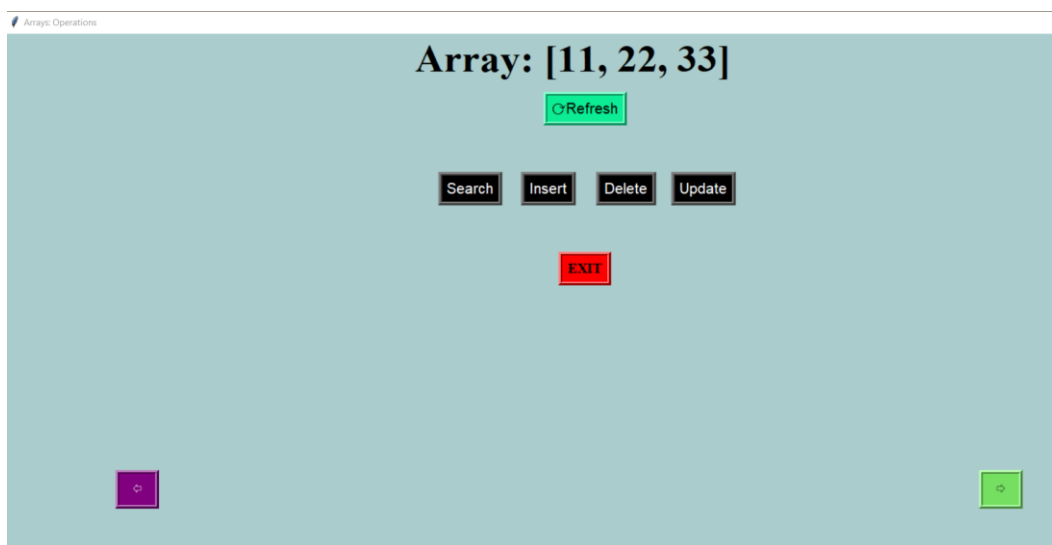
**Create an Array:** To create an array we should input the array size and then hit “Enter” button .Now we can see entry box for input the array elements. So enter the elements in the array. Then click “Create” button to create the array. If you want to go to the home page click “Back” button.



The screenshot shows a web application window titled "Array". It has a light blue background. At the top, there are two input sections. The first section is labeled "Enter the size of array:" and contains a text input field with the number "3" and a green "Enter" button. The second section is labeled "Enter array elements:" and contains a text input field with the values "11 22 33" and a green "Create" button. At the bottom left, there is a purple square button with a left-pointing arrow. At the bottom right, there is a green square button with a right-pointing arrow.

### **Array Operation:**

After creating an array, you will see the array operation page. You can perform the search, insertion, deletion and update operations whichever you want. To do so, just press the desired button.



The screenshot shows a web application window titled "Arrays: Operations". It has a light blue background. At the top, it displays "Array: [11, 22, 33]" in bold black text. Below this, there is a green "Refresh" button. In the center, there are four black buttons labeled "Search", "Insert", "Delete", and "Update" arranged horizontally. Below these buttons is a red "EXIT" button. At the bottom left, there is a purple square button with a left-pointing arrow. At the bottom right, there is a green square button with a right-pointing arrow.

### Search Element:

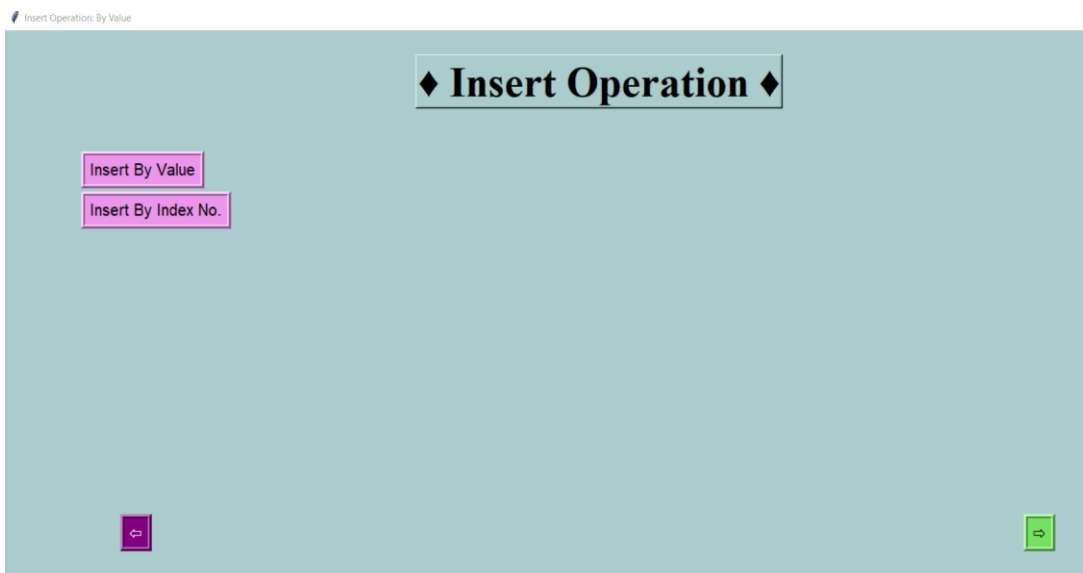
Enter the element you want to search in the array and hit “Search” button.



The screenshot shows a web application titled "Search Operation". It features a central text input field containing the number "11" and a yellow "Search" button. Above the input field, the text "Enter the element you want to search: [11, 22, 33]" is displayed. Below the input field, the results are shown: "10 Not Found in the Array" and "11 Found at Position 0". The interface has a light blue background with a dark blue header bar. There are small purple and green icons in the bottom left and right corners, respectively.

### Insertion:

In the insert operation, you can insert a value in two ways, Insert by value & Insert by index no.



The screenshot shows a web application titled "Insert Operation". It features two pink buttons: "Insert By Value" and "Insert By Index No.". The interface has a light blue background with a dark blue header bar. There are small purple and green icons in the bottom left and right corners, respectively.

**Insert by Value:** Enter the value you want to insert and hit “Insert” button

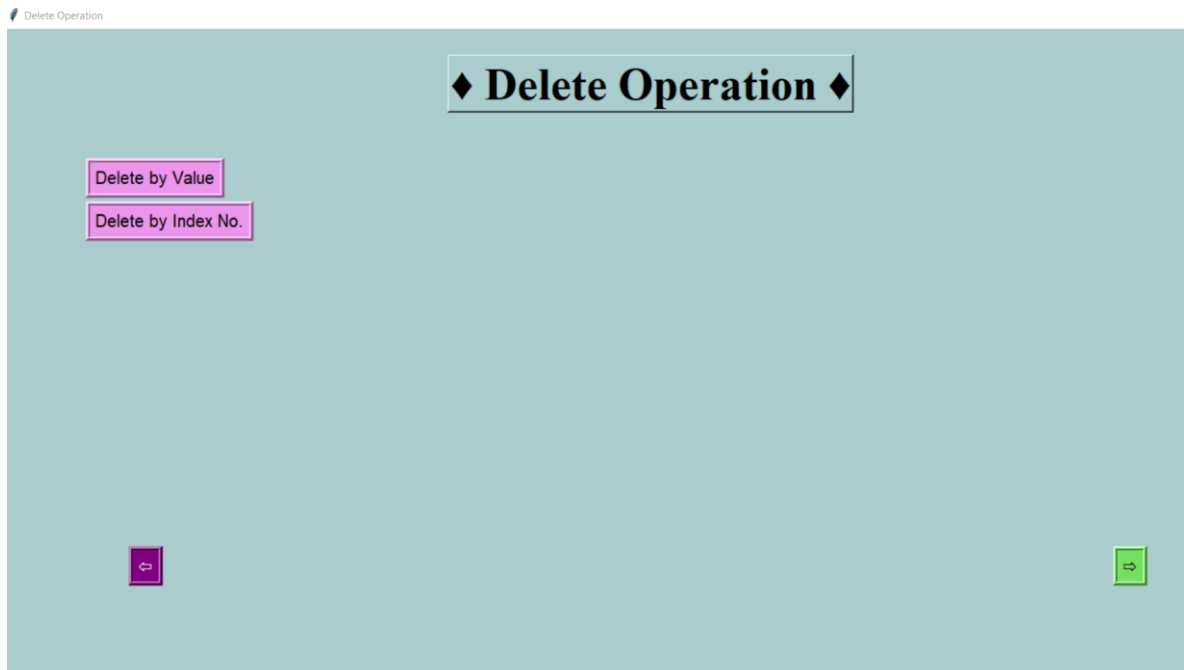
The screenshot shows a web application titled "Insert Operation: By Value". It features a central heading "◆ Insert Operation ◆". Below the heading, there is a text prompt "Enter the element you want to insert: [11, 22, 33]". To the left of the input field, there are two buttons: "Insert By Value" (highlighted in pink) and "Insert By Index No.". The input field contains the number "22". Below the input field is a yellow "Insert" button. Below the "Insert" button, the text "After inserting 22" is displayed, followed by "Updated array: [11, 22, 33, 22]". At the bottom left, there is a purple button with a double arrow icon, and at the bottom right, there is a green button with a double arrow icon.

**Insert by Index No:** Enter the index number & value you want to insert and hit “Enter” button.

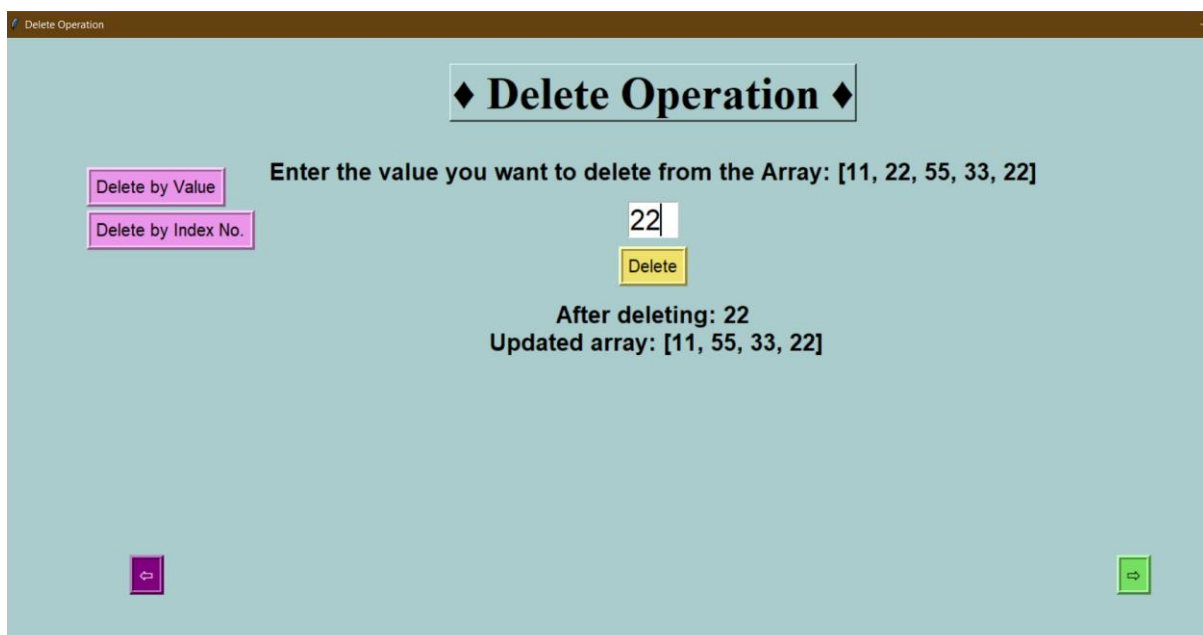
The screenshot shows a web application titled "Insert Operation: By Index". It displays the current "Array: [11, 22, 33, 22]". Below this, there is a prompt "Enter the Index No." followed by an input field containing the number "2". Below the index input field is a prompt "Enter the Value" followed by an input field containing the number "55". Below the value input field is a purple "Enter" button. Below the "Enter" button, the text "After inserting 55 at Position: 2" is displayed, followed by "Updated array: [11, 22, 55, 33, 22]". At the bottom left, there is a purple button with a double arrow icon, and at the bottom right, there is a green button with a double arrow icon.

## **Deletion:**

In the deletion operation, you can delete elements by indexing and by value.

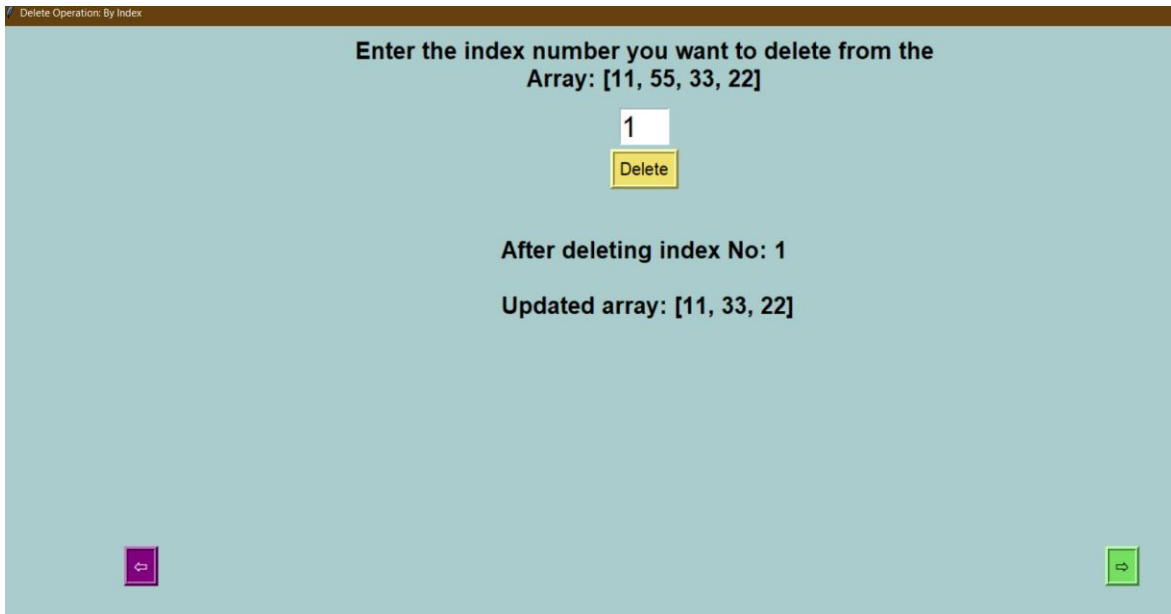


**Delete by Value:** Enter the value you want to delete and hit “Delete” button.





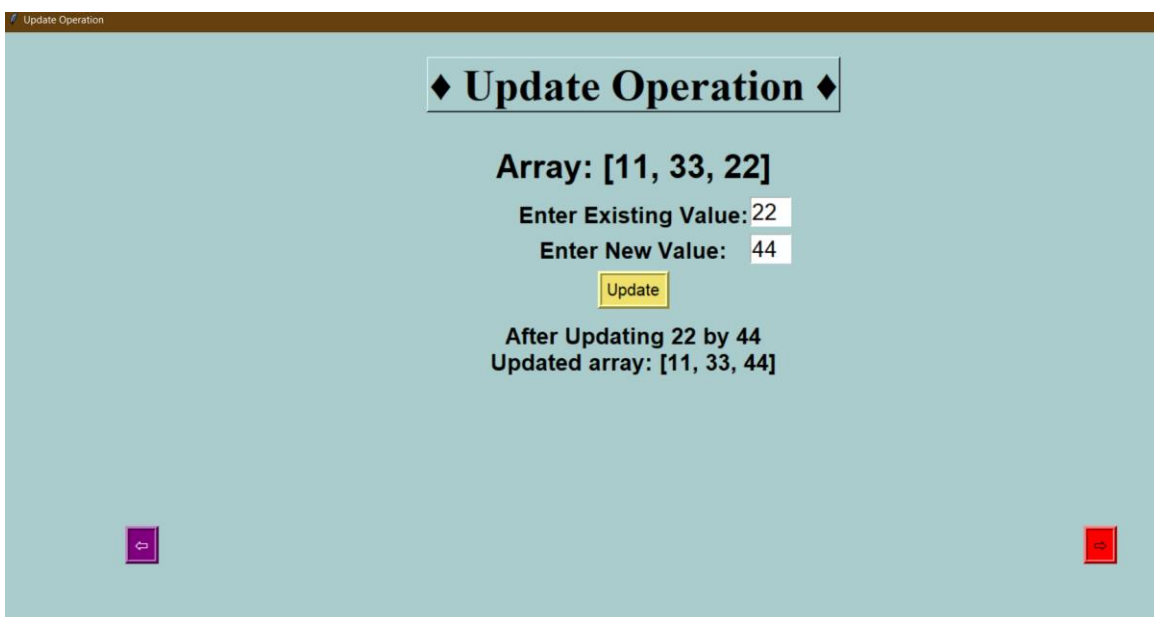
**Delete by Index:** Enter the index number you want to delete and hit “Delete” button.



The screenshot shows a web application titled "Delete Operation By Index". The main content area has a light blue background. At the top, it says "Enter the index number you want to delete from the Array: [11, 55, 33, 22]". Below this, there is a text input field containing the number "1" and a yellow "Delete" button. Underneath the button, it says "After deleting index No: 1" and "Updated array: [11, 33, 22]". At the bottom left, there is a purple square button with a white up and down arrow. At the bottom right, there is a green square button with a white up and down arrow.

### **Update:**

In the first entry box input the old value that you want to update and in the second entry box enter the updated value and then hit “Update” button.



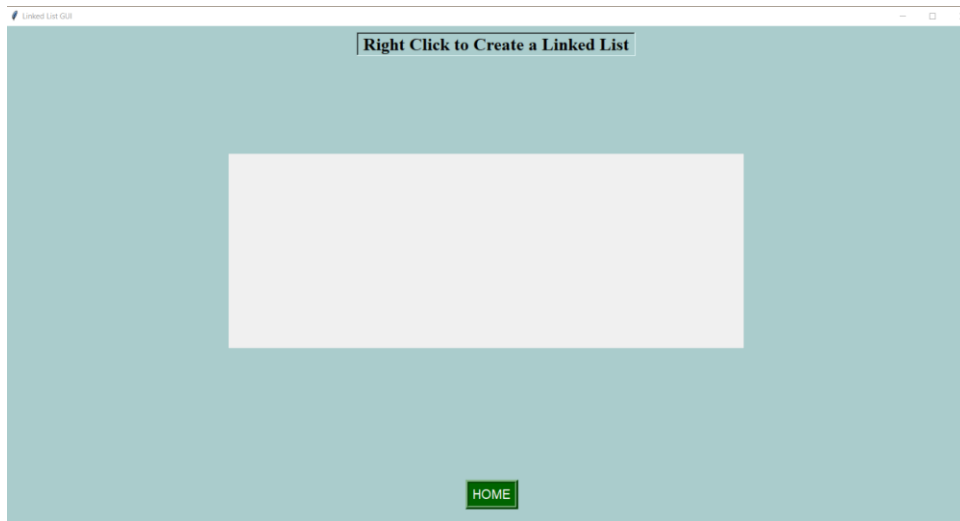
The screenshot shows a web application titled "Update Operation". The main content area has a light blue background. At the top, there is a title "◆ Update Operation ◆" in a dark blue box. Below this, it says "Array: [11, 33, 22]". Then, there are two text input fields: "Enter Existing Value: 22" and "Enter New Value: 44". Below these fields is a yellow "Update" button. Underneath the button, it says "After Updating 22 by 44" and "Updated array: [11, 33, 44]". At the bottom left, there is a purple square button with a white up and down arrow. At the bottom right, there is a red square button with a white up and down arrow.

And, the array operation is finished here.

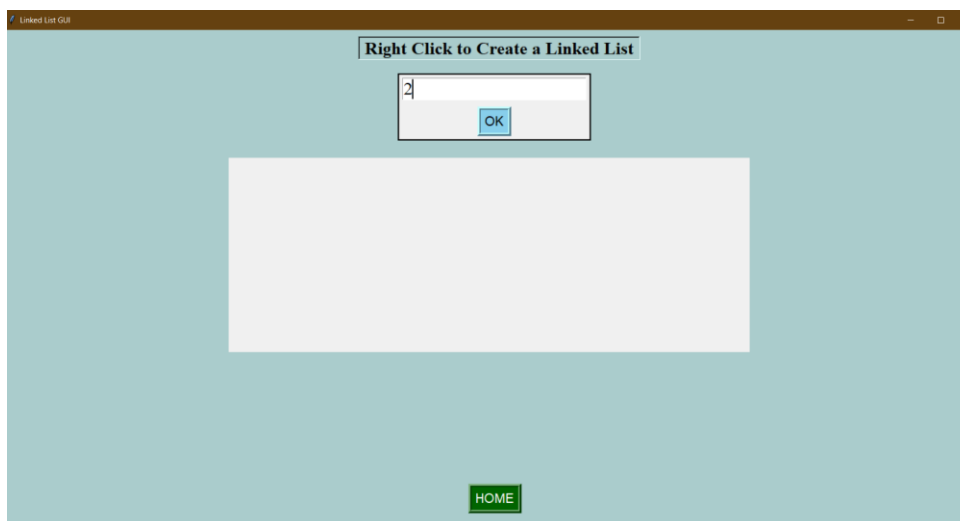
Linked list operation started on the next page.....

## Linked list

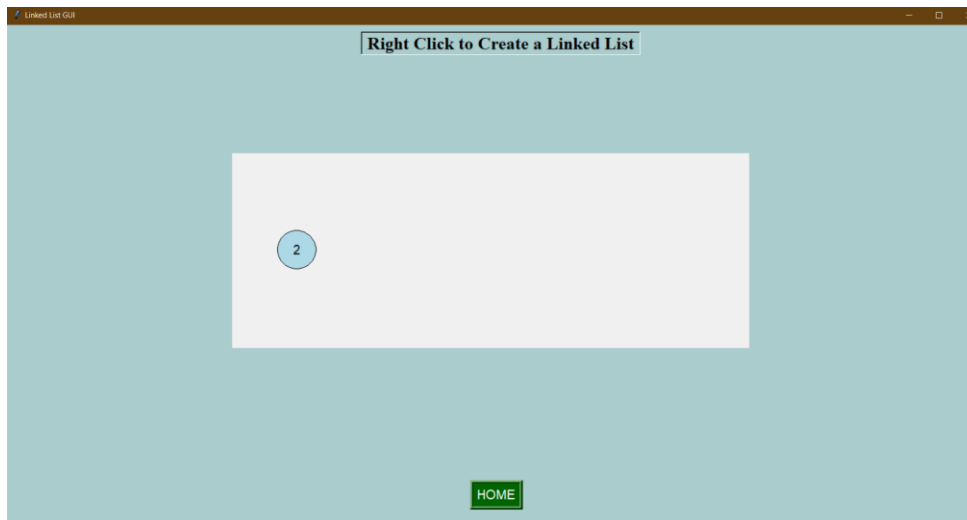
By clicking the “Linked list” button, you go to the linked list page. At first, it is an empty page.



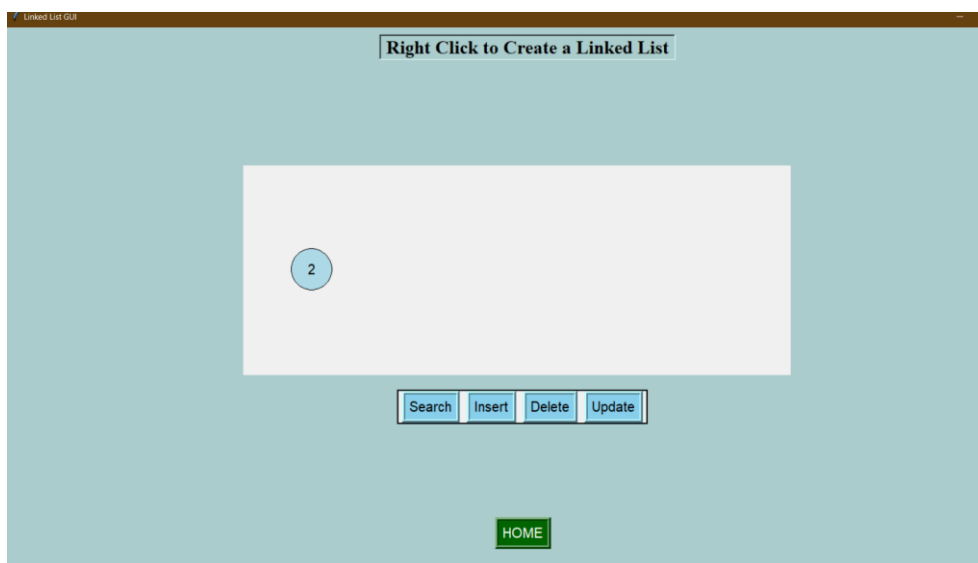
**Create Linked list:** To create a linked list you need to right click the mouse. Input as many values as you want and press the “OK” button.



The list is shown in the next picture.



You can do any operation on the linked list .To do so, .you just need to click any node. After clicking on any node, you will see four buttons “Search”, “Insert”, “Delete”, “Update”. As shown below:



### Search:

Search for a node in the linked list whether it is found or not. Enter the node element you want to search in the linked list then hit “Search” button.



Assume that you can searched “6” and “6” is found in the linked list.

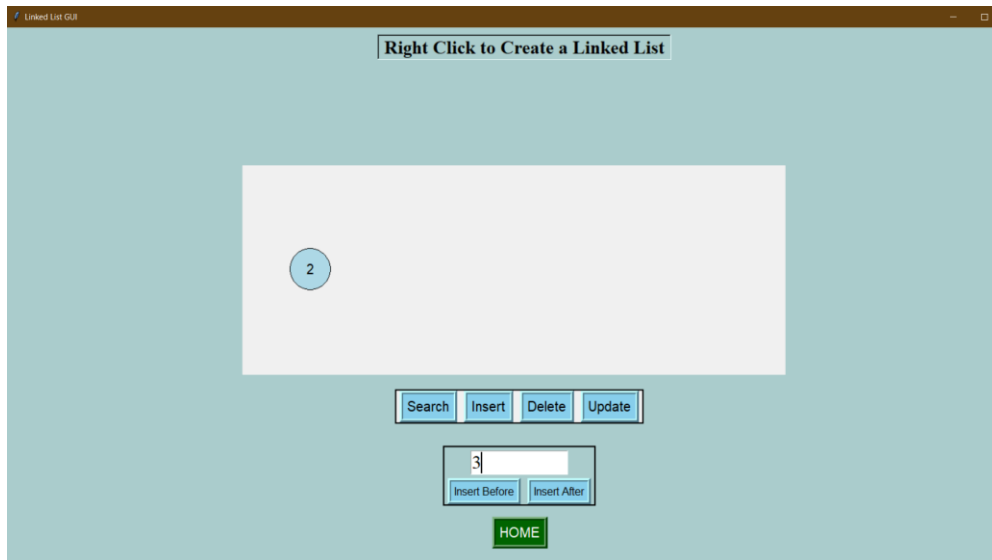
### Insertion:

You can insert a node element in two ways. Insert before & Insert after.

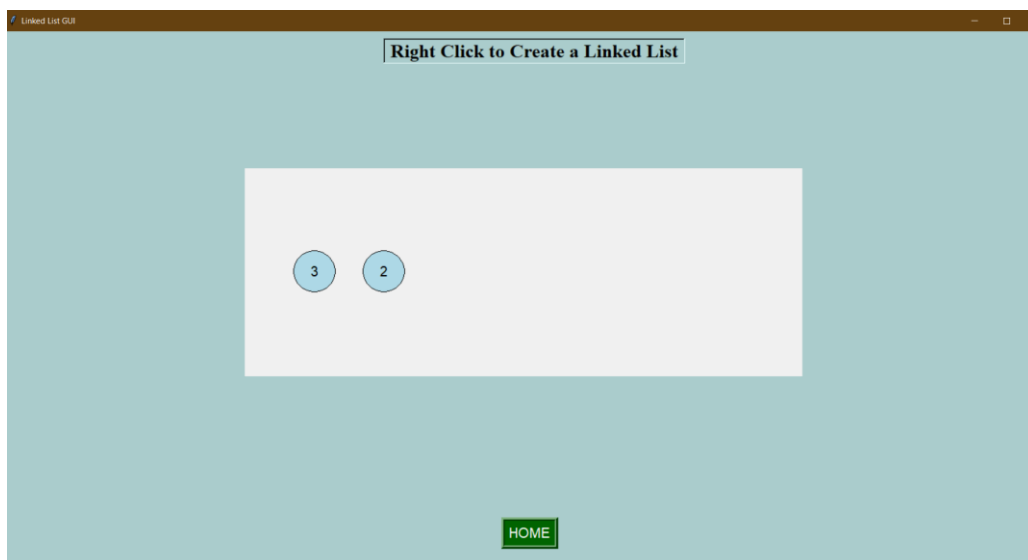


### Insert Before:

To insert a node before current node, enter the node element in the entry box and press the “Insert Before” button.



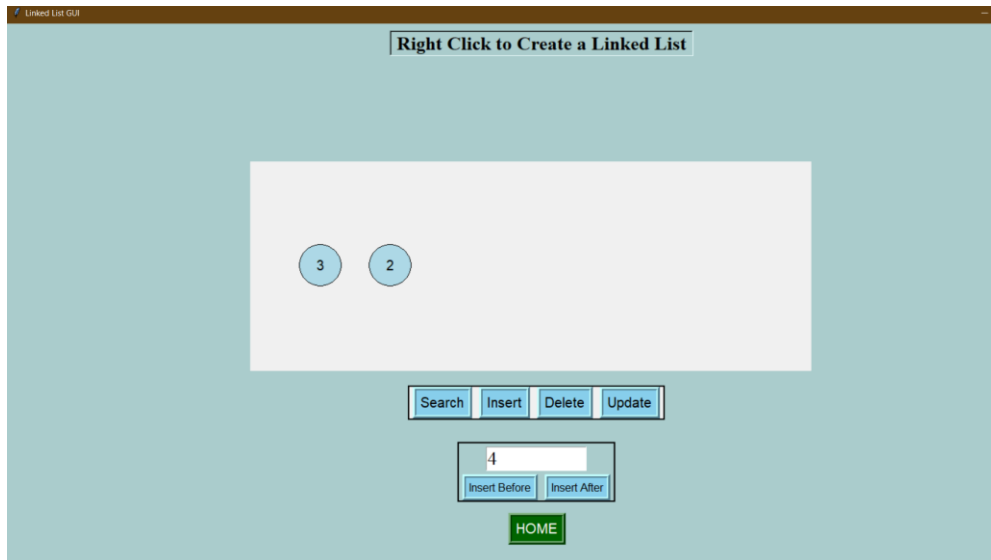
Assume that you can insert “3” before the current node and then hit “Insert Before” button .you can see the result as the next picture.



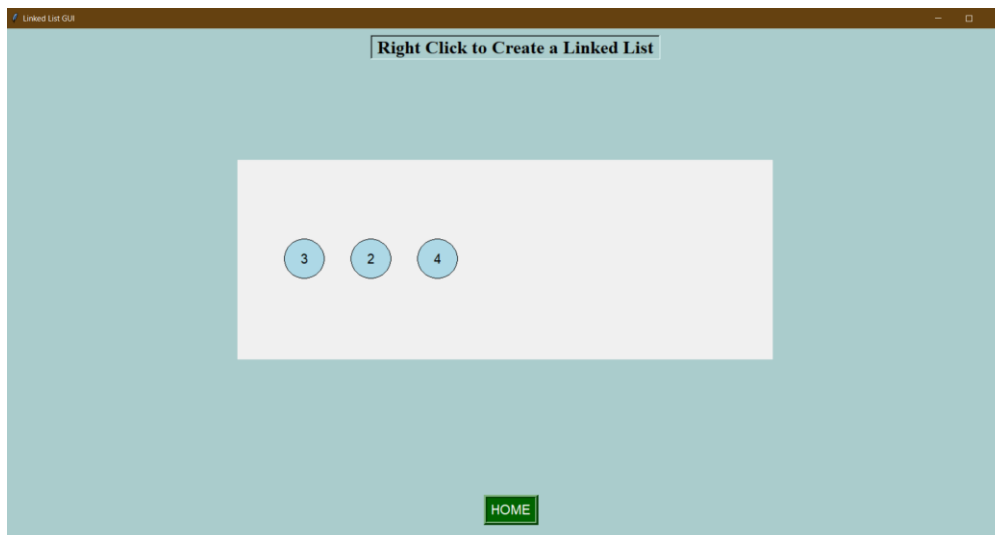
You can see the node element “3” is insert before the current node.

### **Insert After :**

To insert a node after current node, enter the node element in the entry box and press the “Insert After” button.



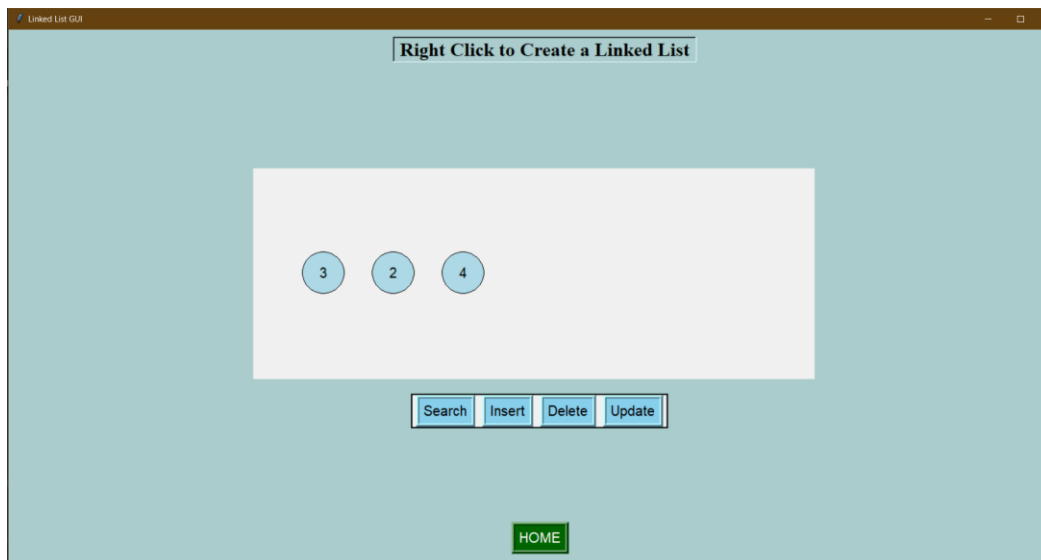
Assume that you can insert “4” after the current node and then hit “Insert After” button. you can see the result as the next picture.



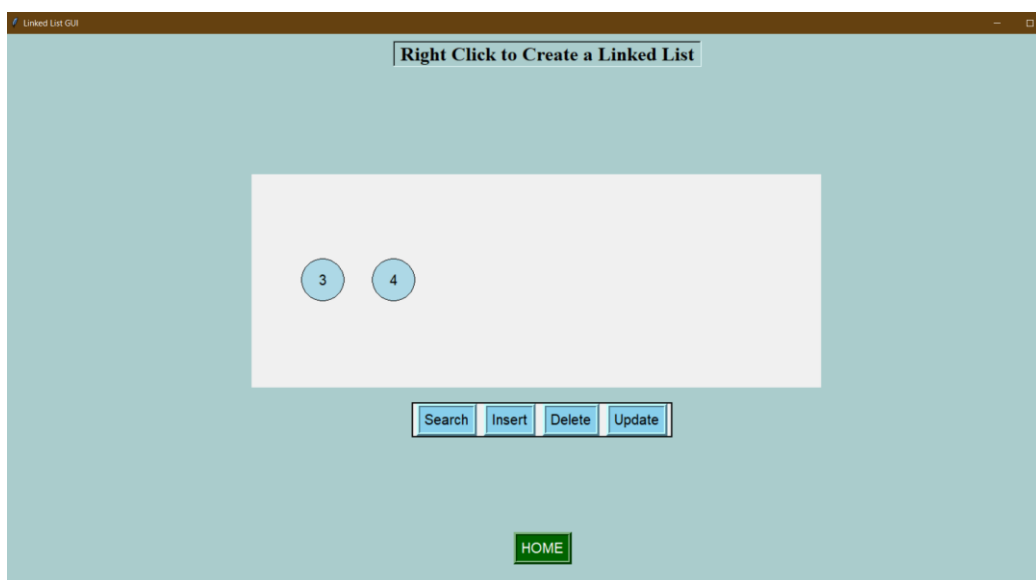
You can see the node element “4” is insert after the current node.

## **Deletion:**

To delete a node ,click the node you want to delete and then hit “Delete” button.



Assume that you can delete “2” and then hit “Delete” you can see the result as the next picture.

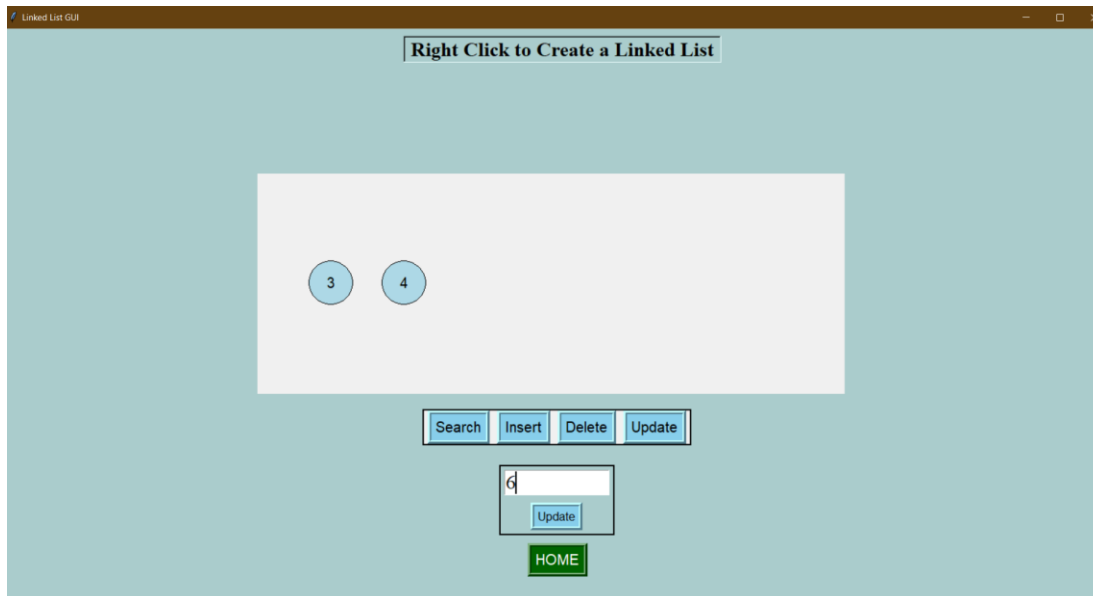


You can see the node “2” is deleted.

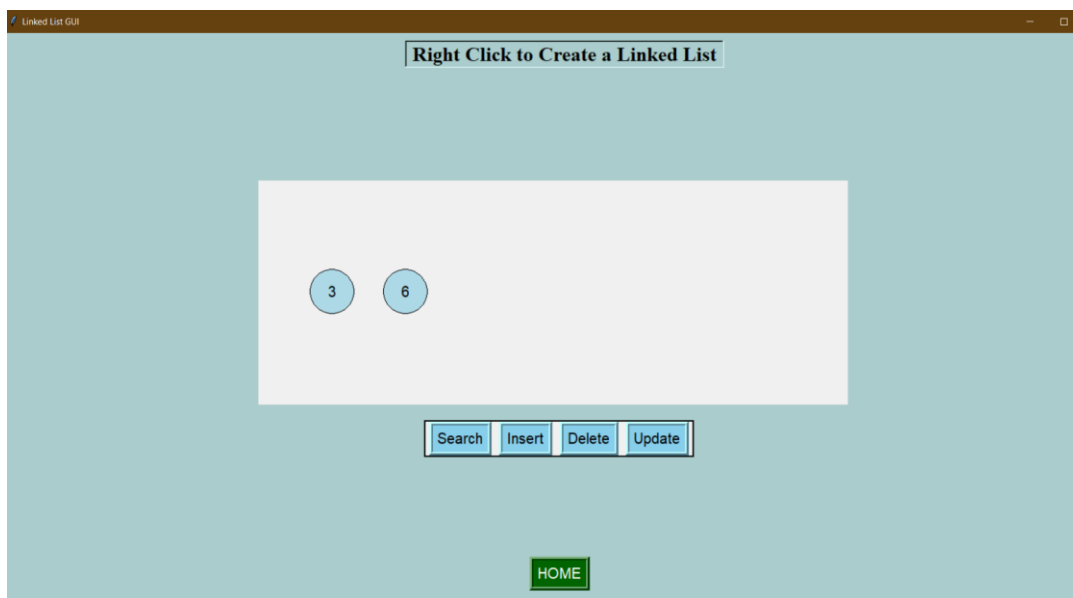


## Update:

To update a node in the linked list, you have to enter the update node element at the entry box, and press the “Update” button.



You can see the update list as the next picture.



You can see the element “4” updated into “6”

### **Dependencies**

**Python 3.11.2:** PyCharm lets you quickly and easily develop a Python project. For built this project we use Python language and Tkinter (Tk) built in library. After Installing all library the project will run successfully.

**Python Language:** We implement this data structure project in Python Language.

**25 June, 2023**

**North Western University**

**Khulna, Bangladesh.**