

# *North Western University*



## User Manual

**Course Code: CSE-2104**

**Course Title : Data Structure – Laboratory**

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## Introduction

**Array:** An array is a sequenced collection of data items that share a common name. It is also called the Linear Derived Data Type. We can use an array number *num* to represents a set of *numbers* of a group of employees in an organization. We can refer to the individual numbers by writing a number called *index* or *subscript* in brackets after the array name. Arrays in data structures help solve some high-level problems like the "longest consecutive subsequence" program or some easy tasks like arranging the same things in ascending order.

**Linked List:** A Linked List is a dynamic process data type. A completely different way to represent a list is to make each item in the list part of a structure that also contains a *link* to the structure containing the next item of list is called a linked list. Because it is a list whose order is given by links from one item to the next. Each structure of the list is called a node and consists of two fields, one containing the *item*, and the other containing the *address* of the *next* item (a pointer to the next item) in the list.

A linked list is therefore a collection of structures ordered not by their physical placement in memory (like an array) but by logical links that are stored as part of the data in the structure itself. The link is in the form of a pointer to another structure of the same type.

## Objectives

This is an array and linked list project of Data Structure Lab. This is a software base project. This project is built by Java language. It is a Java GUI attached program. GUI means Graphics User Interface. This GUI makes the project visually experienced. This java project has to some operation such as: Search, Insert, Update, Delete.

**Search:** To search an element according to the number or index/position.

**Insert:** To insert an element according to the number or position.

**Update:** To update an element according to the number or position for the replace.

**Delete:** To delete an element according to the number or position.

The operations of the project will be valid for both array and linked list elements. There are also two other options for the operations:

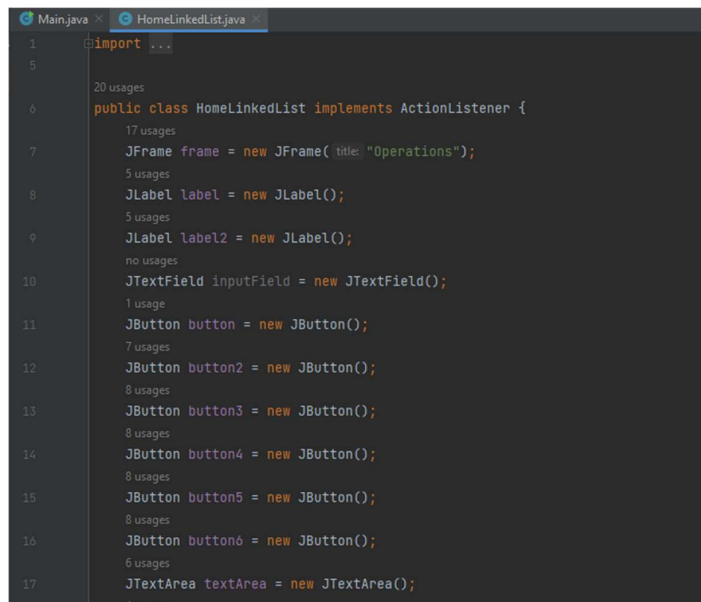
- i. Position: It defines the index or sequential position of the set of array and linked list.
- ii. Number: It defines the elements or number or value of the set of number and the linked list.

For more help:

YouTube Video Link: <https://youtu.be/rrx7lVv0tPc>

# Descriptions

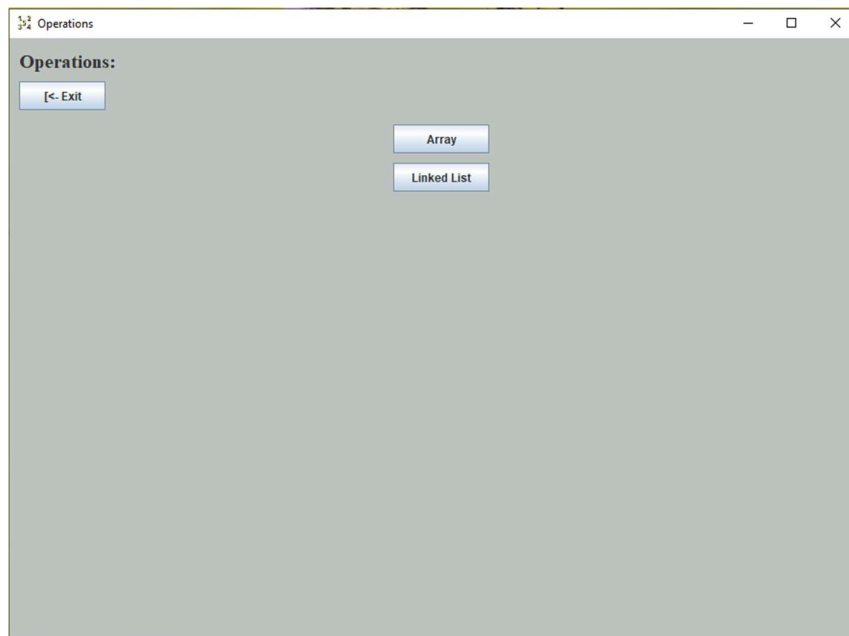
1. **GUI:** a GUI forms of the project is very important for this. It makes awesome and easier to visible and understand the process for the users. The users input data to the operator functions easily.



```

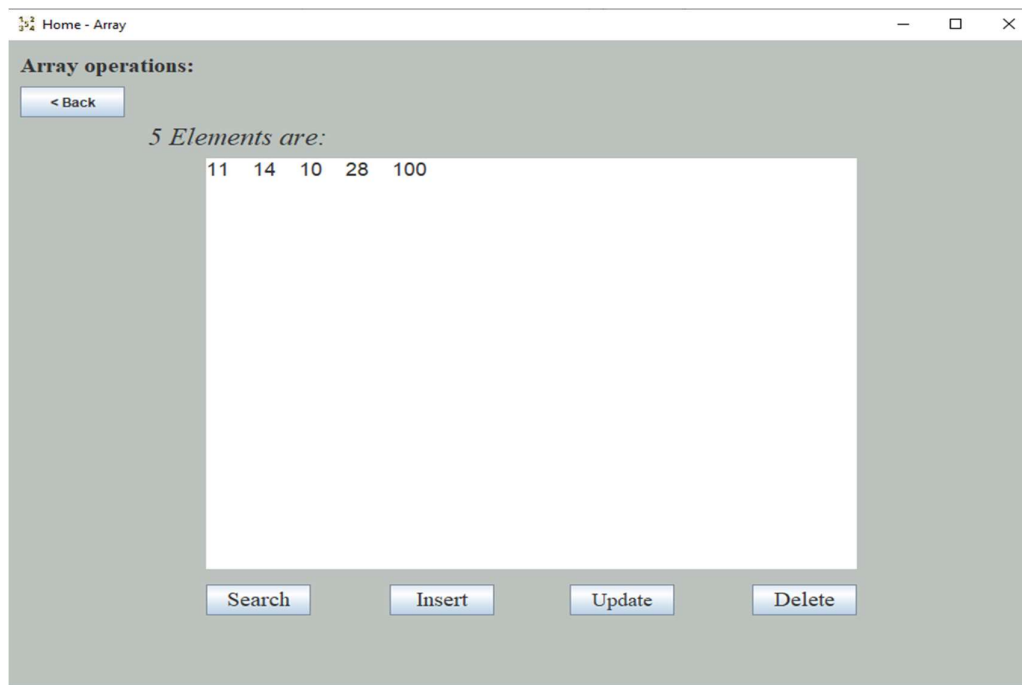
1  import ...
5
6  public class HomeLinkedList implements ActionListener {
7      JFrame frame = new JFrame( title, "Operations");
8      JLabel label = new JLabel();
9      JLabel label2 = new JLabel();
10     JTextField inputField = new JTextField();
11     JButton button = new JButton();
12     JButton button2 = new JButton();
13     JButton button3 = new JButton();
14     JButton button4 = new JButton();
15     JButton button5 = new JButton();
16     JButton button6 = new JButton();
17     JTextArea textArea = new JTextArea();

```



The Java GUI program used by “JFrame” function for first interface.

2. **Array:** An array operation is produced. Users select ‘Array’ option then ‘Create’ and then Enter ‘Size of Array’. At last, they input the ‘Elements’ (numbers) and click ‘Finish’ to go to the ‘Home’ page for the array operation.



There are shown the button for Search, Insert, Update, Delete.

3. **Linked List:** A linked list operation is produced. Users select 'Linked List' option then 'Create'. At last, they input the 'Elements' (numbers) as the size of list that user wants. After complete the input, click 'Display' to go to the 'Home' page for the Linked List operations.

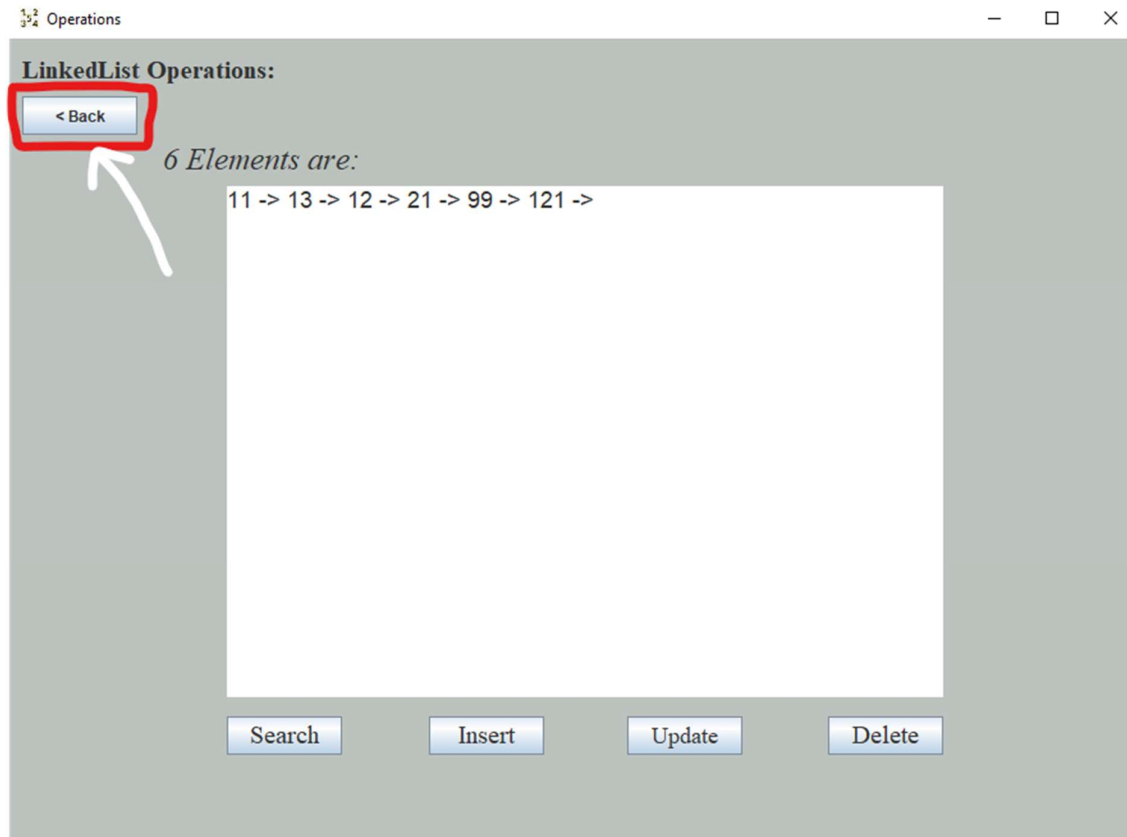
The image shows two screenshots of a web application interface for Linked List operations.

The top screenshot shows the 'Operations' page. It has a title bar 'Operations' with standard window controls. The main content area has a '< Back' button, the text 'Elements are:', and a form for 'Element 7:' with a text input field, a 'Submit' button, and a 'Display' button. Below the form, a large white box displays the linked list: '11 -> 13 -> 12 -> 21 -> 99 -> 121 ->'.

The bottom screenshot shows the 'LinkedList Operations' page. It has a title bar 'LinkedList Operations' with standard window controls. The main content area has a '< Back' button, the text '6 Elements are:', and a large white box displaying the linked list: '11 -> 13 -> 12 -> 21 -> 99 -> 121 ->'. At the bottom of the page, there are four buttons: 'Search', 'Insert', 'Update', and 'Delete'.

This is the Home page. User can operate the numbers from here. Operate buttons are shown below of the page.

Note: There are also a 'Back' button to go to back position or page. If user make wrong or mistake to operate function, they can go to back by the click Back.



## Dependencies

**IntelliJ IDEA:** This is an application software to built or design a Java GUI project. It makes easier to write the codes and design a GUI. It works and build project by “JDK-19” extension file.

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