Lab 8-Doubly Linked list Implementation

Objective

To understand the basic concepts of the Implementation of Doubly Linked List and its searching.

Theory

Doubly Linked List

Doubly Linked List is a variation of Linked list in which navigation is possible in both ways, either forward and backward easily as compared to Single Linked List. Following are the important terms to understand the concept of doubly linked list.

Link − Each link of a linked list can store a data called an element.

Next − Each link of a linked list contains a link to the next link called Next.

Prev − Each link of a linked list contains a link to the previous link called Prev.

LinkedList − A Linked List contains the connection link to the first link called First and to the last link called Last.

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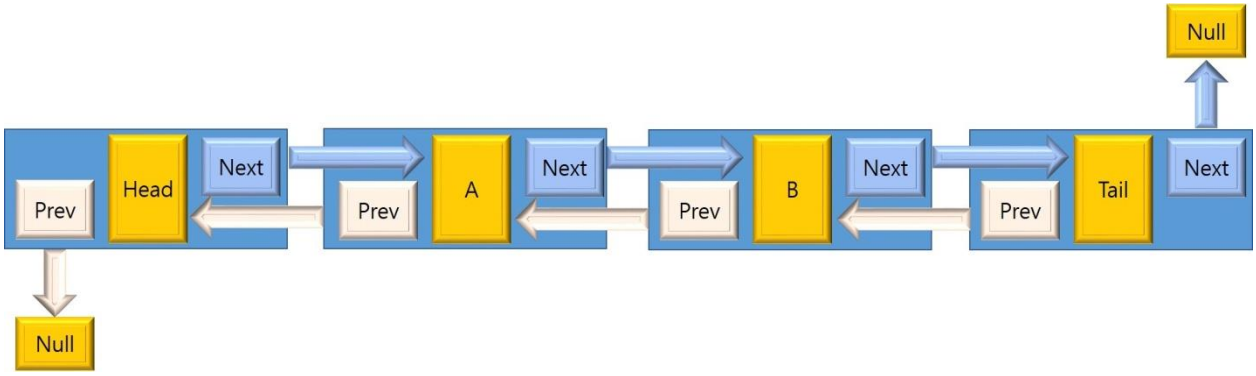

Figure 1 Doubly Linked List

Basic Operations

Following are the basic operations supported by a doubly linked list.

- Insertion − Adds an element at the beginning of the list.
- Deletion − Deletes an element at the beginning of the list.
- Insert Last − Adds an element at the end of the list.
- Delete Last − Deletes an element from the end of the list.
- Insert After − Adds an element after an item of the list.
- Delete − Deletes an element from the list using the key.
- Display forward − Displays the complete list in a forward manner.

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- Display backward − Displays the complete list in a backward manner.

Example

```
class LinkedList{
        Node head;
        LinkedList(){
        this.head=null;
        }
}
```

```
class Node{
        int data;
        Node next;
        Node pre;
        Node(int d){
        data=d;
        next=null;
        pre=null;
        }
}
```

```
class Main{
        public static void main(String[] args) {
                LinkedList l1 = new LinkedList();
                Node n1 = new Node (20);
                Node n2 = new Node (100);
                l1.head = n1;
                n1.next = n2;
                n2.pre=n1;
                Node temp = l1.head;
```

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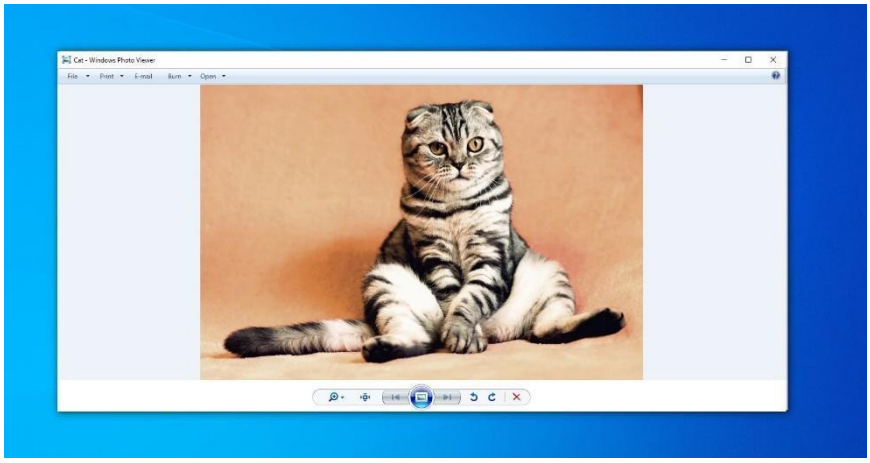
```
                while(temp != null){
                        System.out.println(temp.data);
                        temp = temp.next;
                }
        }
}
```

Practice Tasks

- Write a program to create a doubly linked list with three nodes having char data and print the list. Insert a node using addAfter() and remove a node using deleteByPosition(). Print the list.
- Write a program to create a doubly linked list. Insert a node at the start of the doubly linked list and at the end of the doubly linked list. Print the linked list using the printList().
- Write a program to create a linked list of 4 nodes. Take input from user to search a data in a linked list and delete that node if found.

Exercise

Task#01 (PhotoViewer App)



PhotoViwer is one of the most used web apps which comes pre-installed on windows 10 devices and there are several different apps that are present in Google Play to view the media files present in your device. You must create a **PhotoViwer** app in which you can view all the photos which you have stored on your device. Along with that, you can view the individual photos in our app as well.

The **PhotoViwer** application is having the following view functions

1. **Previous**: View Previous image
2. **Next:** View the next image
3. **SlideShow:** display all stored images

Other functions of **PhotoViwer** are

1. **Add** new image
2. **Rename/Update** an image
3. **Delete** an image
4. **Search** any image
5. **Counter:** display the total number of images stored

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