LAB

JAN 2023

TEB1113

Algorithm & Data Structure

Lab 5

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```
import java.util.*;

public class StackList {
    private int[] arr;
    private int top;
    private int capacity;

    public StackList(int size) {
        arr = new int[size];
        capacity = size;
        top = -1;
    }

    class Node{
        int data;
       Node next;

       public Node(int initialData){
            data= initialData;
            next=null;
       }
    }

    public Node head = null;
    public Node tail = null;

    public int length(){
        int counter = 0;
        Node temp = head;
        if (head == null){
            return 0;
        }
        else if(head!=null){
            while(temp.next != null){
                temp = temp.next;
```

```
            counter++;
        }
    }
    return counter;
}

public void addNodeToEnd(int newEntry){
    Node newNode = new Node(newEntry);
    if(head==null){
        head = newNode;
        tail = newNode;
    }else{
        tail.next = newNode;
        tail = newNode;
    }
}

public void removeLastNode(){
    Node temp = head;
    if(head == null){
        System.out.println("The linked list is empty. ");
    }else{
        for (int i = 1; i < length(); i++){
            temp = temp.next;
        }
    tail = temp;
    temp.next = null;
    }
}


public boolean isEmpty(){return (top < 0) ? true: false;}

public boolean isFull(){return (top >= capacity - 1)? true: false;}
```

```
public void push(int data) {
    if (isFull()) {
        System.out.println("Stack is full.");
    } else {
        addNodeToEnd(data);
        top++;
        System.out.println("Item " +  data + " is added.");
        System.out.println(" ");
    }
}

public int pop() {
    if (isEmpty()) {
        return -1;
    } else {
        System.out.println("Item " + tail.data + " has been removed.");
        removeLastNode();
        top--;
        return tail.data;
    }
}

public int peek() {
    if (isEmpty()) {
        System.out.println("Stack is empty.");
        return -1;
    } else {
        return tail.data;
    }
}

public int size() {
    return top + 1;
}
```

```
    public static void main(String[] args){
        StackList obj = new StackList(5);
        Scanner sc = new Scanner(System.in);
        int ch = 0;
        while (true){
            System.out.println("Choose one option from the following: ");
            System.out.println("1: Push");
            System.out.println("2: Pop");
            System.out.println("3: Peek");
            System.out.println("4: Exit. ");
            System.out.print("Enter your option: ");

            ch= sc.nextInt();
            switch(ch){
                case 1: // Push
                    int input;
                    System.out.print("Enter the number that you want to
add: ");
                    input = sc.nextInt();
                    obj.push(input);
                    continue;
                case 2: // Pop
                    if(obj.isEmpty()){
                        System.out.println("Stack is empty.");
                    }else{
                       obj.pop();
                    }
                    System.out.println(" ");
                    continue;
                case 3: // Peek
                    if(obj.isEmpty()){
                        System.out.println("Stack is empty.");
                    }else{
                        System.out.println("The top item is " +
obj.peek());
                    }
```

```
                    System.out.println(" ");
                    continue;
                case 4:
                    break;
                default: System.out.println("Invalid input. ");
            }

        }
    }
}

// https://onlinegdb.com/ppWRNmgh3E
```