9/2/2024

Data Structures

Assignment 1 Solutions

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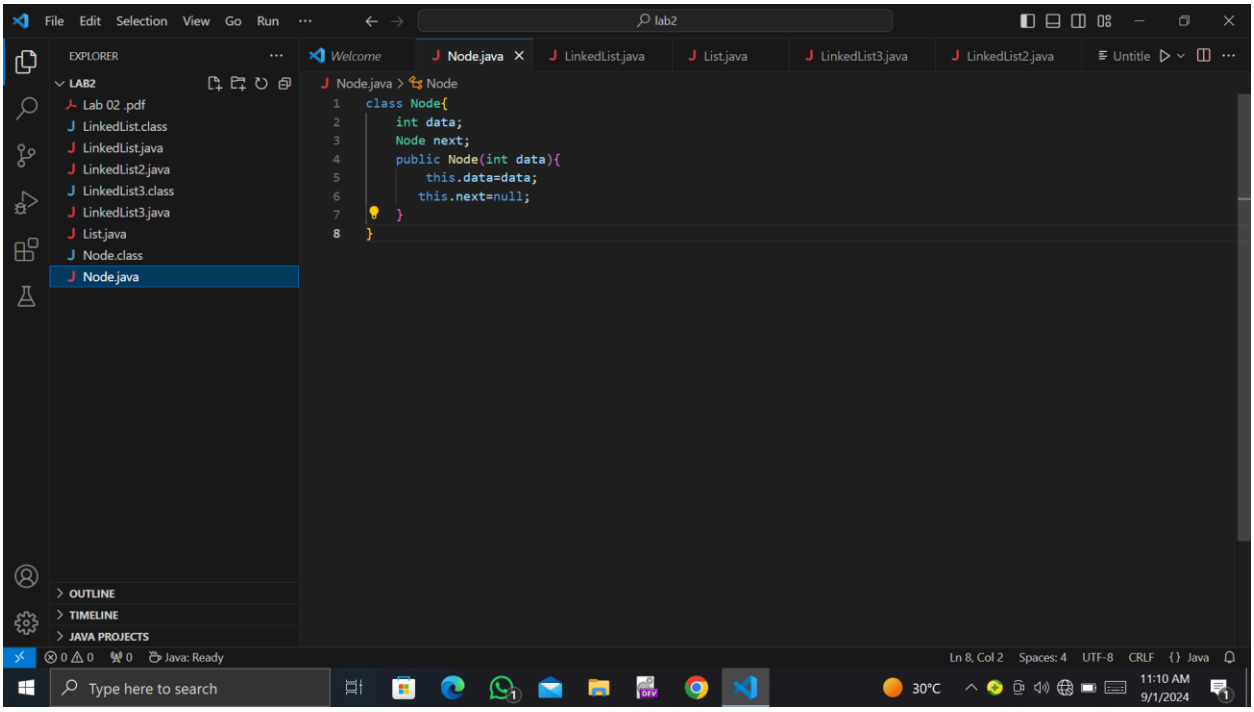
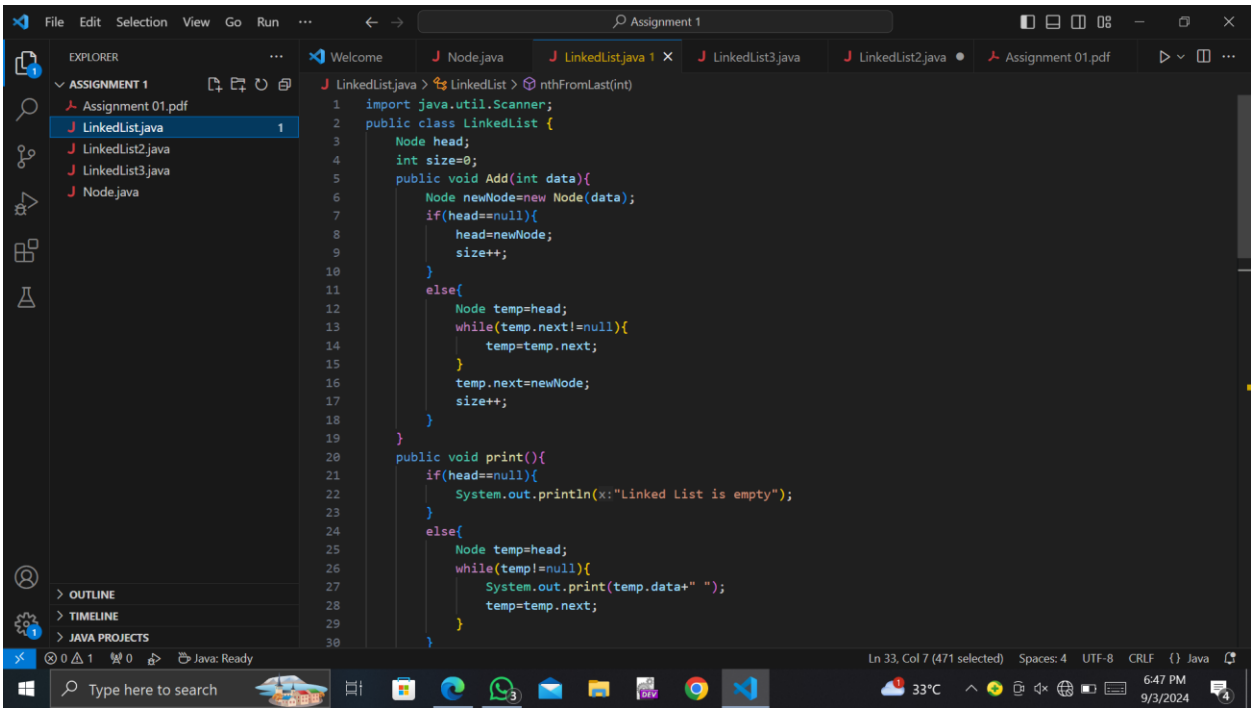
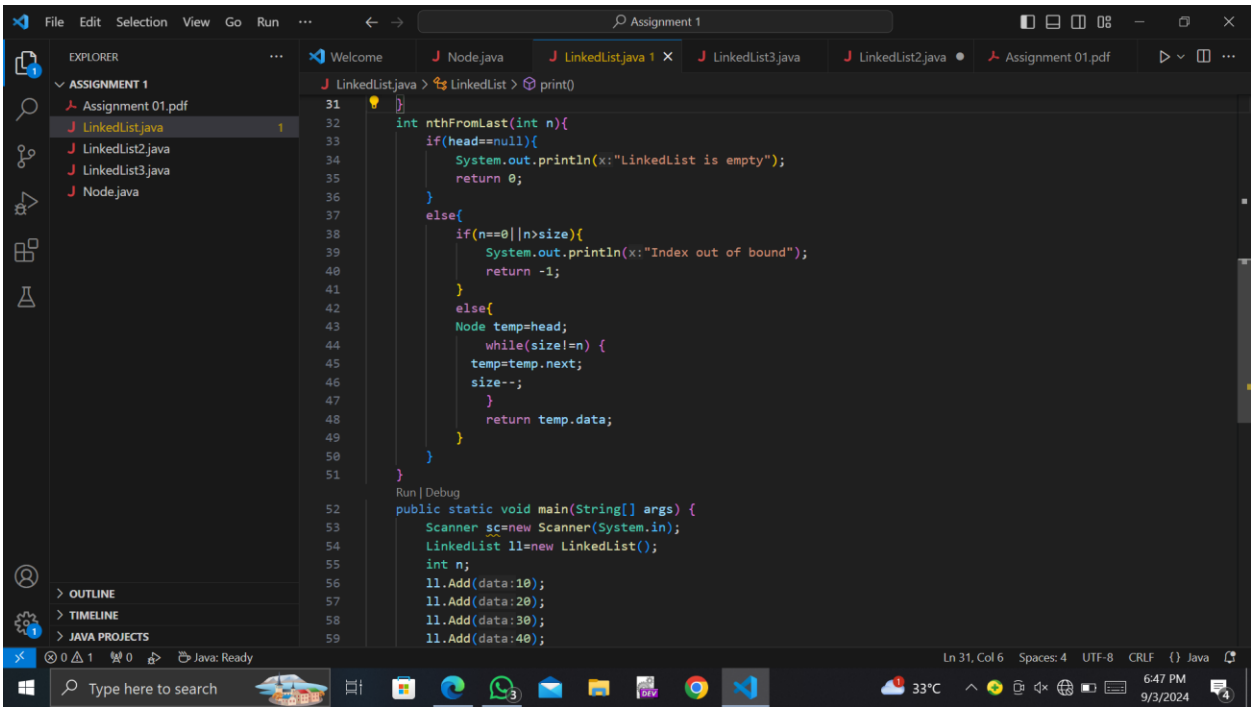
B-S CS III Section B
023-23-0350
To: Ma’am Marina Rajpoot

Task #1

Solution:






File Edit Selection View Go Run
Assignment 1
EXPLORER
ASSIGNMENT 1
Assignment 01.pdf
LinkedList.java 1
LinkedList2.java
LinkedList3.java
Node.java
Welcome
Node.java
LinkedList.java 1
LinkedList3.java
LinkedList2.java
Assignment 01.pdf
LinkedList.java > LinkedList > print()
31 }
32 int nthFromLast(int n){
33 if(head==null){
34 System.out.println(x:"LinkedList is empty");
35 return 0;
36 }
37 else{
38 if(n==0||n>size){
39 System.out.println(x:"Index out of bound");
40 return -1;
41 }
42 else{
43 Node temp=head;
44 while(size!=n) {
45 temp=temp.next;
46 size--;
47 }
48 return temp.data;
49 }
50 }
51 }
Run | Debug
52 public static void main(String[] args) {
53 Scanner sc=new Scanner(System.in);
54 LinkedList ll=new LinkedList();
55 int n;
56 ll.Add(data:10);
57 ll.Add(data:20);
58 ll.Add(data:30);
59 ll.Add(data:40);
OUTLINE
TIMELINE
JAVA PROJECTS
Java: Ready
Ln 31, Col 6 Spaces: 4 UTF-8 CRLF { } Java
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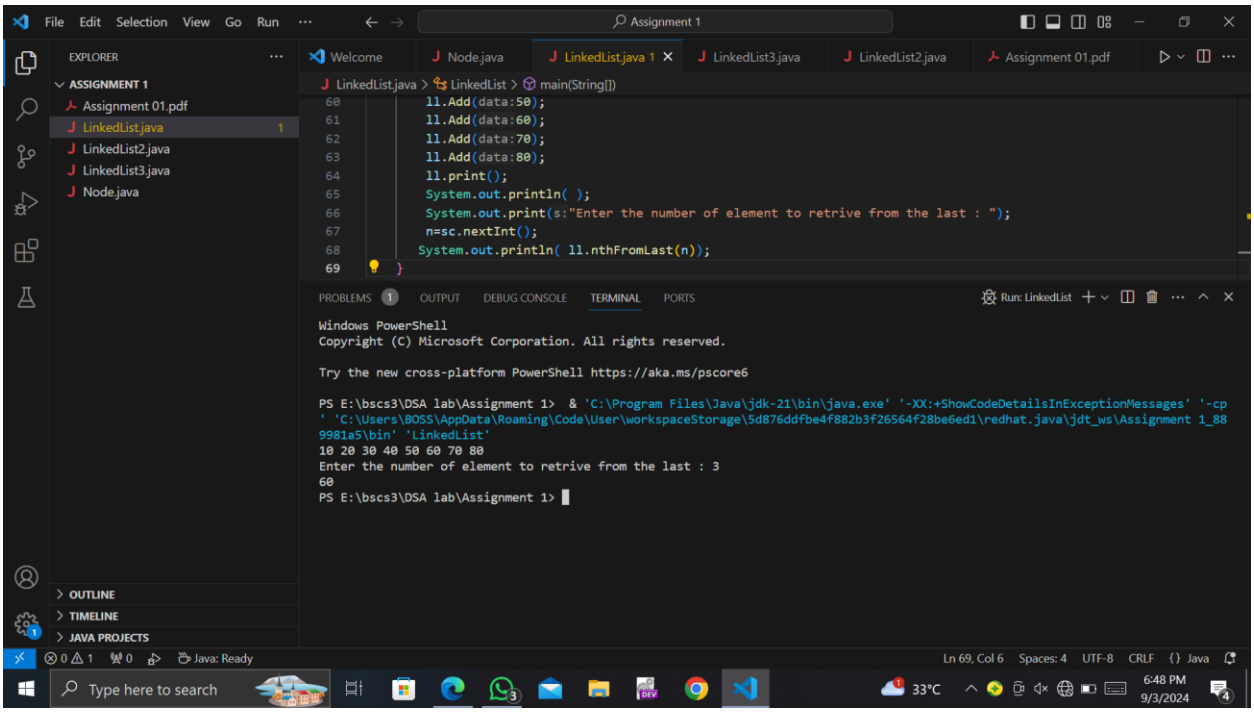
9/3/2024


File Edit Selection View Go Run
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ASSIGNMENT 1
Assignment 01.pdf
LinkedList.java 1
LinkedList2.java
LinkedList3.java
Node.java
Welcome
Node.java
LinkedList.java 1
LinkedList3.java
LinkedList2.java
Assignment 01.pdf
LinkedList.java > LinkedList > main(String[])
60 ll.Add(data:50);
61 ll.Add(data:60);
62 ll.Add(data:70);
63 ll.Add(data:80);
64 ll.print();
65 System.out.println( );
66 System.out.print(s:"Enter the number of element to retrive from the last : ");
67 n=sc.nextInt();
68 System.out.println(ll.nthFromLast(n));
69 }
PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS
Run: LinkedList
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6
PS E:\bscs3\DSA lab\Assignment 1> & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp
' 'C:\Users\BOSS\AppData\Roaming\Code\User\workspaceStorage\5d876ddfbe4f882b3f26564f28be6ed1\redhat.java\jdt_ws\Assignment 1_88
9981a5\bin' 'LinkedList'
10 20 30 40 50 60 70 80
Enter the number of element to retrive from the last : 3
60
PS E:\bscs3\DSA lab\Assignment 1>
OUTLINE
TIMELINE
JAVA PROJECTS
Java: Ready
Ln 69, Col 6 Spaces: 4 UTF-8 CRLF { } Java
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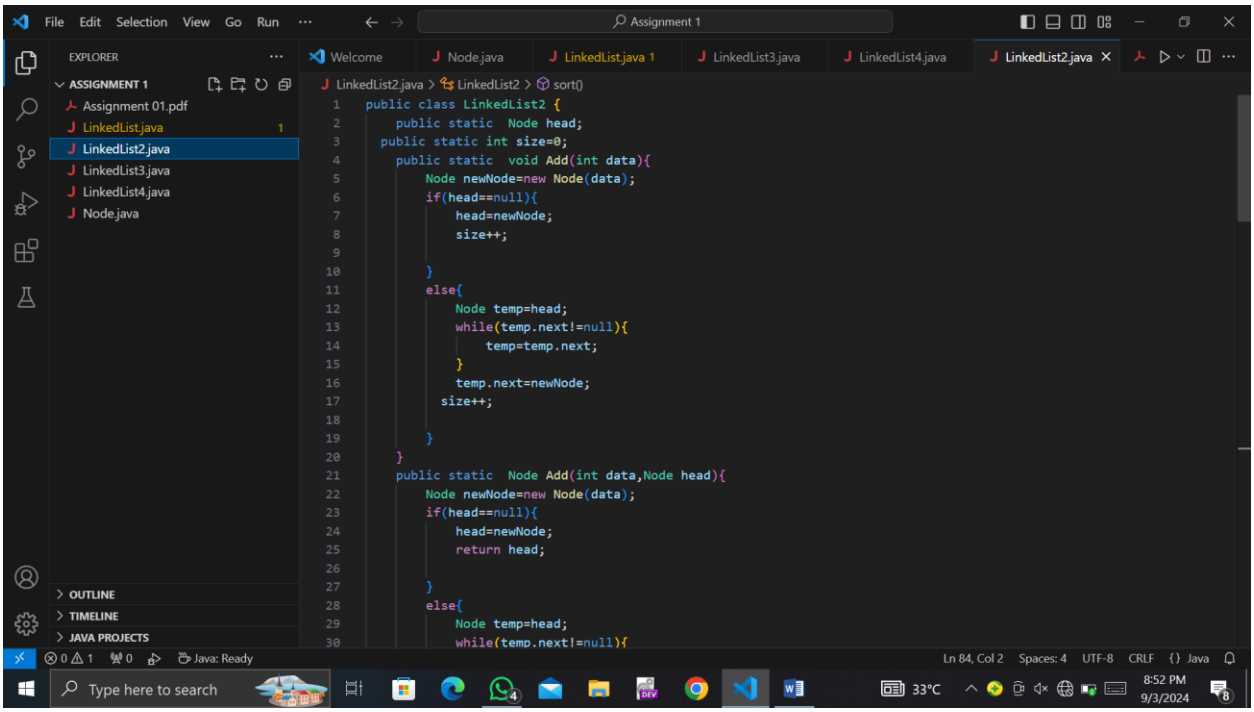
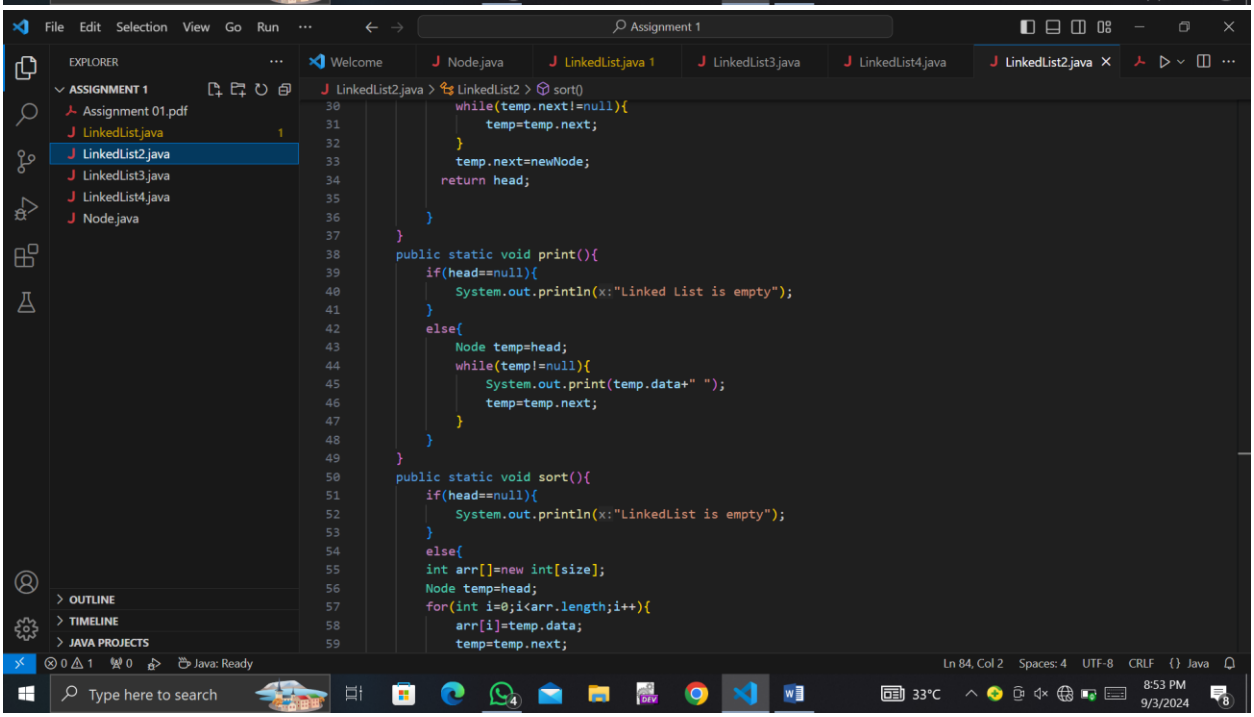
9/3/2024

Task#2

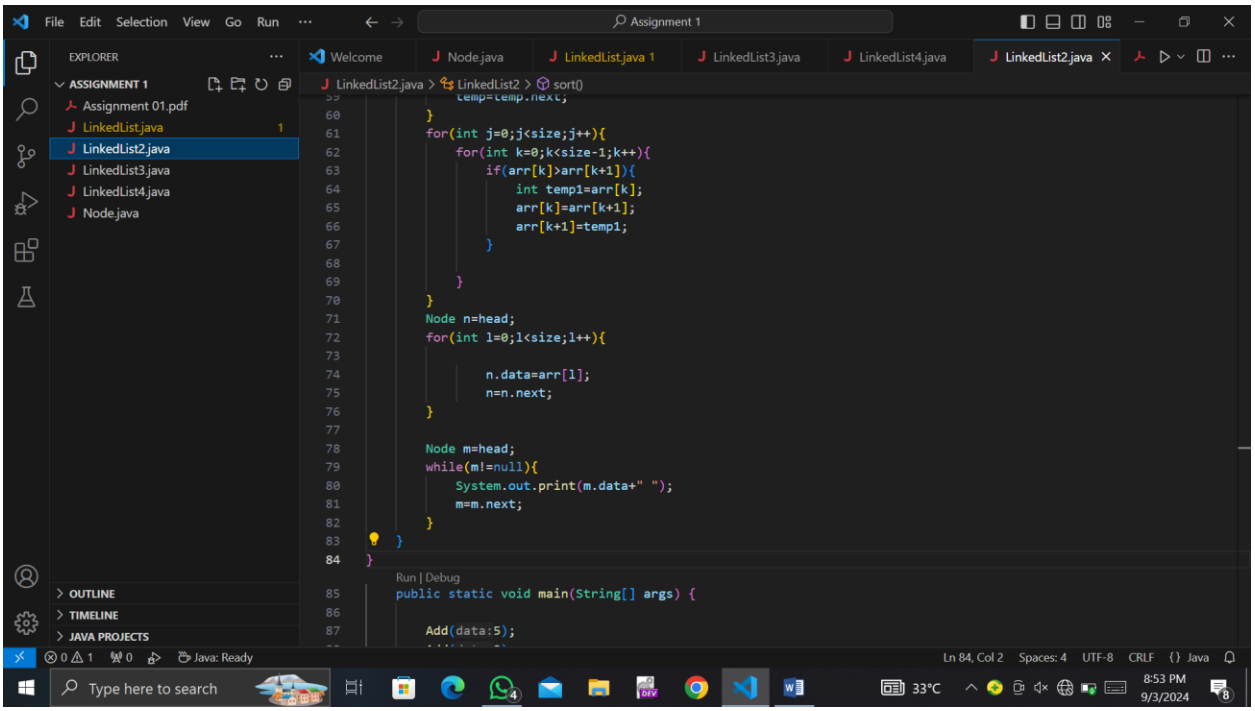
Solution:



```java
public class LinkedList2 {
    public static  Node head;
  public static int size=0;
    public static  void Add(int data){
        Node newNode=new Node(data);
        if(head==null){
            head=newNode;
            size++;

        }
        else{
            Node temp=head;
            while(temp.next!=null){
                temp=temp.next;
            }
            temp.next=newNode;
          size++;

        }
    }
    public static  Node Add(int data,Node head){
        Node newNode=new Node(data);
        if(head==null){
            head=newNode;
            return head;

        }
        else{
            Node temp=head;
            while(temp.next!=null){
```



```java
                while(temp.next!=null){
                    temp=temp.next;
                }
                temp.next=newNode;
              return head;

            }
        }
        public static void print(){
            if(head==null){
                System.out.println("Linked List is empty");
            }
            else{
                Node temp=head;
                while(temp!=null){
                    System.out.print(temp.data+" ");
                    temp=temp.next;
                }
            }
        }
        public static void sort(){
            if(head==null){
                System.out.println("LinkedList is empty");
            }
            else{
            int arr[]=new int[size];
            Node temp=head;
            for(int i=0;i<arr.length;i++){
                arr[i]=temp.data;
                temp=temp.next;
```


File Edit Selection View Go Run
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ASSIGNMENT 1
Assignment 01.pdf
LinkedList.java 1
LinkedList2.java
LinkedList3.java
LinkedList4.java
Node.java
Welcome
Node.java
LinkedList.java 1
LinkedList3.java
LinkedList4.java
LinkedList2.java
LinkedList2.java > LinkedList2 > sort()
temp=temp.next;
}
for(int j=0;j<size;j++){
for(int k=0;k<size-1;k++){
if(arr[k]>arr[k+1]){
int temp1=arr[k];
arr[k]=arr[k+1];
arr[k+1]=temp1;
}
}
}
Node n=head;
for(int l=0;l<size;l++){
n.data=arr[l];
n=n.next;
}
Node m=head;
while(m!=null){
System.out.print(m.data+" ");
m=m.next;
}
}
}
Run | Debug
public static void main(String[] args) {
Add(data:5);
OUTLINE
TIMELINE
JAVA PROJECTS
Java: Ready
Ln 84, Col 2 Spaces: 4 UTF-8 CRLF { } Java
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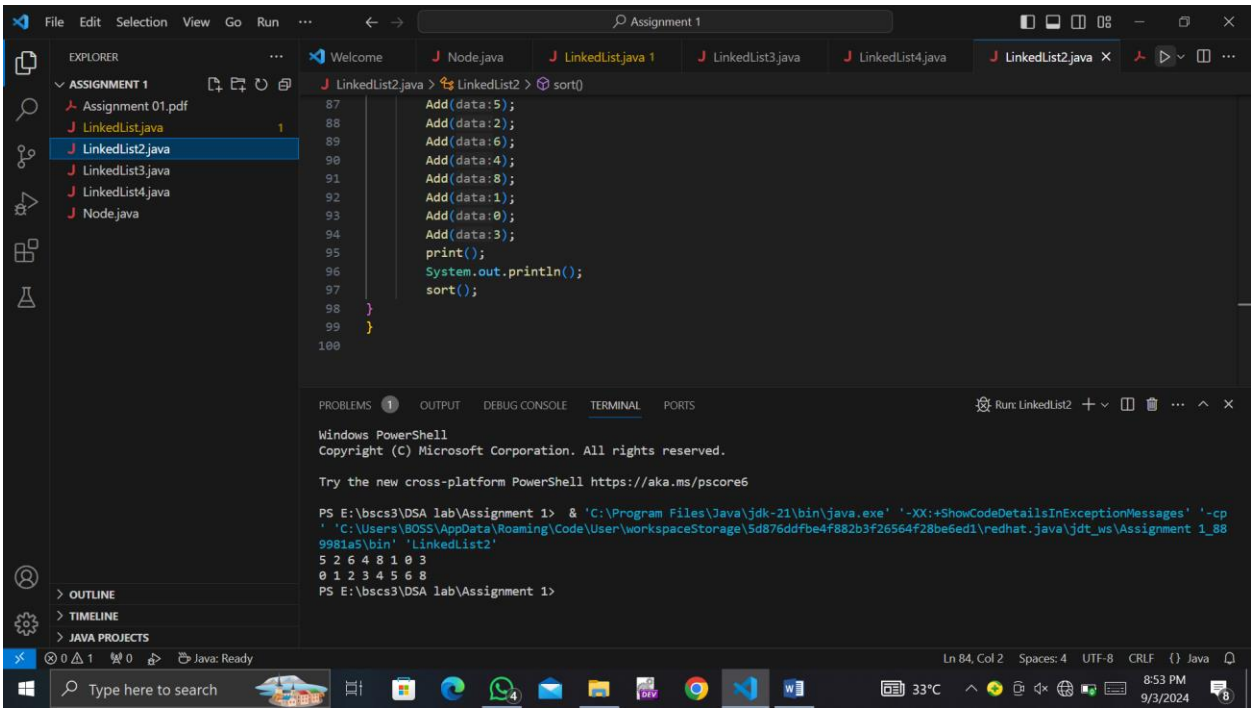
8:53 PM
9/3/2024


File Edit Selection View Go Run
Assignment 1
EXPLORER
ASSIGNMENT 1
Assignment 01.pdf
LinkedList.java 1
LinkedList2.java
LinkedList3.java
LinkedList4.java
Node.java
Welcome
Node.java
LinkedList.java 1
LinkedList3.java
LinkedList4.java
LinkedList2.java
LinkedList2.java > LinkedList2 > sort()
Add(data:5);
Add(data:2);
Add(data:6);
Add(data:4);
Add(data:8);
Add(data:1);
Add(data:0);
Add(data:3);
print();
System.out.println();
sort();
}
}
PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS
Run: LinkedList2
Windows PowerShell
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PS E:\bscs3\DSA lab\Assignment 1> & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp
' 'C:\Users\BOSS\AppData\Roaming\Code\User\workspaceStorage\5d876ddfbe4f882b3f26564f28be6ed1\redhat.java\jdt_ws\Assignment 1_88
9981a5\bin' 'LinkedList2'
5 2 6 4 8 1 0 3
0 1 2 3 4 5 6 8
PS E:\bscs3\DSA lab\Assignment 1>
OUTLINE
TIMELINE
JAVA PROJECTS
Java: Ready
Ln 84, Col 2 Spaces: 4 UTF-8 CRLF { } Java
Type here to search
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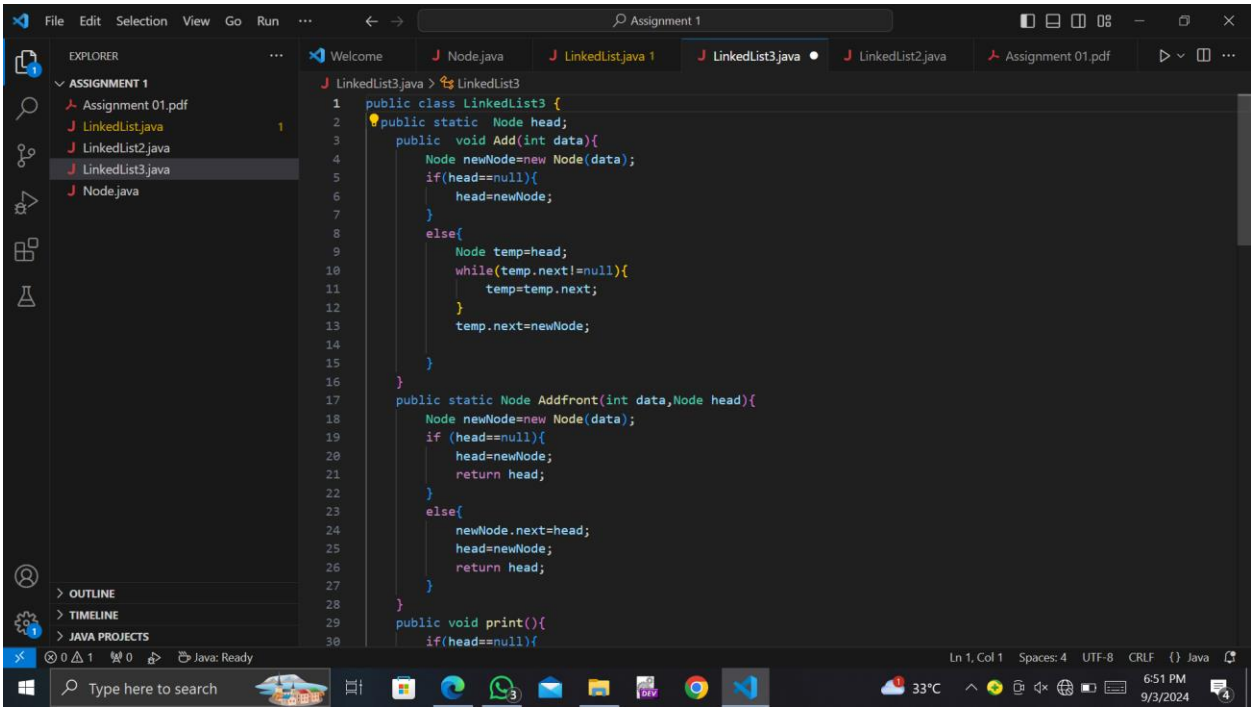
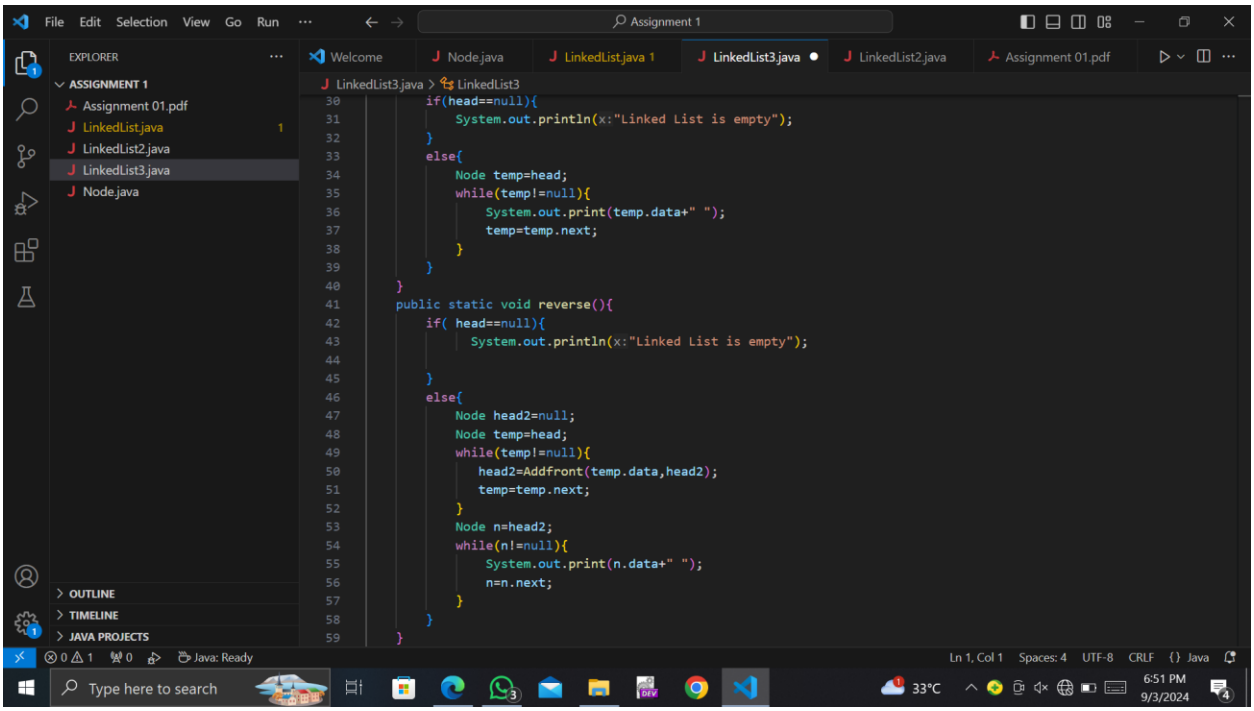
9/3/2024

Task#3

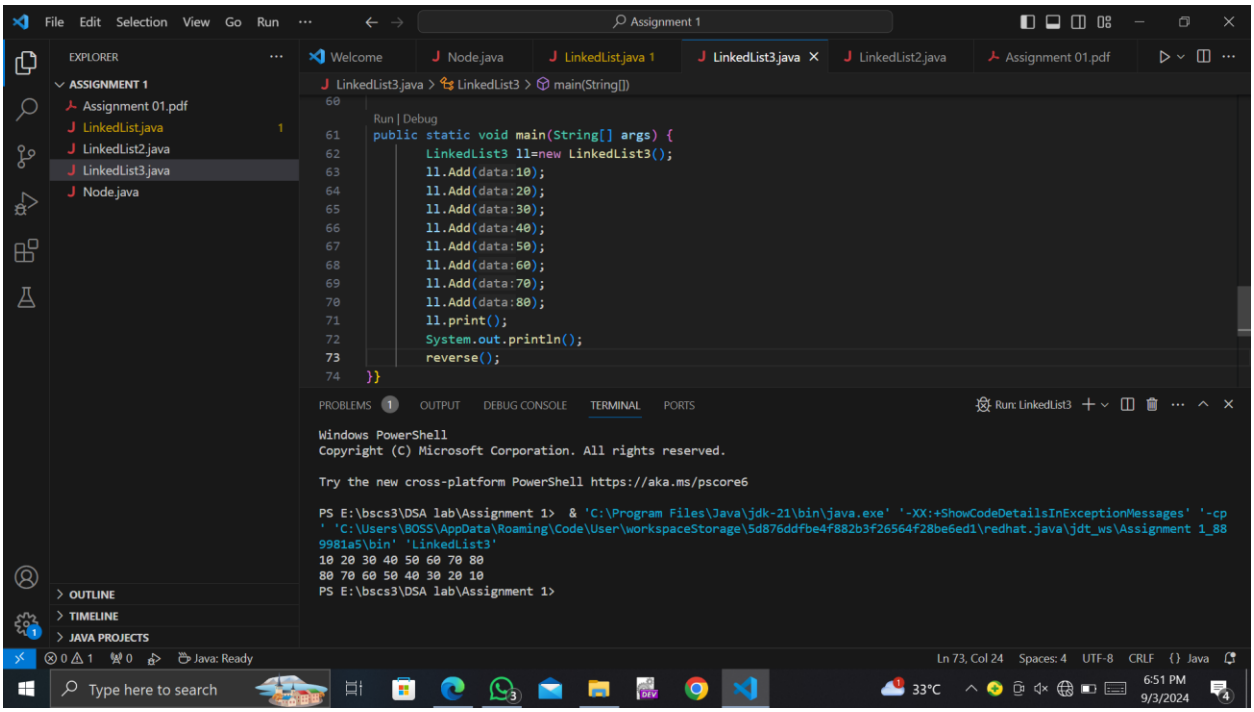
Solution:





```
        if(head==null){
            System.out.println("Linked List is empty");
        }
        else{
            Node temp=head;
            while(temp!=null){
                System.out.print(temp.data+" ");
                temp=temp.next;
            }
        }
    }
    public static void reverse(){
        if( head==null){
            System.out.println("Linked List is empty");

        }
        else{
            Node head2=null;
            Node temp=head;
            while(temp!=null){
               head2=Addfront(temp.data,head2);
               temp=temp.next;
            }
            Node n=head2;
            while(n!=null){
                System.out.print(n.data+" ");
                n=n.next;
            }
        }
    }
```



```
    Run | Debug
    public static void main(String[] args) {
        LinkedList3 ll=new LinkedList3();
        ll.Add(data:10);
        ll.Add(data:20);
        ll.Add(data:30);
        ll.Add(data:40);
        ll.Add(data:50);
        ll.Add(data:60);
        ll.Add(data:70);
        ll.Add(data:80);
        ll.print();
        System.out.println();
        reverse();
    }}
```

```
Windows PowerShell
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PS E:\bscs3\DSA lab\Assignment 1>  & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp
' 'C:\Users\BOSS\AppData\Roaming\Code\User\workspaceStorage\5d876ddfbe4f882b3f26564f28be6ed1\redhat.java\jdt_ws\Assignment 1_88
9981a5\bin' 'LinkedList3'
10 20 30 40 50 60 70 80
80 70 60 50 40 30 20 10
PS E:\bscs3\DSA lab\Assignment 1>
```
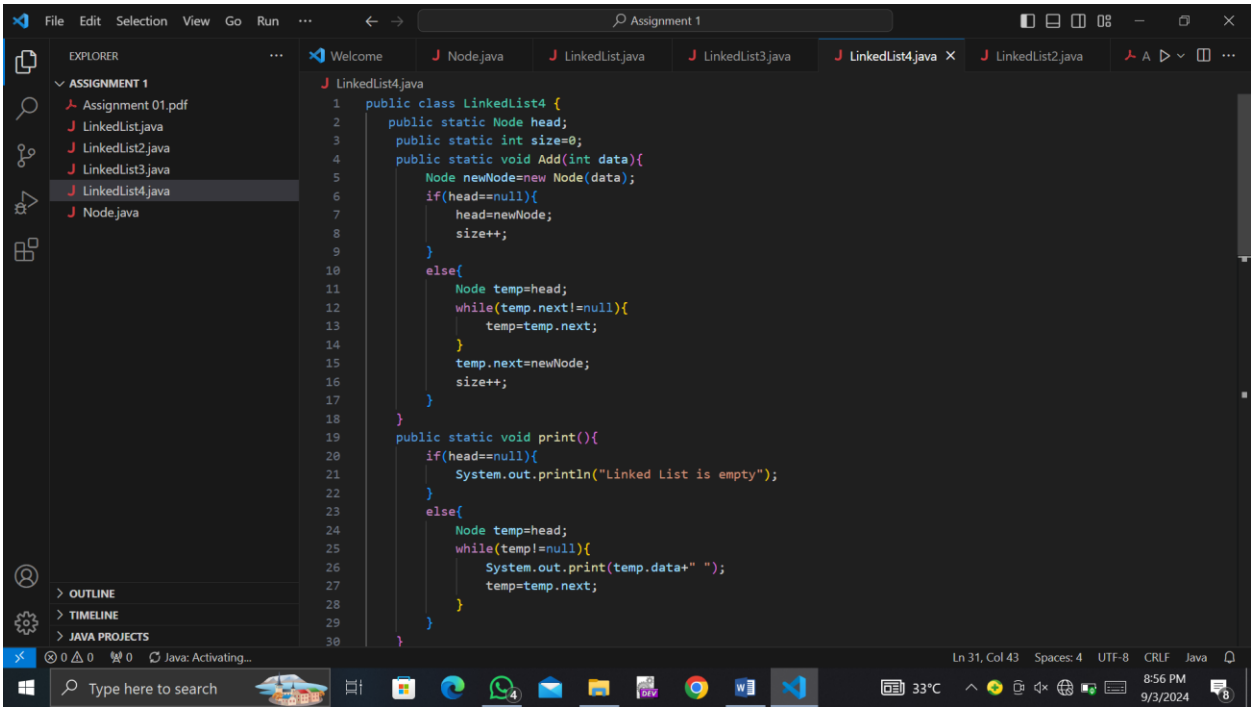
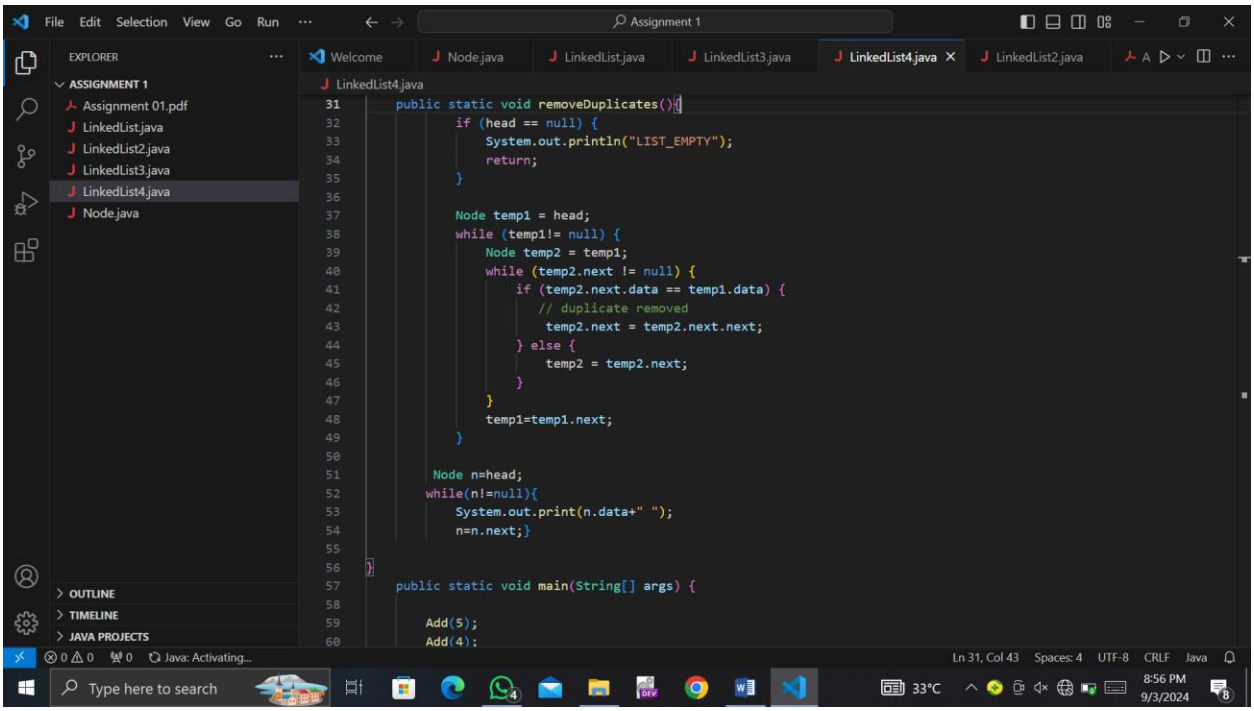
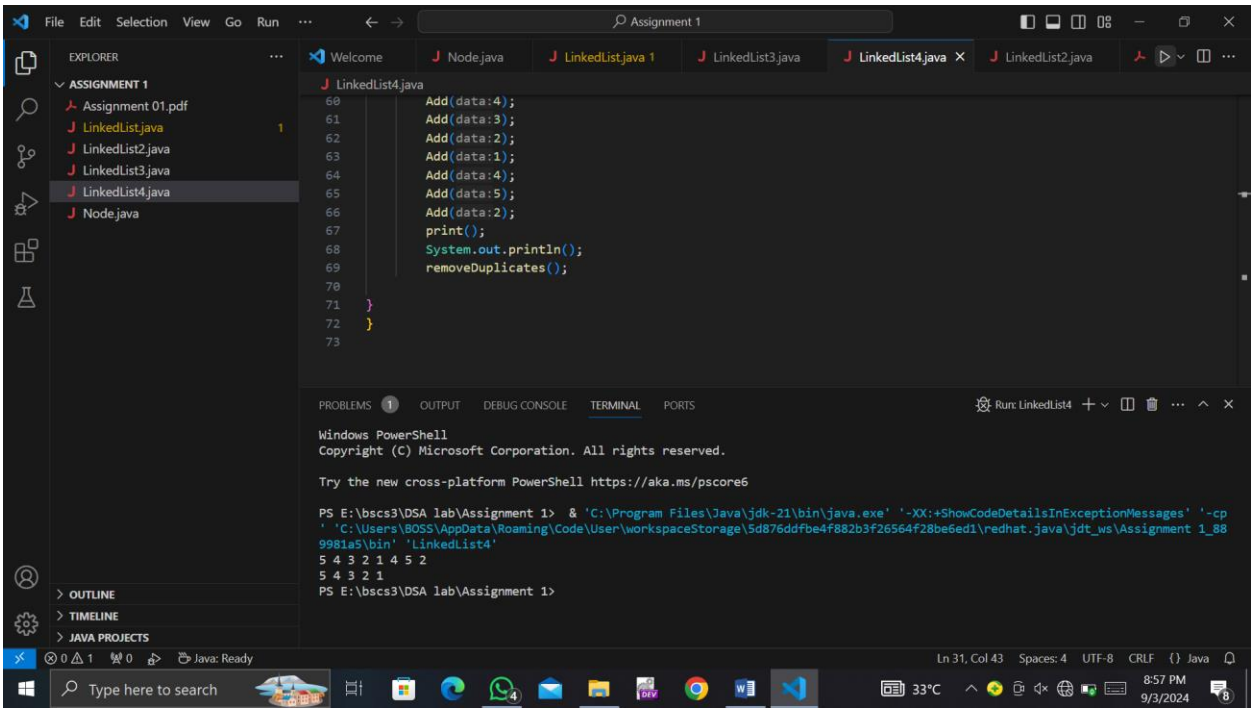

Task#4

Solution:





```java
    public static void removeDuplicates(){
            if (head == null) {
                System.out.println("LIST_EMPTY");
                return;
            }

            Node temp1 = head;
            while (temp1!= null) {
                Node temp2 = temp1;
                while (temp2.next != null) {
                    if (temp2.next.data == temp1.data) {
                       // duplicate removed
                        temp2.next = temp2.next.next;
                    } else {
                        temp2 = temp2.next;
                    }
                }
                temp1=temp1.next;
            }

         Node n=head;
        while(n!=null){
            System.out.print(n.data+" ");
            n=n.next;}

}
    public static void main(String[] args) {

        Add(5);
        Add(4);
```



```java
        Add(data:4);
        Add(data:3);
        Add(data:2);
        Add(data:1);
        Add(data:4);
        Add(data:5);
        Add(data:2);
        print();
        System.out.println();
        removeDuplicates();

}
}
```

```
Windows PowerShell
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' 'C:\Users\BOSS\AppData\Roaming\Code\User\workspaceStorage\5d876ddfbe4f882b3f26564f28be6ed1\redhat.java\jdt_ws\Assignment 1_88
9981a5\bin' 'LinkedList4'
5 4 3 2 1 4 5 2
5 4 3 2 1
PS E:\bscs3\DSA lab\Assignment 1>
```

THE END