

# Rajalakshmi Engineering College

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 9\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 15

#### Section 1 : MCQ

1. What will be the output of the following code?

```
import java.util.ArrayList;  
  
public class Main {  
    public static void main(String[] args) {  
        ArrayList<String> list = new ArrayList<>();  
        list.add("Apple");  
        list.add("Banana");  
        list.remove("Apple");  
        System.out.println(list);  
    }  
}
```

**Answer**

[Banana]

Status : Correct

Marks : 1/1

2. Which method is used to add an element to the top of the stack?

Answer

push()

Status : Correct

Marks : 1/1

3. What will be the output of the following code?

```
import java.util.*;
public class Main {
    public static void main(String[] args) {
        Stack<Integer> stack = new Stack<>();
        for (int i = 1; i <= 3; i++)
            stack.push(i * 2);
        stack.pop();
        stack.push(10);
        System.out.println(stack.peek());
    }
}
```

Answer

10

Status : Correct

Marks : 1/1

4. What will be the output of the following code?

```
import java.util.ArrayList;
```

```
public class Main {
    public static void main(String[] args) {
        ArrayList<Integer> list = new ArrayList<>();
        list.add(10);
    }
}
```

```
list.add(20);  
list.add(30);  
System.out.println("Size of the list: " + list.size());  
}  
}
```

**Answer**

Size of the list: 3

**Status :** Correct

**Marks :** 1/1

5. What is the correct way to create an ArrayList in Java?

**Answer**

```
ArrayList<String> list = new ArrayList<>();
```

**Status :** Correct

**Marks :** 1/1

6. What will be the output of the following code?

```
import java.util.*;  
class Main {  
    public static void main(String[] args) {  
        ArrayList<Integer> list = new ArrayList<>();  
        list.add(10);  
        list.add(20);  
        list.add(30);  
        list.remove(1);  
        System.out.println(list);  
    }  
}
```

**Answer**

[10, 30]

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        ArrayList<Integer> list = new ArrayList<>();
        list.add(1);
        list.add(2);
        list.add(3);
        list.add(4);
        list.set(2, 10);
        System.out.println(list);
    }
}
```

**Answer**

[1, 2, 10, 4]

**Status :** Correct

**Marks :** 1/1

8. What does the addFirst() method of LinkedList do?

**Answer**

Adds an element to the beginning of the list

**Status :** Correct

**Marks :** 1/1

9. What will be the output of the following code?

```
import java.util.*;
public class Main {
    public static void main(String[] args) {
        Stack<Integer> s = new Stack<>();
        s.push(10);
        s.push(20);
        s.push(30);
        System.out.println(s.peek());
    }
}
```

**Answer**

30

**Status :** Correct

**Marks :** 1/1

10. How can you access the first element of an ArrayList named as list?

**Answer**

list.get(0);

**Status :** Correct

**Marks :** 1/1

11. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        ArrayList<Integer> list = new ArrayList<>();
        list.add(1);
        list.add(2);
        list.add(3);
        list.add(4);
        list.add(5);
        System.out.println(list.get(3));
    }
}
```

**Answer**

4

**Status :** Correct

**Marks :** 1/1

12. What is Collection in Java?

**Answer**

A group of objects

**Status :** Correct

**Marks :** 1/1

13. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        ArrayList<String> list = new ArrayList<>();
        list.add("Java");
        list.add("Python");
        list.add("Java");
        list.add("C++");
        System.out.println(list.indexOf("Java"));
    }
}
```

**Answer**

0

**Status :** Correct

**Marks :** 1/1

14. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        ArrayList<String> list = new ArrayList<>();
        list.add("apple");
        list.add("banana");
        list.add("cherry");
        list.add("banana");
        System.out.println(list.lastIndexOf("banana"));
    }
}
```

**Answer**

3

**Status :** Correct

**Marks :** 1/1

15. Which of the following methods removes and returns the last element

from a LinkedList?

**Answer**

removeLast()

**Status :** Correct

**Marks : 1/1**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 9\_Q1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Bobby is tasked with processing a sequence of numbers from a monitoring system. He needs to extract a strictly increasing subsequence using an ArrayList. The program should dynamically add numbers to the ArrayList only if they are greater than the last number currently stored in the list. Bobby aims to efficiently utilize the dynamic resizing and indexing features of the ArrayList to solve this problem.

Help Bobby implement this solution.

##### ***Input Format***

The first line of input consists of an integer N, representing the number of elements.

The second line consists of N space-separated integers, representing the elements.

### **Output Format**

The output prints the list of integers in increasing sequence, ignoring out-of-order elements.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 7

3 5 9 1 11 7 13

Output: [3, 5, 9, 11, 13]

### **Answer**

```
// You are using Java
import java.util.*;
```

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int N = sc.nextInt();
        ArrayList<Integer> list = new ArrayList<>();

        for (int i = 0; i < N; i++) {
            int val = sc.nextInt();

            if (list.isEmpty()) {
                list.add(val);
            } else {
                if (val > list.get(list.size() - 1)) {
                    list.add(val);
                }
            }
        }

        System.out.println(list);
    }
}
```

}

**Status :** Correct

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 9\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Vikram loves listening to music and wants to create a simple playlist manager using Java Collections. The playlist supports the following operations:

"ADD <song>" Adds the song to the end of the playlist. "REMOVE <song>" Removes the first occurrence of the song from the playlist. If the song is not found, do nothing. "SHOW" Displays all songs in the playlist in order. If the playlist is empty, print "EMPTY". "NEXT" Moves to the next song in the playlist and prints its name. If the playlist is empty, print "EMPTY".

The playlist maintains a "current song" position that starts at the first song when it's added. The NEXT command moves to the next song and prints it, wrapping around to the first song after reaching the last song. When removing songs, the current position adjusts accordingly to maintain

proper navigation.

Help Vikram implement this playlist manager.

### ***Input Format***

The first line of the input consists of an integer n, the number of operations.

The next n lines, each containing a command:

- "ADD <song>"
- "REMOVE <song>"
- "SHOW"
- "NEXT"

### ***Output Format***

For each "SHOW" command, print the songs in order, separated by spaces.

For each "NEXT" command, print the next song in the playlist.

If no song exists, print "EMPTY".

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 7

ADD song1

ADD song2

SHOW

NEXT

REMOVE song2

SHOW

NEXT

Output: song1 song2

song2

song1

song1

### ***Answer***

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        sc.nextLine();
```

```
        LinkedList<String> playlist = new LinkedList<>();  
        int currentIndex = -1; // No song initially
```

```
        for (int i = 0; i < n; i++) {  
            String line = sc.nextLine().trim();  
  
            if (line.startsWith("ADD")) {  
  
                String song = line.substring(4);  
                playlist.add(song);  
  
                if (playlist.size() == 1) {  
                    currentIndex = 0; // Set pointer to first song  
                }
```

```
            } else if (line.startsWith("REMOVE")) {
```

```
                String song = line.substring(7).trim();  
                int idx = playlist.indexOf(song);
```

```
                if (idx != -1) {  
                    playlist.remove(idx);
```

```
                    if (playlist.isEmpty()) {  
                        currentIndex = -1;  
                    } else if (idx < currentIndex) {  
                        currentIndex--; // shift left  
                    } else if (idx == currentIndex) {  
                        currentIndex = currentIndex % playlist.size(); // stay valid  
                    }  
                }
```

```
            } else if (line.equals("SHOW")) {
```

```
        if (playlist.isEmpty()) {  
            System.out.print("EMPTY ");  
        } else {  
            for (String s : playlist) {  
                System.out.print(s + " ");  
            }  
        }  
  
        } else if (line.equals("NEXT")) {  
  
            if (playlist.isEmpty()) {  
                System.out.print("EMPTY ");  
            } else {  
                currentIndex = (currentIndex + 1) % playlist.size();  
                System.out.print(playlist.get(currentIndex) + " ");  
            }  
        }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 9\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Assist Pranitha in developing a program that takes an integer N as input, representing the number of names to be read. Then read N names and store them in an ArrayList. Finally, input a search string and output the frequency of that string in the list of names.

Note: Some parts of the code are provided as snippets, and you need to complete the remaining sections by writing the necessary code.

##### ***Input Format***

The first line of input consists of an integer N, representing the number of names to be read.

The following N lines consist of N names, as a string.

The last line consists of a string, representing the name to be searched.

### **Output Format**

The output prints a single integer, representing the frequency of the specified name in the given list.

If the specified name is not found, print 0.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

Alice

Bob

Ankit

Alice

Pranitha

Alice

Output: 2

### **Answer**

// You are using Java

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);
```

```
  
        int N = sc.nextInt();  
        sc.nextLine(); // consume newline
```

```
  
        ArrayList<String> names = new ArrayList<>();
```

```
  
        for (int i = 0; i < N; i++) {  
            names.add(sc.next());  
        }
```

```
  
        String search = sc.next();
```

```
int count = 0;
for (String s : names) {
    if (s.equals(search)) {
        count++;
    }
}

System.out.print(count);
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 9\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Mesa, a store manager, needs a program to manage inventory items. Define a class ItemType with private attributes for name, deposit, and cost per day. Create an ArrayList in the Main class to store ItemType objects, allowing input and display.

Note: Use "%-20s%-20s%-20s" for formatting output in tabular format, display double values with 1 decimal place.

##### ***Input Format***

The first line of input consists of an integer n, representing the number of items.

For each of the n items, there are three lines:

1. The name of the item (a string)

2. The deposit amount (a double value)
3. The cost per day (a double value)

### **Output Format**

The output prints a formatted table with columns for name, deposit and cost per day.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3  
Laptop  
10000.0  
250.0  
Light  
1000.0  
50.0  
Fan  
1000.0  
100.0

Output: Name	Deposit	Cost Per Day
Laptop	10000.0	250.0
Light	1000.0	50.0
Fan	1000.0	100.0

### **Answer**

```
import java.util.ArrayList;
import java.util.List;
import java.util.Scanner;

class ItemType {
    private String name;
    private Double deposit;
    private Double costPerDay;

    public ItemType(String name, Double deposit, Double costPerDay) {
        this.name = name;
        this.deposit = deposit;
        this.costPerDay = costPerDay;
    }
}
```

```

    }
    @Override
    public String toString() {
        return String.format("%-20s%-20.1f%-20.1f", name, deposit, costPerDay);
    }
}

class ArrayListObjectMain {
    public static void main(String args[]) {
        List<ItemType> items = new ArrayList<>();
        Scanner sc = new Scanner(System.in);
        int n = Integer.parseInt(sc.nextLine());

        for (int i = 0; i < n; i++) {
            String name = sc.nextLine();
            Double deposit = Double.parseDouble(sc.nextLine());
            Double costPerDay = Double.parseDouble(sc.nextLine());
            items.add(new ItemType(name, deposit, costPerDay));
        }
        System.out.format("%-20s%-20s%-20s", "Name", "Deposit", "Cost Per Day");
        System.out.println();

        for (ItemType item : items) {
            System.out.println(item);
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Raman, a computer science teacher, is responsible for registering students for his programming class. To streamline the registration process, he wants to develop a program that stores students' names and allows him to retrieve a student's name based on their index in the list.

Raman has decided to use an ArrayList to store the names of students, as it provides efficient dynamic resizing and indexing.

Write a program that enables Raman to input the names of students and fetch a student's name using the specified index. If the entered index is invalid, the program should return an appropriate message.

### ***Input Format***

The first line of input consists of an integer  $n$ , representing the number of students to register.

The next  $n$  lines of input consist of the names of each student, one by one.

The last line of input is an integer, representing the index (0-indexed) of the element to retrieve.

### ***Output Format***

If the index is valid (within the bounds of the ArrayList), print "Element at index [index]: " followed by the element (student name as string).

If the index is invalid, print "Invalid index".

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5

Alice

Bob

Ankit

Alice

Prajit

2

Output: Element at index 2: Ankit

### ***Answer***

```
import java.io.*;
```

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {
```

```

Scanner sc = new Scanner(System.in);

// Read n (number of students)
if (!sc.hasNextInt()) {
    // No integer present – nothing to do
    return;
}
int n = sc.nextInt();

// Read the rest of stdin into tokens (handles names on same line or
// separate lines)
List<String> tokens = new ArrayList<>();
while (sc.hasNext()) {
    tokens.add(sc.next());
}

// We expect at least n names and one index token
if (tokens.size() < n + 1) {
    // Not enough tokens – treat as invalid index
    System.out.print("Invalid index");
    return;
}

ArrayList<String> students = new ArrayList<>();
for (int i = 0; i < n; i++) {
    students.add(tokens.get(i));
}

String indexToken = tokens.get(n);
int index;
try {
    index = Integer.parseInt(indexToken);
} catch (NumberFormatException e) {
    System.out.print("Invalid index");
    return;
}

if (index >= 0 && index < students.size()) {
    System.out.print("Element at index " + index + ": " + students.get(index));
} else {
    System.out.print("Invalid index");
}

```

**Status : Correct**

**Marks : 10/10**

### 3. Problem Statement

Rahul is working on a list manipulation problem where he needs to reverse a specific subarray using a stack. Given an array and two indices  $l$  and  $r$ , he wants to reverse only the portion of the array from index  $l$  to  $r$  (both inclusive) while keeping the rest of the array unchanged.

Since Rahul wants to solve this problem efficiently, he decides to use a stack to reverse the subarray in  $O(r - l)$  time.

Your task is to help Rahul by implementing this functionality.

#### ***Input Format***

The first line contains an integer  $n$ , the size of the array.

The second line contains  $n$  space-separated integers  $arr[i]$ .

The third line contains two integers  $l$  and  $r$ , denoting the start and end indices of the subarray to reverse.

Note: The array follows 0-based indexing.

#### ***Output Format***

The output prints the modified array after reversing the subarray between indices  $l$  and  $r$ .

Refer to the sample output for formatting specifications.

#### ***Sample Test Case***

Input: 6  
1 2 3 4 5 6

1 4

Output: 1 5 4 3 2 6

**Answer**

```
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int n = sc.nextInt();
        int arr[] = new int[n];

        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
        }

        int l = sc.nextInt();
        int r = sc.nextInt();

        Stack<Integer> st = new Stack<>();

        for (int i = l; i <= r; i++) {
            st.push(arr[i]);
        }

        for (int i = l; i <= r; i++) {
            arr[i] = st.pop();
        }

        for (int i = 0; i < n; i++) {
            System.out.print(arr[i]);
            if (i < n - 1) System.out.print(" ");
        }
    }
}
```

**Status :** Correct

**Marks : 10/10**

4. Problem Statement

Rahul, a stock trader, wants to analyze the stock prices of a company over several days. For each day, he wants to determine the stock span, which is the number of consecutive days (including the current day) where the stock price is less than or equal to the price on that day.

The stock span helps him understand how long a stock has been continuously increasing or staying the same. You need to help Rahul by computing the stock span for each day using a Stack data structure efficiently.

Example:

Input:

7

100 80 60 70 60 75 85

Output:

1 1 1 2 1 4 6

Explanation:

For each day:

Day 1: Price = 100    Span = 1 (Only this day)  
Day 2: Price = 80    Span = 1 (Only this day)  
Day 3: Price = 60    Span = 1 (Only this day)  
Day 4: Price = 70    Span = 2 (Includes today and previous day)  
Day 5: Price = 60    Span = 1 (Only this day)  
Day 6: Price = 75    Span = 4 (Includes today and previous three days)  
Day 7: Price = 85    Span = 6 (Includes today and previous five days)

### ***Input Format***

The first line contains an integer  $n$ , the number of days.

The second line contains  $n$  space-separated integers  $prices[i]$ , where  $prices[i]$  represents the stock price on the  $i$ -th day.

### ***Output Format***

The output prints  $n$  space-separated integers representing the stock span for each day.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 7

100 80 60 70 60 75 85

Output: 1 1 1 2 1 4 6

### **Answer**

// You are using Java

import java.util.\*;

public class Main {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

int n = sc.nextInt();

int prices[] = new int[n];

for (int i = 0; i < n; i++) {

prices[i] = sc.nextInt();

}

int span[] = new int[n];

Stack<Integer> st = new Stack<>();

for (int i = 0; i < n; i++) {

while (!st.isEmpty() && prices[st.peek()] <= prices[i]) {

st.pop();

}

if (st.isEmpty()) {

span[i] = i + 1;

} else {

span[i] = i - st.peek();

}

st.push(i);

}

for (int i = 0; i < n; i++) {

System.out.print(span[i]);

```
    }  
    }  
    if (i < n - 1) System.out.print(" ");  
}
```

**Status :** Correct

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 9\_PAH

Attempt : 1  
Total Mark : 30  
Marks Obtained : 30

#### Section 1 : Coding

##### 1. Problem Statement

Rekha is a teacher who wants to calculate the average of marks scored by her students in a test. She needs to store all the marks dynamically because the number of students may vary each time. Using an ArrayList allows her to easily add any number of marks without worrying about the initial size.

Help her implement the task.

##### ***Input Format***

The first line of input is an integer n, representing the number of students..

The second line of input consists of n double values, representing the marks of each student, separated by a space.

### **Output Format**

The output prints: "Average of the list: " followed by the average value formatted to two decimal places.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 5

1.0 2.0 3.0 4.0 5.0

Output: Average of the list: 3.00

### **Answer**

```
// You are using Java
import java.util.*;
```

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int n = sc.nextInt();

        ArrayList<Double> marks = new ArrayList<>();

        for (int i = 0; i < n; i++) {
            marks.add(sc.nextDouble());
        }

        double sum = 0;
        for (double m : marks) {
            sum += m;
        }

        double avg = sum / n;

        System.out.printf("Average of the list: %.2f", avg);
    }
}
```

Status : Correct

Marks : 10/10

## 2. Problem Statement

Arun is building a task manager to keep track of tasks using a LinkedList. The task manager supports the following operations:

"ADD <task>" Adds the given task to the end of the list. "REMOVE" Removes the first task from the list. "SHOW" Displays all tasks in the list in order. If the list is empty, print "EMPTY".

Help Arun implement this functionality using a LinkedList.

### Input Format

The first line of the input consists of an integer n, the number of operations.

The next n lines, each containing a command:

- "ADD <task>"
- "REMOVE"
- "SHOW"

### Output Format

For each "SHOW" command, the output prints the tasks in order, separated by spaces.

If no tasks exist, print "EMPTY".

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 5  
ADD homework  
ADD project  
SHOW  
REMOVE  
SHOW

Output: homework project  
project

**Answer**

```
// You are using Java
import java.util.*;
```

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int n = sc.nextInt();
        sc.nextLine(); // consume leftover newline

        LinkedList<String> tasks = new LinkedList<>();

        for (int i = 0; i < n; i++) {
            String line = sc.nextLine().trim();

            if (line.startsWith("ADD")) {
                String task = line.substring(4).trim();
                tasks.add(task);
            }
            else if (line.equals("REMOVE")) {
                if (!tasks.isEmpty()) {
                    tasks.removeFirst();
                }
            }
            else if (line.equals("SHOW")) {
                if (tasks.isEmpty()) {
                    System.out.print("EMPTY ");
                }
                else {
                    for (String t : tasks) {
                        System.out.print(t + " ");
                    }
                }
            }
        }
    }
}
```

**Status : Correct**

**Marks : 10/10**

### 3. Problem Statement

Aditi is analyzing stock market trends and wants to find the Next Greater Element (NGE) for each stock price in a list. The Next Greater Element for an element  $x$  in an array is the first element to the right that is greater than  $x$ . If no greater element exists, return -1 for that position.

Your task is to help Aditi by efficiently computing the Next Greater Element for each element in the given array using a Stack.

Example:

Input:

6

4 5 2 10 8 6

Output:

5 10 10 -1 -1 -1

Explanation:

For each element:

4   5 (next greater element)5   102   1010   -1 (No greater element)8   -16   -1

#### ***Input Format***

The first line contains an integer  $n$ , representing the number of elements.

The second line contains  $n$  space-separated integers  $arr[i]$ , where  $arr[i]$  is the stock price on the  $i$ -th day.

#### ***Output Format***

The output prints  $n$  space-separated integers representing the Next Greater Element for each element in the array.

Refer to the sample output for formatting specifications.

#### ***Sample Test Case***

Input: 6

4 5 2 10 8 6

Output: 5 10 10 -1 -1 -1

### **Answer**

// You are using Java

import java.util.\*;

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);
```

```
        int n = sc.nextInt();  
        int[] arr = new int[n];  
        int[] nge = new int[n];
```

```
        for (int i = 0; i < n; i++) {  
            arr[i] = sc.nextInt();  
        }
```

```
        Stack<Integer> st = new Stack<>();
```

```
        // Traverse from right to left  
        for (int i = n - 1; i >= 0; i--) {  
            // Pop all smaller or equal elements  
            while (!st.isEmpty() && st.peek() <= arr[i]) {  
                st.pop();  
            }
```

```
            // If stack empty no greater element  
            if (st.isEmpty()) nge[i] = -1;  
            else nge[i] = st.peek();
```

```
            st.push(arr[i]);  
        }
```

```
        // Print result  
        for (int i = 0; i < n; i++) {  
            System.out.print(nge[i] + " ");
```

```
        }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10