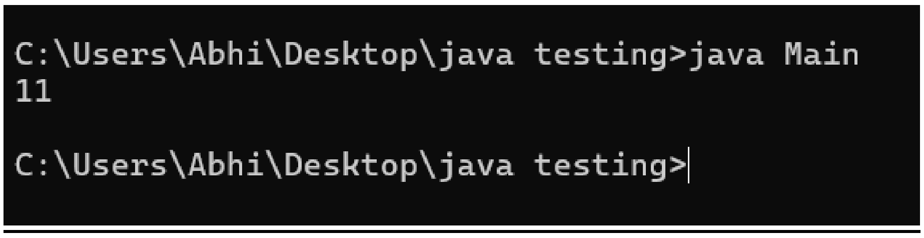
Coding practice Problems- Set1:

1. Maximum Subarray Sum – Kadane‟s Algorithm: Given an array arr[], the task is to find the subarray that has the maximum sum and return its sum.
   Input: arr[] = {2, 3, -8, 7, -1, 2, 3} Output: 11
   Explanation: The subarray {7, -1, 2, 3} has the largest sum 11. Input: arr[] = {-2, -4} Output: –2 Explanation: The subarray {-2} has the largest sum -2.
   Input: arr[] = {5, 4, 1, 7, 8} Output: 25 Explanation: The subarray {5, 4, 1, 7, 8} has the largest sum 25.

CODE:

```
import java.util.*;
public class maxsubarray {
   public static void main(String[] args) {
      maxsubsum(new int[]{2, 3, -8, 7, -1, 2, 3});
      maxsubsum(new int[]{5, 4, 1, 7, 8});
   }

   public static void maxsubsum(int[] arr){
      System.out.print(Arrays.toString(arr) + " :");
      int ans = 0;
      int max = arr[0];
      for(int i = 1;  i<arr.length ; i++){
         max = Math.max(max+arr[i],arr[i]);
         ans = Math.max(ans,max);
      }
      System.out.println(ans);
   }
}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
11

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

SPACE COMPLEXITY : O(1)

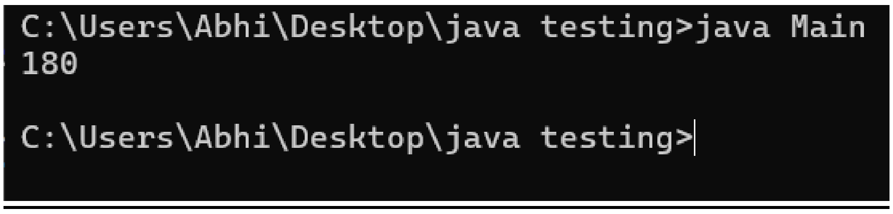
2. Maximum Product Subarray Given an integer array, the task is to find the maximum product of any subarray.
   Input: arr[] = {-2, 6, -3, -10, 0, 2} Output: 180

Explanation: The subarray with maximum product is {6, -3, -10} with product = 6 * (-3) * (-10) = 180
Input: arr[] = {-1, -3, -10, 0, 60} Output: 60 Explanation: The subarray with maximum product is {60}.

CODE :

```
import java.util.*;
class Main{
public static void main(String[] args){
List<Integer> arr = new ArrayList<>(Arrays.asList(0, 6, -3, -10, 0, 2));
if(arr.size()>0){
int maxpro = arr.get(0);
int minpro = arr.get(0);
int res = 0;
for(int i=1; i<arr.size(); i++){
int currpro = arr.get(i);
if(currpro<0){
int temp = maxpro;
maxpro = minpro;
minpro = temp;
}
minpro = Math.min(currpro, minpro*currpro);
maxpro = Math.max(currpro, maxpro*currpro);
res = Math.max(res, maxpro);
}
System.out.println(res);
}else{
System.out.println(-1);
}}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
180

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

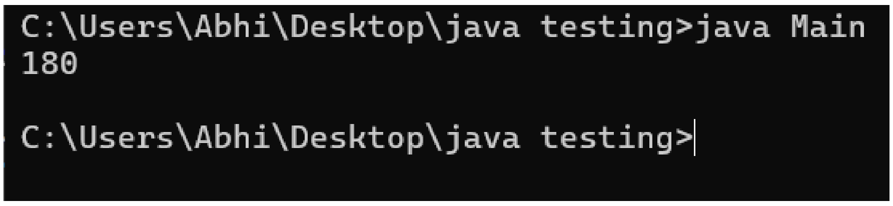
SPACE COMPLEXITY : O(1)

3. Search in a sorted and rotated Array Given a sorted and rotated array arr[] of n distinct elements, the task is to find the index of given key in the array. If the key is not present in the array, return -1. Input : arr[] = {4, 5, 6, 7, 0, 1, 2}, key = 0 Output : 4
   Input : arr[] = { 4, 5, 6, 7, 0, 1, 2 }, key = 3 Output : -1
   Input : arr[] = {50, 10, 20, 30, 40}, key = 10 Output : 1

CODE :

```
import java.util.*;
class Main {
public static void main(String[] args) {
int[] arr = {4, 5, 6, 7, 0, 1, 2};
int key = 0;
int start = 0;
int end = arr.length - 1;
while (start <= end) {
int mid = (start + end) / 2;
if (arr[mid] == key) {
System.out.print(mid);
break;
}
if (arr[start] <= arr[mid]) {
if (arr[start] <= key && key < arr[mid]) {
end = mid - 1;
} else {
start = mid + 1;
}
}else {
if (arr[mid] < key && key <= arr[end]) {
start = mid + 1;
} else {
end = mid - 1;
}}}}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
180

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

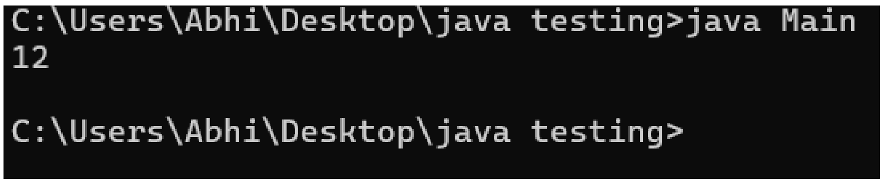
SPACE COMPLEXITY : O(1)

4. Container with Most Water
   Input: arr = [1, 5, 4, 3] Output: 6 Explanation: 5 and 3 are distance 2 apart. So the size of the base = 2. Height of container = min(5, 3) = 3. So total area = 3 * 2 = 6
   Input: arr = [3, 1, 2, 4, 5] Output: 12 Explanation: 5 and 3 are distance 4 apart. So the size of the base = 4. Height of container = min(5, 3) = 3. So total area = 4 * 3 = 12

CODE :

```
import java.util.*;

class Main{
public static void main(String[] args){
int[] arr = {3,1,2,4,5};
int start = 0;
int end = arr.length-1;
int maxarea = 0;
while(start<end){
int currarea = Math.min(arr[start], arr[end])*(end-start);
maxarea = Math.max(currarea,maxarea);
if(arr[start]<arr[end]){
start+=1;
}else{
end-=1;
}}
System.out.println(maxarea);
}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
12

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

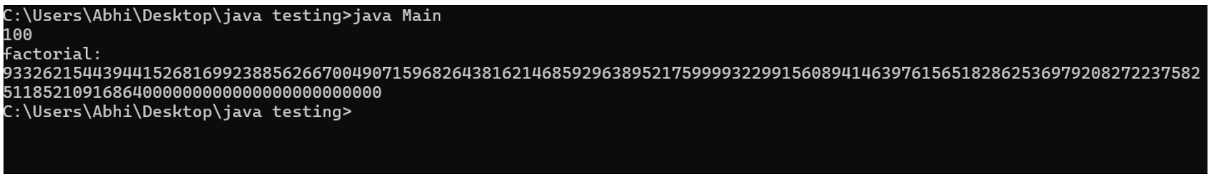
SPACE COMPLEXITY : O(1)

5. Find the Factorial of a large number
   Input: 100 Output:
   9332621544394415268169923885626670049071596826438162146859296389521759999322991560894146397615651828625369792082722375825118521091686400000000000000000000000 00
   Input: 50 Output:
   30414093201713378043612608166064768844377641568960512000000000000

CODE :

```
import java.util.*;
class Main{
static int mul(int x, int arr[], int size){
int carry = 0;
for(int i = 0;i<size;i++){
int prod = arr[i]*x + carry;
arr[i] = prod%10;
carry = prod/10;
}
while(carry !=0){
arr[size] = carry%10;
carry = carry/10;
size++;
}
return size;
}
static void factorial(int n){
int[] arr = new int[400];
arr[0] = 1;
int size = 1;
for(int i = 2;i<=n;i++){
size = mul(i,arr,size);
}
System.out.println("factorial:");
for(int i = size-1;i>=0;i--){
System.out.print(arr[i]);
}}
public static void main(String[] args){
Scanner sc = new Scanner(System.in);
int n = sc.nextInt();
factorial(n);
}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
100
factorial:
933262154439441526816992388562667004907159682643816214685929638952175999932299156089414639761565182862536979208272237582
511852109168640000000000000000000000000
C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n^2 log n)

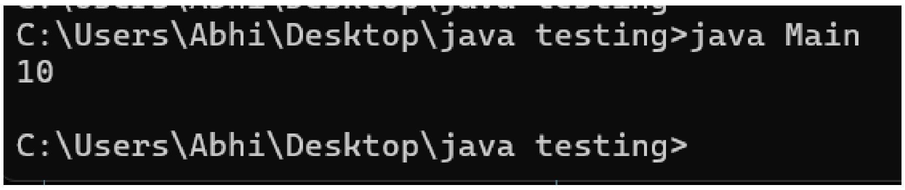
SPACE COMPLEXITY : O(n log n)

6. Trapping Rainwater Problem states that given an array of n non-negative integers arr[] representing an elevation map where the width of each bar is 1, compute how much water it can trap after rain.
   Input: arr[] = {3, 0, 1, 0, 4, 0, 2} Output: 10 Explanation: The expected rainwater to be trapped is shown in the above image.
   Input: arr[] = {3, 0, 2, 0, 4} Output: 7 Explanation: We trap 0 + 3 + 1 + 3 + 0 = 7 units.
   Input: arr[] = {1, 2, 3, 4} Output: 0 Explanation : We cannot trap water as there is no height bound on both sides
   Input: arr[] = {10, 9, 0, 5} Output: 5 Explanation : We trap 0 + 0 + 5 + 0 = 5

CODE :

```
public class RainWater {
public static void main(String[] args) {
int[] arr = {3, 0, 1, 0, 4, 0, 2};
int n = arr.length;
int i = 0, j = n - 1, ans = 0;
while (i < j) {
if (arr[i] <= arr[j]) {
int tmp = arr[i];
while (tmp >= arr[i]) {
ans += tmp - arr[i++];
}
} else {
int tmp = arr[j];
while (tmp >= arr[j]) {
ans += tmp - arr[j--];
}}}
System.out.println(ans);
}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
10

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

SPACE COMPLEXITY : O(1)

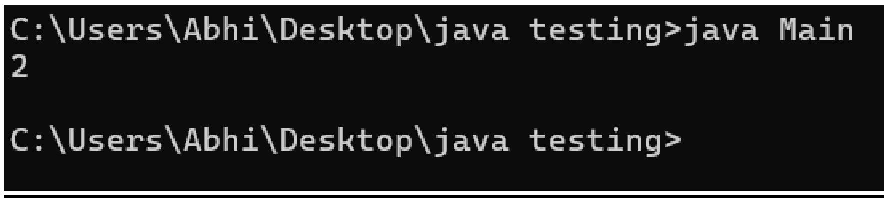
7. Chocolate Distribution Problem Given an array arr[] of n integers where arr[i] represents the number of chocolates in ith packet. Each packet can have a variable number of chocolates. There are m students, the task is to distribute chocolate packets such that: Each student gets exactly one packet. The difference between the maximum and minimum number of chocolates in the packets given to the students is minimized.
   Input: arr[] = {7, 3, 2, 4, 9, 12, 56}, m = 3 Output: 2 Explanation: If we distribute chocolate packets {3, 2, 4}, we will get the minimum difference, that is 2.
   Input: arr[] = {7, 3, 2, 4, 9, 12, 56}, m = 5 Output: 7 Explanation: If we distribute chocolate packets {3, 2, 4, 9, 7}, we will get the minimum difference, that is 9 – 2 = 7.

CODE :

```
import java.util.*;
class Main{
```

```
public static void main(String[] args){
int[] arr = {7, 3, 2, 4, 9, 12, 56};
int m = 3;
int res = Integer.MAX_VALUE;
Arrays.sort(arr);
for(int i =0; i<arr.length-m; i++){
      res = Math.min(res, arr[i+m-1]-arr[i]);
}
System.out.println(res);
}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
2

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n log n)

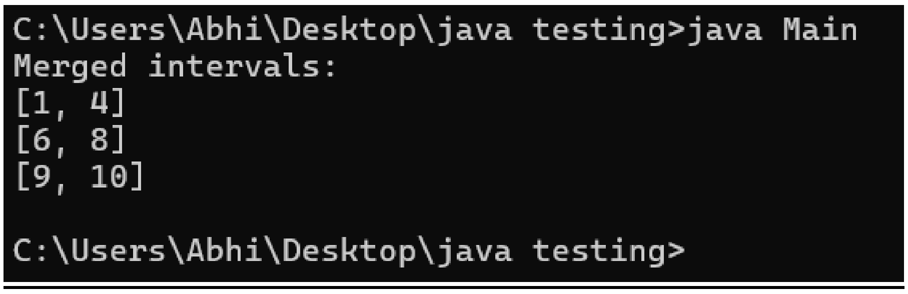
SPACE COMPLEXITY : O(1)

8. Merge Overlapping Intervals Given an array of time intervals where arr[i] = [starti, endi], the task is to merge all the overlapping intervals into one and output the result which should have only mutually exclusive intervals.
   Input: arr[] = [[1, 3], [2, 4], [6, 8], [9, 10]] Output: [[1, 4], [6, 8], [9, 10]] Explanation: In the given intervals, we have only two overlapping intervals [1, 3] and [2, 4]. Therefore, we will merge these two and return [[1, 4}], [6, 8], [9, 10]].
   Input: arr[] = [[7, 8], [1, 5], [2, 4], [4, 6]] Output: [[1, 6], [7, 8]] Explanation: We will merge the overlapping intervals [[1, 5], [2, 4], [4, 6]] into a single interval [1, 6].

CODE :

```
import java.util.*;

public class Main {
public static void main(String[] args) {
int[][] mat = {{1, 3}, {2, 4}, {6, 8}, {9, 10}};
Arrays.sort(mat, (a, b) -> Integer.compare(a[0], b[0]));
List<int[]> mergedIntervals = new ArrayList<>();
int start = mat[0][0];
int end = mat[0][1];
for (int i = 1; i < mat.length; i++) {
if (end >= mat[i][0]) {
end = Math.max(end, mat[i][1]);
} else {
mergedIntervals.add(new int[]{start, end});
start = mat[i][0];
end = mat[i][1];
}}
mergedIntervals.add(new int[]{start, end});
int[][] result = new int[mergedIntervals.size()][2];
for (int i = 0; i < mergedIntervals.size(); i++) {
result[i] = mergedIntervals.get(i);
}
System.out.println("Merged intervals:");
for (int[] interval : result) {
System.out.println(Arrays.toString(interval));
}}}
```

<u>OUTPUT :</u>



```
C:\Users\Abhi\Desktop\java testing>java Main
Merged intervals:
[1, 4]
[6, 8]
[9, 10]

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n log n)

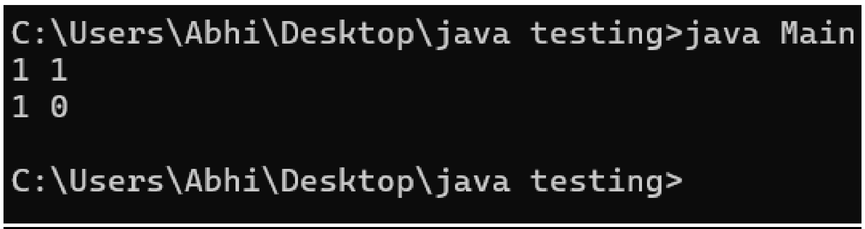
SPACE COMPLEXITY : O(n)

9. A Boolean Matrix Question Given a boolean matrix mat[M][N] of size M X N, modify it such that if a matrix cell mat[i][j] is 1 (or true) then make all the cells of ith row and jth column as

<u>CODE :</u>

```
import java.util.*;
class Main{
public static void main(String[] args){
int[][] matrix = {{1, 0},{0, 0}};
int row = matrix.length;
int col = matrix[0].length;
List<Integer> rowarr = new ArrayList<>();
List<Integer> colarr = new ArrayList<>();
for(int i=0; i<row; i++){
for(int j =0; j<col; j++){
if(matrix[i][j]==1){
rowarr.add(i);
colarr.add(j);
}}}
for(int i=0; i<rowarr.size(); i++){
for(int j=0; j<col; j++){
matrix[rowarr.get(i)][j] = 1;
}}
for(int i=0; i<colarr.size(); i++){
for(int j=0; j<row; j++){
matrix[j][colarr.get(i)] = 1;
}}

for(int[] i: matrix){
for(int j: i){
System.out.print(j+" ");
}
System.out.println();
}
}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
1 1
1 0

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n*m)

SPACE COMPLEXITY : O(n+m)

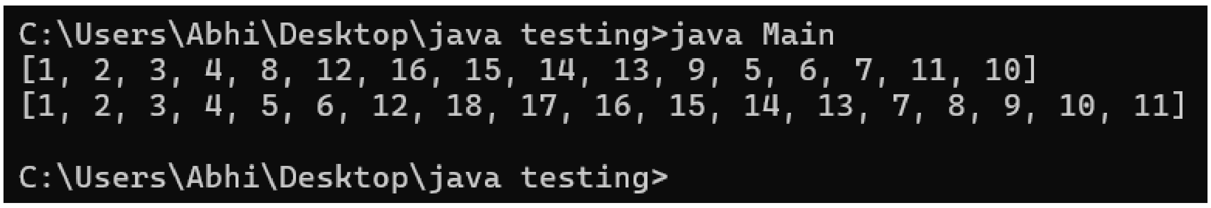
10. Print a given matrix in spiral form Given an m x n matrix, the task is to print all elements of the matrix in spiral form.
    Input: matrix = {{1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16 }} Output: 1 2 3 4 8 12 16 15 14 13 9 5 6 7 11 10
    Input: matrix = { {1, 2, 3, 4, 5, 6}, {7, 8, 9, 10, 11, 12}, {13, 14, 15, 16, 17, 18}} Output: 1 2 3 4 5 6 12 18 17 16 15 14 13 7 8 9 10 11 Explanation: The output is matrix in spiral format.

CODE :

```
import java.util.*;
public class Main {
public static void main(String[] args) {
spiral(new int[][]{{1,2,3,4},{5,6,7,8},{9,10,11,12},{13,14,15,16}});
spiral(new int[][]{{1,2,3,4,5,6},{7,8,9,10,11,12},{13,14,15,16,17,18}});
}
public static void spiral(int[][] arr){
int top= 0;
int bottom = arr.length-1;
int left = 0;
int right = arr[0].length-1;
int size = arr.length*arr[0].length;
List<Integer> l = new ArrayList<>();
int i= 0;
while(i!= size){
```

```
for(int n = left; n <= right && (i!= size); n++){
l.add(arr[top][n]);
i++;
}
for(int n = top; n <bottom && (i!= size); n++){
l.add(arr[n+1][right]);
i++;
}
for(int n = right-1; n>= left && (i!= size); n--){
l.add(arr[bottom][n]);
i++;
}
for(int n = bottom-1; n >= top+1 && (i!= size); n--){
l.add(arr[n][left]);
i++;
}
top++;
bottom--;
left++;
right--;
}
System.out.println(l);
}}
```

<u>OUTPUT :</u>



```
C:\Users\Abhi\Desktop\java testing>java Main
[1, 2, 3, 4, 8, 12, 16, 15, 14, 13, 9, 5, 6, 7, 11, 10]
[1, 2, 3, 4, 5, 6, 12, 18, 17, 16, 15, 14, 13, 7, 8, 9, 10, 11]

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

SPACE COMPLEXITY : O(n)

13. Check if given Parentheses expression is balanced or not Given a string str of length N, consisting of „(„ and „)„ only, the task is to check whether it is balanced or not.

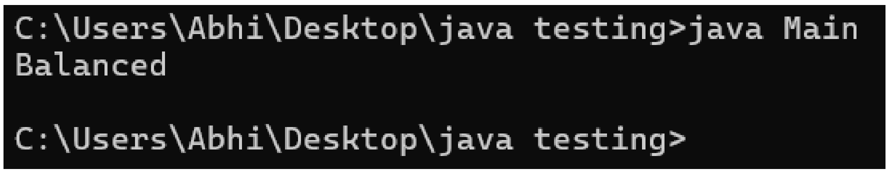
Input: str = “((()))()()” Output: Balanced

Input: str = “())((())” Output: Not Balanced

<u>CODE :</u>

```
import java.util.*;
class Main{
public static void main(String[] args){
String st = "((()))()()";
int c =0;
for(int i=0; i<st.length(); i++){
if(st.charAt(i)=='('){
c+=1;
}else{
c-=1;
}
if(c<0){
System.out.println("Not Balanced");
break;
}

}
System.out.println("Balanced");
}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
Balanced

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

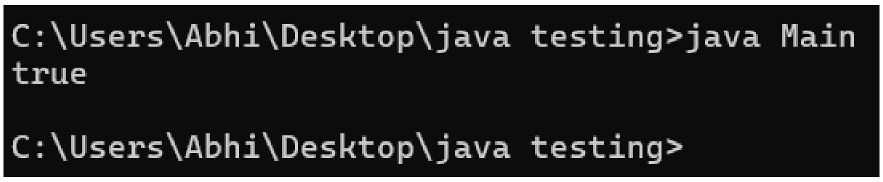
SPACE COMPLEXITY : O(1)

14. Check if two Strings are Anagrams of each other Given two strings s1 and s2 consisting of lowercase characters, the task is to check whether the two given strings are anagrams of each other or not. An anagram of a string is another string that contains the same characters, only the order of characters can be different.
Input: s1 = “geeks” s2 = “kseeg” Output: true Explanation: Both the string have same characters with same frequency. So, they are anagrams.
Input: s1 = “allergy” s2 = “allergic” Output: false Explanation: Characters in both the strings are not same. s1 has extra character „y‟ and s2 has extra characters „i‟ and „c‟, so they are not anagrams. Input: s1 = “g”, s2 = “g” Output: true Explanation: Characters in both the strings are same, so they are anagrams.

CODE :

```
import java.util.*;
class Main {
public static void main(String[] args) {
String st1 = "geeks";
String st2 = "kseeg";
char[] st1array = st1.toCharArray();
char[] st2array = st2.toCharArray();
Arrays.sort(st1array);
Arrays.sort(st2array);
if (Arrays.equals(st1array, st2array)) {
System.out.println(true);
} else {
System.out.println(false);
}}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
true

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n log n)

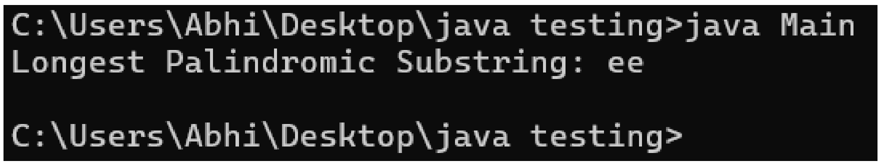
SPACE COMPLEXITY : O(n)

15. Longest Palindromic Substring Given a string str, the task is to find the longest substring which is a palindrome. If there are multiple answers, then return the first appearing substring.
Input: str = “forgeeksskeegfor” Output: “geeksskeeg” Explanation: There are several possible palindromic substrings like “kssk”, “ss”, “eeksskee” etc. But the substring “geeksskeeg” is the longest among all.

CODE :

```
import java.util.*;
class Main {
public static void main(String[] args) {
String s = "Geeks";
String res = "";
int resLen = 0;
for (int i =0; i<s.length(); i++) {
int l = i, r = i;
while (l >= 0 && r < s.length() && s.charAt(l) == s.charAt(r)) {
if ((r-l+1)> resLen) {
res = s.substring(l, r + 1);
resLen=r-l+ 1;
}
l--;
r++;
}
l=i;
r=i+1;
while(l>=0 && r < s.length() && s.charAt(l) == s.charAt(r)) {
if ((r - l + 1) > resLen) {
res = s.substring(l, r + 1);
resLen=r-l+1;
}
l--;
r++;
}}
System.out.println("Longest Palindromic Substring: " + res);
}}
```

OUTPUT :


```
C:\Users\Abhi\Desktop\java testing>java Main
Longest Palindromic Substring: ee

C:\Users\Abhi\Desktop\java testing>
```

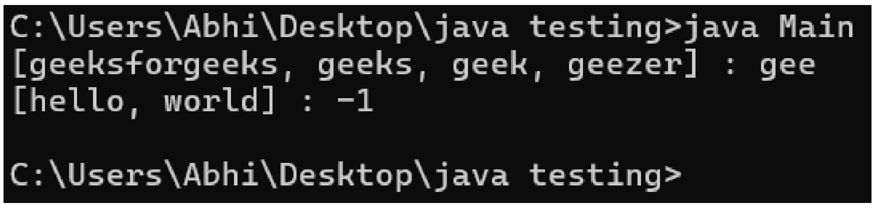
TIME COMPLEXITY : O(n^2)
SPACE COMPLEXITY : O(1)

16. Longest Common Prefix using Sorting Given an array of strings arr[]. The task is to return the longest common prefix among each and every strings present in the array. If there‟s no prefix common in all the strings, return “-1”.
Input: arr[] = [“geeksforgeeks”, “geeks”, “geek”, “geezer”] Output: gee Explanation: “gee” is the longest common prefix in all the given strings.
Input: arr[] = [“hello”, “world”] Output: -1 Explanation: There‟s no common prefix in the given strings.

CODE :

```
import java.util.*;
public class Main {
public static void main(String[] args) {
prefix(new String[]{"geeksforgeeks", "geeks", "geek", "geezer"});
prefix(new String[]{"hello", "world"});
}
public static void prefix(String[] arr){
System.out.print(Arrays.toString(arr) + " : ");
int l = arr[0].length();
for(int i = 1 ; i<arr.length ; i++){
l = Math.min(l , arr[i].length());
for(int j = 0 ; j<l; j++){
char c= arr[0].charAt(j);
char d = arr[i].charAt(j);
if(c!=d){
l = j;
break;
}}}
String ans = arr[0].substring(0,l);
System.out.println(ans.length() > 0 ? ans : -1 );
}}
```

OUTPUT :


```
C:\Users\Abhi\Desktop\java testing>java Main
[geeksforgeeks, geeks, geek, geezer] : gee
[hello, world] : -1

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n*m)

SPACE COMPLEXITY : O(1)

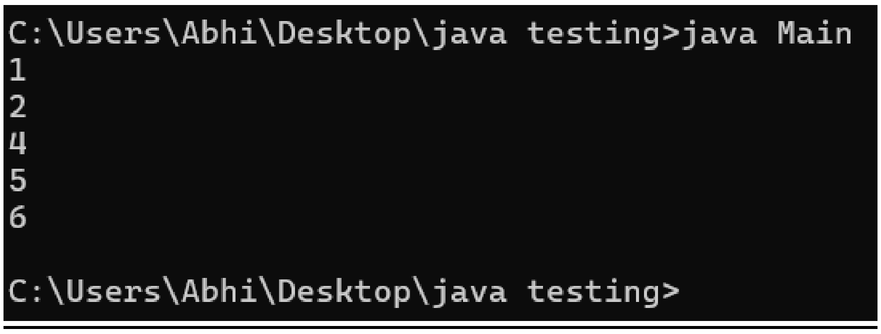
17. Delete middle element of a stack Given a stack with push(), pop(), and empty() operations, The task is to delete the middle element of it without using any additional data structure.

Input : Stack[] = [1, 2, 3, 4, 5] Output : Stack[] = [1, 2, 4, 5]
Input : Stack[] = [1, 2, 3, 4, 5, 6] Output : Stack[] = [1, 2, 4, 5, 6]

<u>CODE :</u>

```
import java.util.*;
public class Main {
public static void main(String[] args) {
Stack<Integer> st = new Stack<>();
st.push(1);st.push(2);st.push(3);st.push(4);st.push(5);st.push(6);//st.push(7)
;
int n = st.size()/2;
Stack<Integer> temp = new Stack<>();
for(int i=0; i<n; i++){
temp.push(st.pop());
}
st.pop();
while(!temp.isEmpty()){
st.push(temp.pop());
}
for(int i: st){
System.out.println(i);
}}}
```

<u>OUTPUT :</u>



```
C:\Users\Abhi\Desktop\java testing>java Main
1
2
4
5
6

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

SPACE COMPLEXITY : O(n)

18. Next Greater Element (NGE) for every element in given Array Given an array, print the Next Greater Element (NGE) for every element. Note: The Next greater Element for an element x is the first greater element on the right side of x in the array. Elements for which no greater element exist, consider the next greater element as -1.

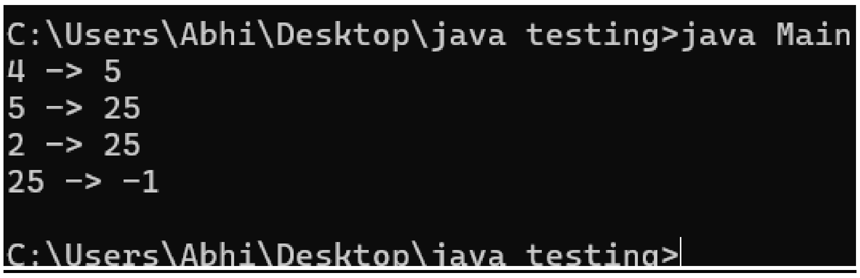
Input: arr[] = [4 , 5 , 2 , 25] Output: 4 5 2 –> 5 –> 25 –> 25 25 –> -1 Explanation: Except 25 every element has an element greater than them present on the right side

Input: arr[] = [13 , 7, 6 , 12] Output: 13 –> 7 -1 –> 12 6 12 –> 12 –> -1 Explanation: 13 and 12 don‟t have any element greater than them present on the right side

CODE :

```
class Main{
public static void main(String[] args){
int[] arr = {4, 5, 2, 25};
for (int i = 0; i < arr.length; i++) {
int greatest = -1;
for (int j = i + 1; j < arr.length; j++) {
if (arr[j] > arr[i]) {
greatest = arr[j];
break;
}}
System.out.println(arr[i] + " -> " + greatest);
}}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
4 -> 5
5 -> 25
2 -> 25
25 -> -1

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n^2)

SPACE COMPLEXITY : O(1)

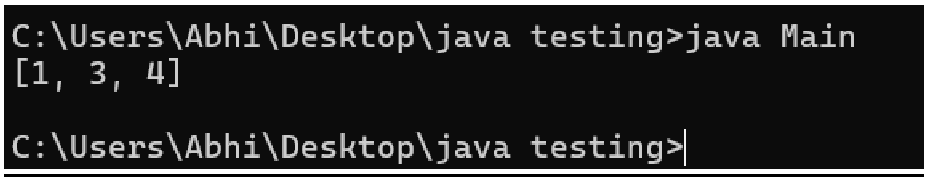
19. Print Right View of a Binary Tree Given a Binary Tree, the task is to print the Right view of it. The right view of a Binary Tree is a set of rightmost nodes for every level.

CODE :

```
import java.util.*;
class TreeNode {
int val;
TreeNode left;
TreeNode right;
TreeNode(int val) {
this.val = val;
left = null;
right = null;
}
}
class Main {
public List<Integer> rightSideView(TreeNode root) {
```

```
List<Integer> result = new ArrayList<Integer>();
rightView(root, result, 0);
return result;
}
public void rightView(TreeNode curr, List<Integer> result, int currDepth) {
if (curr == null) {
return;
}
if (currDepth == result.size()) {
result.add(curr.val);
}
rightView(curr.right, result, currDepth + 1);
rightView(curr.left, result, currDepth + 1);
}
public static void main(String[] args) {
TreeNode root = new TreeNode(1);
root.left = new TreeNode(2);
root.right = new TreeNode(3);
root.left.right = new TreeNode(5);
root.right.right = new TreeNode(4);
Main solution = new Main();
List<Integer> result = solution.rightSideView(root);
System.out.println(result);
}}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
[1, 3, 4]

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

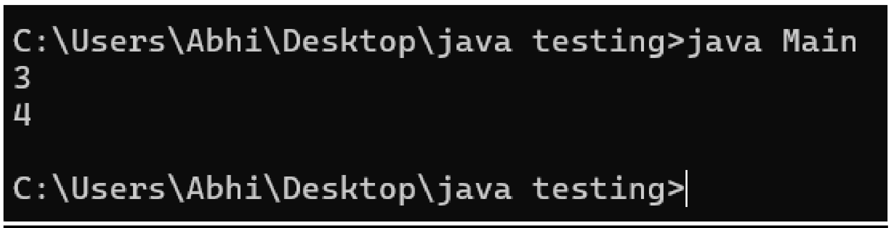
SPACE COMPLEXITY : O(n)

20. Maximum Depth or Height of Binary Tree Given a binary tree, the task is to find the maximum depth or height of the tree. The height of the tree is the number of vertices in the tree from the root to the deepest node.

CODE :

```
import java.util.LinkedList;
import java.util.Queue;

class TreeNode{
int data;
TreeNode left ;
TreeNode right ;

TreeNode(int data){
this.data = data;
left = null;
right = null;
}
}

public class Main {
public static void main(String[] args) {
TreeNode root = new TreeNode(12);
root.right = new TreeNode(18);
root.left = new TreeNode(8);
root.left.left = new TreeNode(5);
root.left.right = new TreeNode(11);
depth(root);

TreeNode r = new TreeNode(1);
r.left = new TreeNode(2);
r.left.left = new TreeNode(4);
r.right = new TreeNode(3);
r.right.right = new TreeNode(5);
r.right.right.right  = new TreeNode(7);
r.right.right.left = new TreeNode(6);
depth(r);

}
public static void depth(TreeNode root){
Queue<TreeNode> q = new LinkedList<>();
q.add(root);

int d = 0;
while(!q.isEmpty()){
int n = q.size();
d++;
for(int i = 0 ; i<n ; i++){
TreeNode curr = q.poll();
if(curr.left != null){
q.add(curr.left);
}
if(curr.right != null){
q.add(curr.right);
}
}
}
System.out.println(d);
}
}
```

OUTPUT :



```
C:\Users\Abhi\Desktop\java testing>java Main
3
4

C:\Users\Abhi\Desktop\java testing>
```

TIME COMPLEXITY : O(n)

SPACE COMPLEXITY : O(n)