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**Data structures and algorithms**

**Assignment:**

**Q:01 write a program to reverse an array using stack data structures**

**import java utill.stack;**

**public class Main {**

**public static void reverseArray(int[] array){**

**stack<Integer>stack= newStack<>();**

**for (int value : array){**

**stack.push(value);**

**}**

**for(int i=0;i <array.length; i++){**

**array[i]= stack.pop();**

**}**

**}**

**Public static void printArray(int[] array){**

**for(int value :array){**

**System.out.println( value + “ “);**

**}**

**System.out.println( );**

**Public static void main (String[] args ){**

**Int[] original array = { 10,20,30,40,50};**

**System.out.println( “original Array”);**

**printArray (original Array);**

**reverse Array( original Array);**

**System.out.println(“reversed Array”);**

**printArray (original array);**

**}**

**}**

**Output:**

**Original Array**

**10,20,30,40,50**

**Reversed Array**

**50,40,30,20,10**

**Q:02 write a program to match the parentheses stored in a string using stack data structure**

**Import java .utill.stack;**

**Public class Main{**

**Public static boolean are parentheses balanced ( String expr){**

**Stack<character>stack= new stack<>();**

**for (char:ch expr to char Array( ) ){**

**if(ch= ‘(‘ ch= ‘{‘ || ch = ‘[‘ ){**

**Stack.push(ch);**

**}**

**Else if (ch = ‘)’ ||ch = ‘}’ || ch = ‘]’) {**

**if ( stack.isEmpty( ) ){**

**return false ;**

**}**

**Char top = stack.pop( );**

**If(! Is matching pair ( top,ch) ){**

**return false ;**

**}**

**}**

**}**

**Return stack.isEmpty( );**

**Private static boolean is Matching pair ( char open,char close)**

**Return ( open= ‘(‘ && close = ‘)’ ) ||**

**( open= ‘{‘ && close = ‘}’) ||**

**( open = ‘[‘ && close = ‘]’ ) ;**

**Public static void main ( String [] args ) {**

**String input = {[( )]}; // Example input**

**If (are parentheses balanced ( input) ) {**

**System.out.println( “the parentheses are balanced “);**

**}else{**

**System.out.println (“ the parentheses are not balanced :”);**

**}**

**}**

**}**

**Output**

**The parentheses are balanced**

**Q: 03 write a program to calculate the sum of all integer elements in an integer array by implimenting a recursive sum method/ function**

**public class Main {**

**public static int recursiveSum ( int []arr ,int index ){**

**if ( index = arr .length) {**

**return 0;**

**}**

**return arr [index + recursive sum (are,index +1);**

**}**

**Public static void main (String []args ){**

**int numbers ={ 5,10,15,20,25};**

**int sum = recursive sum ( numbers,0);**

**System.out.println(“sum of array elements :”+ sum);**

**}**

**}**

**Output**

**Sum of array elements: 75**