



Programming Assignment Helper

1.) Java program to Find Odd or Even number

```
import java.util.Scanner;

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

        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter any number: ");
        int number = scanner.nextInt();

        if (number % 2 == 0) {
            System.out.println(number + " is even.");
        } else {
            System.out.println(number + " is odd.");
        }
    }
}
```

2.) Java program to find Prime number

```
import java.util.Scanner;

public class PrimeNumber {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int number = scanner.nextInt();
        if (isPrime(number)) {
            System.out.println(number+"is a prime number.");
        } else {
            System.out.println(number+"is not a prime number.");
        }
    }

    public static boolean isPrime(int num) {
        for (int i = 2; i <= num / 2; i++) {
            //try each number by using %
            if (num % i == 0) {
                return false;
            }
        }
        return true;
    }
}
```

3.) Java program to find Fibonacci series upto a given number range

```
import java.util.Scanner;

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

        System.out.println("enter number of terms");
        int number = 6;
        int first = 0, second = 1, next;
        System.out.println("Fibonacci series is ");
        for (int i = 0; i <= number; i++) {
            {
                System.out.println(first + "");
                next = second + first;
                first = second;
                second = next;
            }
        }
    }

Output: 0 1 1 2 3 5 8
```

4.) Java program to swap two numbers without using third variable

```
import java.util.Scanner;

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

        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the first number: ");
        int a = 5,
        System.out.print("Enter the second number: ");
        int b = 10;
        System.out.println("Before swapping: a = " + a + ", b = " + b);
        a = a + b;
        b = a - b;
        a = a - b;
        System.out.println("After swapping: a = " + a + ", b = " + b);

    }
}
```

Output: After Swapping: a = 10 , b = 5



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5.) Java program to Find Factorial on given Number

```
import java.util.Scanner;

public class FactorialNumber{

    public static void main(String[] args) {
        int factorial = 1;
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter any number ");
        int number = 5;

        for(int i = 1; i <= number; i++) {
            factorial = factorial * i;
        }
        System.out.println("Factorial number is :" +factorial);

    }
}

Input: 5!
Output:5!=5*4*3*2*1 = 120
```

6.) Java program to Reverse Number

```
import java.util.Scanner;

public class ReverseNumber{

    public static void main(String[] args) {
        int no, rev=0,r,a;
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter any number : ");
        no = scanner.nextInt();
        a = no;
        while(no>0)
        {
            r = no%10;
            rev = rev*10+r;
            no=no/10;
        }

        System.out.println("Reverse:" +rev);

    }
}
```

Input:15786
Output: 68751



7.) Java program to find Armstrong Number

```
import java.util.Scanner;
public class ArmstrongNumber{
    public static void main(String[] args) {

        int arm=0, a,b,c,d,no;
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter any number : ");
        no = scanner.nextInt();
        d = no;
        while(no>0)
        {
            a = no%10;  no =
            no/10;      arm
            =arm+a*a*a;
        }
        if(arm==d){
            System.out.println("Armstrong number");
        }
        else{
            System.out.println("Not Armstrong number");
        }
    }
}
```

8.) Java program to find number of digits in given number

```
import java.util.Scanner;
public class NumberOfDigits{
    public static void main(String[] args) {

        int no = 0, a = 0;
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter any number : ");
        no = scanner.nextInt();
        if(no<0)
        {
            no = no * -1;
        } else if (no==0) {
            no=1;
        }
        while(no>0)
        {
            no=no/10;
            a++;
        }
        System.out.println("Number of digits in given number is :" +a);}
```



9.) Java program to find Palindrome number

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int number = scanner.nextInt();

        if (isPalindrome(number)) {
            System.out.println(number+"is a palindrome.");
        } else {
            System.out.println(number+"is not a palindrome.");
        }
    }

    public static boolean isPalindrome(int num) {
        int originalNumber = num;
        int reversedNumber = 0;
        while (num != 0) {

            int digit = num % 10;
            reversedNumber=reversedNumber*10+digit;
            num = num/10;
        }
        return originalNumber == reversedNumber;
    }
}
```

Enter a number: 1001

1001 is a palindrome.



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10.) Java program to calculate the sum of digits of a number

```
public class Main {  
    public static void main(String[] args) {  
        int number = 12345;  
        int sumOfDigits = calculateSumOfDigits(number);  
  
        System.out.println("Sumofdigitsof"+number+"is: " +  
sumOfDigits);  
    }  
  
    public static int calculateSumOfDigits(int number) {  
        int sum = 0;  
        while (number > 0) {  
            int digit=number%10;//Extract the last digit  
            sum = sum + digit; // Add the digit to sum  
            number=number/10;//Remove the last digit from number  
        }  
        return sum;  
    }  
}
```

Output:

Sumofdigitsof12345 is: 15



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Strings

1.) Java program to reverse a string

```
import java.util.Scanner;
public class Test {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();
        char ch;
        String nstr = "";
        for (int i = 0; i < input.length(); i++) {
            ch = input.charAt(i);
            nstr = ch + nstr;
        }
        System.out.println("Reversed String is : " + nstr);
```

2.) Java program to reverse each word of a given string

```
public static void main(String[] args) {
    reverseEachWordOfString("Java is good programming languages");
}

static void reverseEachWordOfString(String inputString)
{
    String[] words = inputString.split(" ");
    String reverseString = "";
    for (int i = 0; i < words.length; i++) {
        String word = words[i];
        String nstr = "";
        char ch;
        for (int j = 0; j < word.length(); j++) {
            ch = word.charAt(j);
            nstr = ch + nstr;
        }
        reverseString = reverseString + nstr + " ";
    }
    System.out.println(inputString);
    System.out.println(reverseString);
}
```

Input: Java is good programming languages
Output: avaJ si doog gnimmargorp seguagnal



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3.) Java program to find duplicate characters in a string

```
import java.util.HashMap;
import java.util.Set;

public class Main {

    public static void main(String[] args) {
        duplicateCharacterCount("Learn Java Programming");
    }

    static void duplicateCharacterCount(String inputString) {

        HashMap<Character, Integer> charCountMap=newHashMap<>();
        char[] strArray = inputString.toCharArray();
        for (char c : strArray) {
            if (charCountMap.containsKey(c)) {
                charCountMap.put(c, charCountMap.get(c) + 1);
            } else {
                charCountMap.put(c, 1);
            }
        }

        Set<Character> charsInString = charCountMap.keySet();
        System.out.println("Duplicate Characters in :" + inputString);
        for (Character ch : charsInString) {
            if (charCountMap.get(ch) > 1) {
                System.out.println(ch + ":" + charCountMap.get(ch));
            }
        }
    }
}
```

Duplicate Characters in : Learn Java Programming

a : 4 g : 2 m : 2 n : 2 r : 3



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4.) Java program to count Occurrences of Each Character in String

```
import java.util.HashMap;

public class Main {

    public static void main(String[] args) {
        CharacterCount("Test Automation Java Automation");
    }

    static void CharacterCount(String inputString) {
        HashMap<String, Integer> charCountMap = new HashMap<>();
        for(String s : inputString.split(" "))
        {
            if(charCountMap.containsKey(s))
            {
                charCountMap.put(s, charCountMap.get(s)+1);
            }
            else
            {
                charCountMap.put(s, 1);
            }
        }
        System.out.println("Count of Characters in a given string:"+
charCountMap);
    }
}
CountofCharacters in a given string : {Java=1, Automation=2, Test=1}
```

5.) Java program to count the number of words in a string

```
public class Main {
    public static void main(String[] args) {
        System.out.println("Enter the String");
        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();
        int count = 1;
        for (int i = 0; i < s.length() - 1; i++) {

            if ((s.charAt(i) == ' ') && (s.charAt(i + 1) != ' ')){
                count++;
            }
        }
        System.out.println("Number of words in a string: " +count);
    }
}
Enter the String: Welcome to Java World
Number of words in a string: 4
```



6.) Java program to find all permutations of a given string

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        String str = "abc";
        permute(str, "");
    }

    static void permute(String str, String prefix) {
        if (str.length() == 0) {
            System.out.println(prefix);
        } else {
            for (int i=0; i<str.length(); i++) {
                String rem = str.substring(0, i) + str.substring(i+1);
                permute(rem, prefix+str.charAt(i));
            }
        }
    }
}
```

abc
acb
bac
bca
cab
cba



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7.) Java program to find if a string is Palindrome

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        String str="madam";
        System.out.println(isPalindrome(str));
    }

    static boolean isPalindrome(String str) {
        int start = 0;
        int end=str.length() - 1;

        while(start<end) {
            if(str.charAt(start) != str.charAt(end)) {
                return false;
            }
            start++;
            end--;
        }
        return true;
    }
}
```



8.) Java program to determine if Two Strings are Anagrams

```
public class Main {  
  
    public static void main(String[] args) {  
        String str1 = "listen";  
        String str2 = "silent";  
        System.out.println(areAnagrams(str1,str2));  
    }  
  
    static boolean areAnagrams(String str1, String str2){  
        if(str1.length()!=str2.length())  
        {  
            return false;  
        int []charCount=new int[256];  
        for(int i=0;i<str1.length(); i++)  
        {  
  
            charCount[str1.charAt(i)]++;  
            charCount[str2.charAt(i)]--;  
        }  
        for(int count:charCount)  
        {  
            if ( count !=0 )  
            {  
                return false;  
            }  
        return true;  
    }  
}
```



9.) Java program to Count Vowels and Consonants in a given string

```
public class Main {  
    public static void main(String[] args) {  
        String str = "Hello World";  
        VowelConsonantCount(str);  
    }  
  
    static void VowelConsonantCount(String str) {  
        int vowels = 0, consonants = 0;  
        str = str.toLowerCase();  
        for (char c : str.toCharArray()) {  
            if (c >= 'a' && c <= 'z') {  
                if(c=='a'||c=='e'||c=='i'|| c == 'o'|| c == 'u')  
                {  
                    vowels++;  
                } else {  
                    consonants++;  
                }  
            }  
        }  
        System.out.println("Vowels : " + vowels);  
        System.out.println("Consonants:" + consonants);  
    }  
}
```

Vowels : 3

Consonants : 7



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10.) Java program to print unique characters

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        System.out.println("Unique characters in " + input + ":");
        printUniqueCharacters(input);
    }

    public static void printUniqueCharacters(String str) {
        // Assume ASCII characters (0-127), use boolean array to track
        character occurrences
        boolean[] unique = new boolean[128];
        for (int i = 0; i < str.length(); i++) {

            char ch = str.charAt(i);
            if (!unique[ch]) {
                unique[ch] = true;
                System.out.print(ch + " ");
            }
        }
    }
}
```

Enter a string: **JavaAutomation**

Unique characters in "Java Automation":

Jav Automin



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11.) Java program to print even indexed characters

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        System.out.println("Even indexed characters in " + input + ":");
        printEvenIndexedCharacters(input);
    }

    public static void printEvenIndexedCharacters(String str) {
        for (int i = 0; i < str.length(); i++) {
            if (i % 2 == 0) {
                System.out.print(str.charAt(i));
            }
        }
    }
}
```

Enter a string: Automation
Even indexed characters in "Automation":
Atmto



12.) Java program to remove space from a given string

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string with spaces:");
        String input = scanner.nextLine();

        String stringWithoutSpaces=removeSpaces(input);
        System.out.println("String without spaces: " +
stringWithoutSpaces);
    }

    public static String removeSpaces(String str) {
        StringBuilder result = new StringBuilder();
        for (int i = 0; i < str.length(); i++) {
            if (str.charAt(i) != ' ') {
                result.append(str.charAt(i));
            }
        }
        return result.toString();
    }
}
```

```
Enter a string with spaces: Welcome to Java World
String without spaces: WelcometoJavaWorld
```



13.) Java program to print each letter twice from a given string

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        String doubledString = doubleCharacters(input);
        System.out.println("Doubled characters: " + doubledString);
    }

    public static String doubleCharacters(String str) {
        StringBuilder doubled = new StringBuilder();
        for (int i = 0; i < str.length(); i++) {
            char ch = str.charAt(i);
            doubled.append(ch).append(ch); // Append each character
twice
        }
        return doubled.toString();
    }
}
```

```
Enter a string: hello
Doubled characters: hheelllloo
```



14.) Java program to swap two string without using 3rd variable

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter first string: ");
        String str1 = scanner.nextLine();
        System.out.print("Enter second string: ");
        String str2 = scanner.nextLine();

        System.out.println("Before swapping: str1 = " + str1 + ", str2 = " + str2);

        // Swapping without using a third variable
        str1 = str1 + str2; // Concatenate str1 and str2 and store in str1
        str2 = str1.substring(0, str1.length() - str2.length());
        // Extract the initial part (original str1) from the concatenated string
        str1 = str1.substring(str2.length()); // Extract the remaining part (original str2) from the concatenated string

        System.out.println("After swapping: str1 = " + str1 + ", str2 = " + str2);
    }
}
```

Enter first string: Hello

Enter second string: World

Before swapping: str1 = **Hello**, str2 = **World**

After swapping: str1 = **World**, str2 = **Hello**



15.) Java program to gives Output: a2b2c3d2 for the Input String Str = “aabbccddd”

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        String output = getCharacterCount(input);
        System.out.println("Output: " + output);
    }

    public static String getCharacterCount(String str) {
        StringBuilder result = new StringBuilder();
        int count = 1;

        for (int i = 0; i < str.length(); i++) {
            // If the next character is the same, increase the count
            if (i + 1 < str.length() && str.charAt(i) == str.charAt(i + 1)) {
                count++;
            } else {
                //Append the character and its count to the result
                result.append(str.charAt(i)).append(count);
                count = 1; // Reset the count
            }
        }

        return result.toString();
    }
}
```

Enter a string: aabbccddd

Output: a2b2c3d2



16.) Java program to gives two Output:

“abcde”, “ABCDE” for the Input

String Str = “aBACbcEDed”

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();
        System.out.println("OriginalStringis:"+ input);
        separateCharacters(input);
    }

    public static void separateCharacters(String input)
    {
        StringBuilder lowerCase = new StringBuilder();
        StringBuilder upperCase = new StringBuilder();
        for(char ch : input.toCharArray())
        {
            if(Character.isLowerCase(ch))
            {
            }
            else lowerCase.append(ch);
            {
            }

            upperCase.append(ch);

        }
        System.out.println("Outputinlowercase:"+lowerCase);
        System.out.println("Outputinuppercase"+upperCase);
    }
}
```

Enter a string: **aBACbcEDed**

Output in lowercase: abced

Output in uppercase: ABCED



17.) Java program to gives two Output: “Subburaj”, “123” for the Input String Str = “Subbu123raj”

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();
        System.out.println("OriginalStringis:"+input);
        separateAlphaAndNumeric(input);
    }

    public static void separateAlphaAndNumeric(String input)
    {
        StringBuilder alphaPart = new StringBuilder();
        StringBuilder numericPart = new StringBuilder();
        for(char ch : input.toCharArray())
        {
            if(Character.isLetter(ch))
            {
            }
            else if(Character.isDigit(ch))
            {
                numericPart.append(ch);
            }
        }
        System.out.println("OutputinAlpha:"+alphaPart.toString());
        System.out.println("Output in Numeric:
"+numericPart.toString());
    }
}
```

Enter a string: **Subbu123raj**

Output in lowercase: Subburaj

Output in uppercase: 123



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18.) Java program to gives Output: “32412120000” for the Input String Str = “32400121200”

```
public class Main {  
    public static void main(String[] args) {  
        String input = "32400121200";  
        String output = rearrangeDigits(input);  
        System.out.println("Output: " + output);  
    }  
  
    public static String rearrangeDigits(String input) {  
        //Split the input into parts: digits and non-digits  
        StringBuilder digits = new StringBuilder();  
        StringBuilder nonDigits = new StringBuilder();  
        for (char c : input.toCharArray()) {  
            if (Character.isDigit(c)) {  
                digits.append(c);  
            } else {  
                nonDigits.append(c);  
            }  
        }  
  
        //Concatenate non-digits followed by digits  
        return digits.toString() + nonDigits.toString();  
    }  
}  
Output: 32412120000
```

19.) Java program to gives Output: “00003241212” for the Input String Str = “32400121200”

```
public class Main {  
    public static void main(String[] args) {  
        String input = "32400121200";  
        String formattedOutput = String.format("%011d",  
Long.parseLong(input));  
        System.out.println("Formatted output: " + formattedOutput);  
    }  
}  
Formatted output: 00003241212
```



20.) Java program to find the longest without repeating characters

```
import java.util.HashSet;

public class Main {
    public static void main(String[] args) {
        String s1="abcabcb"; //Expected: "abc", length 3
        String s2="bbbbbb"; //Expected: "b", length 1
        String s3="pwwkew"; //Expected: "wke", length 3
        String s4=""; //Expected: "", length 0

        System.out.println("Longestsubstring without repeating
characters in s1:"+lengthOfLongestSubstring(s1)); // Output:3
        System.out.println("Longestsubstring without repeating
characters in s2:"+lengthOfLongestSubstring(s2)); // Output:1
        System.out.println("Longestsubstring without repeating
characters in s3:"+lengthOfLongestSubstring(s3)); // Output:3
        System.out.println("Longestsubstring without repeating
characters in s4:"+lengthOfLongestSubstring(s4)); // Output:0
    }

    public static int lengthOfLongestSubstring(String s) {
        HashSet<Character> set=new HashSet<>();
        int maxLength = 0;
        int start = 0;
        int end = 0;

        while (end < s.length()) {
            char currentChar=s.charAt(end);
            if(!set.contains(currentChar)) {
                set.add(currentChar);
                maxLength=Math.max(maxLength, end - start + 1);
                end++;
            } else {
                set.remove(s.charAt(start));
                start++;
            }
        }
        return maxLength;
    }
}
```



Arrays

1.) Find common elements between two arrays

```
import java.util.HashSet;
import java.util.Set;

public class CommonElements {

    public static void main(String[] args) {
        int[] array1 = {1, 2, 3, 4, 5};
        int[] array2 = {4, 5, 6, 7, 8};

        Set<Integer> commonElements = findCommonElements(array1,
array2);

        System.out.println("Common elements: " + commonElements);
    }

    public static Set<Integer> findCommonElements(int[] array1,
int[] array2) {
        Set<Integer> set1 = new HashSet<>();
        Set<Integer> commonSet = new HashSet<>();

        //Add elements of the first array to the set
        for(int num : array1) {
            set1.add(num);
        }

        //Check for common elements in the second array
        for(int num : array2) {
            if(set1.contains(num)) {
                commonSet.add(num);
            }
        }

        return commonSet;
    }
}
```

Input:array1 = {1,2,3,4,5} and

array2={4,5,6,7,8}

Output:Common elements: [4, 5]



2.) Find first and last element of ArrayList

```
import java.util.ArrayList;

public class Main {
    public static void main(String[] args) {
        ArrayList<String> arrayList = new ArrayList<>();
        arrayList.add("Apple");
        arrayList.add("Banana");
        arrayList.add("Cherry");
        arrayList.add("Date");
        arrayList.add("Elderberry");
        if(!arrayList.isEmpty()) {

            String firstElement = arrayList.get(0);
            String lastElement = arrayList.get(arrayList.size() - 1);

            System.out.println("First element: " + firstElement);
            System.out.println("Last element: " + lastElement);
        }else {
            System.out.println("The ArrayList is empty.");
        }
    }
}
```

Output:

First element: Apple

Last element: Elderberry



3.) Sort an array without using in-built method

```
public class Main {
    public static void main(String[] args) {
        int[] array = {5, 2, 9, 1, 6};
        selectionSort(array);

        System.out.println("Sorted array:");
        for (int num : array) {
            System.out.print(num + " ");
        }
    }

    public static void selectionSort(int[] array) {
        int n = array.length;
        for (int i = 0; i < n - 1; i++) {
            int minIndex = i;
            for (int j = i + 1; j < n; j++) {
                if (array[j] < array[minIndex]) {
                    minIndex = j;
                }
            }

            // Swap array[i] and array[minIndex]
            int temp = array[i];
            array[i] = array[minIndex];
            array[minIndex] = temp;
        }
    }
}
```

Output:
Sorted array:
1 2 5 6 9



Programming
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4.) Remove duplicates from an Array

```
import java.util.HashSet;
import java.util.Set;

public class Main {
    public static void main(String[] args) {
        int[] array = {5, 2, 9, 1, 6, 2, 5};

        int[] uniqueArray=removeDuplicates(array);

        System.out.println("Array with duplicates removed:");
        for (int num : uniqueArray) {
            System.out.print(num + " ");
        }
    }

    public static int[] removeDuplicates(int[] array) {
        Set<Integer> set = new HashSet<>();
        for (int num : array) {
            set.add(num);
        }

        int[] result = new int[set.size()];
        int i = 0;
        for (int num : set) {
            result[i++] = num;
        }

        return result;
    }
}
```

Output:

Array with duplicates removed:

1 2 5 6 9



Programming
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5.) Remove duplicates from an ArrayList

```
import java.util.ArrayList;
import java.util.HashSet;
import java.util.Set;

public class Main {
    public static void main(String[] args) {
        ArrayList<Integer>arrayList=newArrayList<>();
        arrayList.add(5);
        arrayList.add(2);
        arrayList.add(9);
        arrayList.add(1);
        arrayList.add(6);
        arrayList.add(2);
        arrayList.add(5);
        ArrayList<Integer> uniqueList =
        removeDuplicates(arrayList);

        System.out.println("ArrayListwithduplicates
removed:");
        for (int num : uniqueList) {
            System.out.print(num + " ");
        }
    }

    public static ArrayList<Integer>
removeDuplicates(ArrayList<Integer> list) {
        Set<Integer>set=newHashSet<>(list);
        return new ArrayList<>(set);
    }
}
```

Output:

ArrayList with duplicates removed:

1 2 5 6 9



**Programming
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6.) Find the missing number in an Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] array={1,2,4,5, 6}; // Missing number is 3  
        int missingNumber=findMissingNumber(array);  
        System.out.println("The missing number is: " + missingNumber);  
    }  
  
    public static int findMissingNumber(int[] array) {  
        int n=array.length+1; // Since one number is missing, the length  
        should be n+1  
        int totalSum=n*(n+1)/2; // Sum of first n natural numbers  
        int arraySum = 0;  
        for (int num : array) {  
            arraySum += num;  
        }  
        return totalSum - arraySum;  
    }  
}
```

Output:

The missing number is: 3



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7.) Find the largest and smallest element in an Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] array = {5, 2, 9, 1, 6, 3};  
  
        int[] result = findLargestAndSmallest(array);  
  
        System.out.println("Smallest element: " + result[0]);  
        System.out.println("Largest element: " + result[1]);  
    }  
  
    public static int[] findLargestAndSmallest(int[] array) {  
        if (array == null || array.length == 0) {  
            throw new IllegalArgumentException("Array must not be null or  
empty");  
        }  
  
        int smallest = array[0];  
        int largest = array[0];  
  
        for (int num : array) {  
            if (num < smallest) {  
                smallest = num;  
            }  
            if (num > largest) {  
                largest = num;  
            }  
        }  
        return new int[]{smallest, largest};  
    }  
}
```

Output:

Smallest element: 1

Largest element: 9



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8.) Search element in an Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] array={5, 2, 9, 1, 6, 3};  
        int target = 6;  
  
        int index=linearSearch(array, target);  
  
        if (index != -1) {  
            System.out.println("Element " + target + " found at index:" +  
index);  
        } else {  
            System.out.println("Element " + target + " not found in the  
array.");  
        }  
    }  
    public static int linearSearch(int[] array, int target) {  
        for(int i=0;i<array.length; i++) {  
            if(array[i]==target) {  
                return i;//Element found, return index  
            }  
        }  
        return -1;//Element not found  
    }  
}
```

Output:

Element 6 found at index: 4

Element 10 not found in the array



9.) Array consists of integers and special characters,sum only integers

```
public class Main {  
    public static void main(String[] args) {  
        String[]array={"5","2","9","a","1","6", "#", "3"};  
        int sum = sumIntegers(array);  
  
        System.out.println("Sumofintegersinthearray: " + sum);  
    }  
  
    public static int sumIntegers(String[] array) {  
        int sum = 0;  
        for (String element : array) {  
            try {  
                int num = Integer.parseInt(element);  
                sum += num;  
            } catch (NumberFormatException e) {  
                // Ignore non-integer elements  
            }  
        }  
        return sum;  
    }  
}
```

Output:

Sum of integers in the array: 26



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10.) Find Minimum and Maximum from an Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] array = {5, 2, 9, 1, 6, 3};  
  
        // Find maximum and minimum  
        int max = findMaximum(array);  
        int min = findMinimum(array);  
  
        // Print the results  
        System.out.println("Minimum value in the array: " + min);  
        System.out.println("Maximum value in the array: " + max);  
    }  
  
    public static int findMaximum(int[] array) {  
  
        if (array.length == 0) {  
            throw new IllegalArgumentException("Array must not be empty");  
        }  
        int max = array[0]; // Initialize max to the first element  
        for (int i = 1; i < array.length; i++) {  
            if (array[i] > max) {  
                max = array[i]; // Update max if current element is larger  
            }  
        }  
        return max;  
    }  
  
    public static int findMinimum(int[] array) {  
  
        if (array.length == 0) {  
            throw new IllegalArgumentException("Array must not be empty");  
        }  
        int min = array[0]; // Initialize min to the first element  
        for (int i = 1; i < array.length; i++) {  
            if (array[i] < min) {  
                min = array[i]; // Update min if current element is smaller  
            }  
        }  
        return min;  
    }  
}
```

Output:

Minimum value in the array: 1

Maximum value in the array: 9



Programming
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11.) Java program to count Odd and Even number from given array

Input: {1,2,3,4,5,6,7,8,9}

```
public class Main {
    public static void main(String[] args) {
        int[] array = {1, 2, 3, 4, 5, 6, 7, 8, 9};
        int[] count = countOddAndEven(array);

        System.out.println("Even numbers count:" + count[1]);
        System.out.println("Odd numbers count:" + count[0]);
    }

    public static int[] countOddAndEven(int[] array) {
        int[] count=newint[2];//Index 0 for odd count, Index 1 for even count

        for (int num : array) {
            if (num % 2 == 0) {
                count[1]++; // Increment even count
            } else {
                count[0]++; // Increment odd count
            }
        }
        return count;
    }
}
```

Output:

Even numbers count:4

Odd numbers count:5



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12.) Java program – input array was given [1,1,2,2,3,4,5,5,6,6], Output – [3,4]

```
import java.util.HashMap;
import java.util.Map;
import java.util.ArrayList;
import java.util.List;
public class Main {

    public static void main(String[] args) {
        int[] array = {1, 1, 2, 2, 3, 4, 5, 5, 6, 6};
        List<Integer> result = findNonRepeatedElements(array);
        System.out.println("Non-repeated elements: " + result);
    }
    public static List<Integer> findNonRepeatedElements(int[]

array) {

        // Step 1: Count occurrences of each element using a
        HashMap
        Map<Integer, Integer> countMap = new HashMap<>();
        for (int num : array) {
            countMap.put(num, countMap.getOrDefault(num, 0) + 1);
        }
        // Step 2: Identify elements with count equal to 1 (non-
        repeated)
        List<Integer> nonRepeatedElements = new ArrayList<>();
        for (Map.Entry<Integer, Integer> entry :
        countMap.entrySet()) {
            if (entry.getValue() == 1) {
                nonRepeatedElements.add(entry.getKey());
            }
        }
        return nonRepeatedElements;
    }
}
```

Output :

Non-repeated elements: [3, 4]



Programming
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Java program to implement hashCode and equals

```
import java.util.Objects;

public class Student {
    private int id;
    private String name;

    // Constructor
    public Student(int id, String name) {
        this.id = id;
        this.name = name;
    }

    //Getters and setters (omitted for brevity)

    // hashCode method
    @Override
    public int hashCode() {
        return Objects.hash(id, name);
    }

    // equals method
    @Override
    public boolean equals(Object obj) {
        if (this == obj)
            return true;
        if (obj == null || getClass() != obj.getClass())
            return false;
        Student student = (Student) obj;
        return id == student.id && Objects.equals(name, student.name);
    }

    public static void main(String[] args) {
        //Creating objects of Student class
        Student student1 = new Student(1, "Alice");
        Student student2 = new Student(2, "Bob");
        Student student3 = new Student(1, "Alice");

        //Testing equals method
        System.out.println("student1.equals(student2): " +
        student1.equals(student2)); // Output: false
        System.out.println("student1.equals(student3): " +
        student1.equals(student3)); // Output: true

        //Testing hashCode method
        System.out.println("HashCode of student1: " + student1.hashCode());
        System.out.println("HashCode of student2: " + student2.hashCode());
        System.out.println("HashCode of student3: " + student3.hashCode());
    }
}
```





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