IMP JAVA Programs for QA/SDET Interview

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
```

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.
```

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

```java
public class Main {
    public static void main(String[] args) {
        int number = 12345;

        int sumOfDigits = calculateSumOfDigits(number);

        System.out.println("Sum of digits of " + 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:

```
Sum of digits of 12345 is: 15
```

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 langauges");
}

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 langauges
Output: avaJ si doog gnimmargorp seguagnal
```

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 = new HashMap<>();
        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
```

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);
          }
      }
```

```
Count of Characters 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
```

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

```java
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

```java
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

10.) Java program to print unqiue characters

```java
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: Java Automation

Unique characters in "Java Automation":

J a v  A u t o m i n
```

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 = “aabbcccdd”

```
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: aabbcccdd

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("Original String is: "+ 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))
                {
                     lowerCase.append(ch);
                }
                else
                {
                     upperCase.append(ch);
                }
           }
           System.out.println("Output in lowercase: "+lowerCase);
           System.out.println("Output in uppercase "+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("Original String is: "+ input);
                   separateAplhaAndNumeric(input);
         }

     public static void separateAlphaAndNumeric(String input)
        {
         StringBuilder alphaPart = new StringBuilder();
         StringBuilder numericPart = new StringBuilder();

         for(char ch : input.toCharArray())
         {
             if(Character.isLetter(ch))
             {
                 alphaPart.append(ch);
             }
             else if (Character.isDigit(ch))
             {
                 numericPart.append(ch);
             }
         }

         System.out.println("Output in Alpha: "+alphaPart.toString());
         System.out.println("Output in Numeric: 
     "+numericPart.toString());
      }
```

```
Enter a string: Subbu123raj

Output in lowercase: Subburaj

Output in uppercase: 123
```

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

```java
import java.util.HashSet;

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

        System.out.println("Longest substring without repeating
characters in s1: " + lengthOfLongestSubstring(s1)); // Output: 3
        System.out.println("Longest substring without repeating
characters in s2: " + lengthOfLongestSubstring(s2)); // Output: 1
        System.out.println("Longest substring without repeating
characters in s3: " + lengthOfLongestSubstring(s3)); // Output: 3
        System.out.println("Longest substring 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

4.) Remove duplicates from an Array

```java
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
```

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 = new ArrayList<>();
        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("ArrayList with duplicates
removed:");
        for (int num : uniqueList) {
            System.out.print(num + " ");
        }
    }

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

Output:

ArrayList with duplicates removed:

1 2 5 6 9

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

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

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("Sum of integers in the array: " + 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

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
```

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 = new int[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
```

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;
    }
}
```

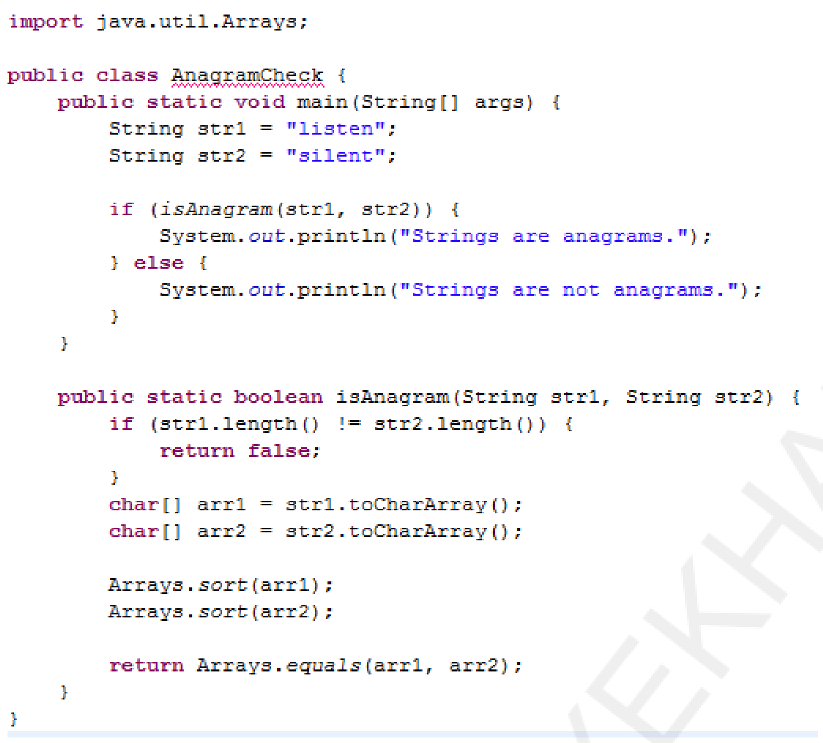
Output :

Non-repeated elements: [3, 4]

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());
    }
}
```

Check if two strings are anagrams

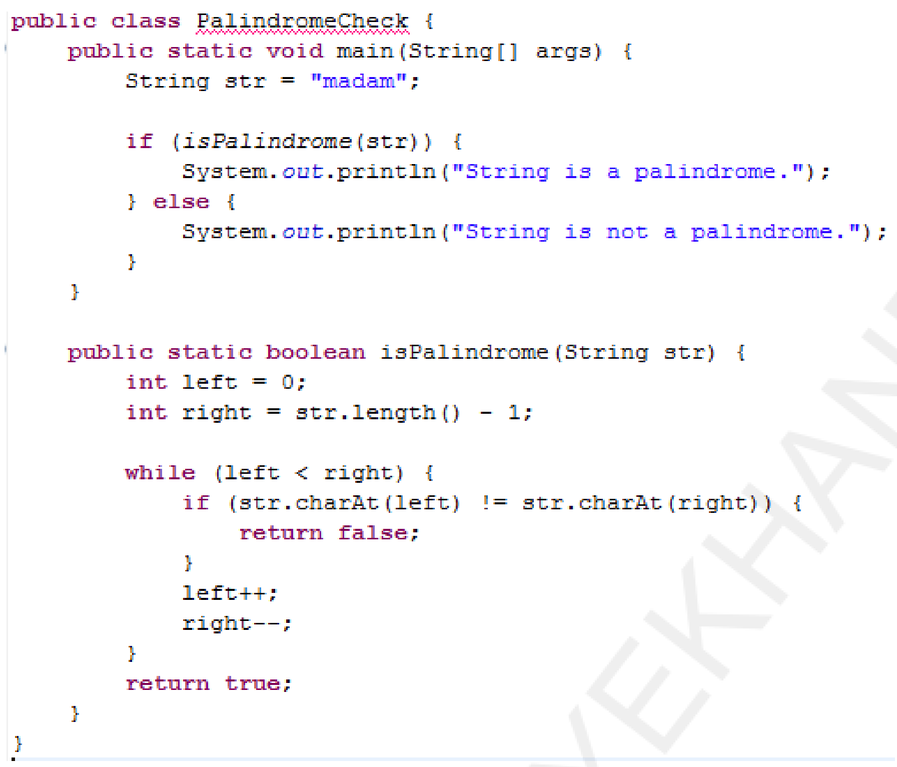


```java
import java.util.Arrays;

public class AnagramCheck {
    public static void main(String[] args) {
        String str1 = "listen";
        String str2 = "silent";

        if (isAnagram(str1, str2)) {
            System.out.println("Strings are anagrams.");
        } else {
            System.out.println("Strings are not anagrams.");
        }
    }

    public static boolean isAnagram(String str1, String str2) {
        if (str1.length() != str2.length()) {
            return false;
        }
        char[] arr1 = str1.toCharArray();
        char[] arr2 = str2.toCharArray();

        Arrays.sort(arr1);
        Arrays.sort(arr2);

        return Arrays.equals(arr1, arr2);
    }
}
```

Explanation:

- **if (str1.length() != str2.length())**: Checks if both strings have the same length.
- **Arrays.sort(arr1)**: Sorts the character array of the first string.
- **Arrays.equals(arr1, arr2)**: Compares the sorted character arrays of both strings.

Check if a string is a palindrome

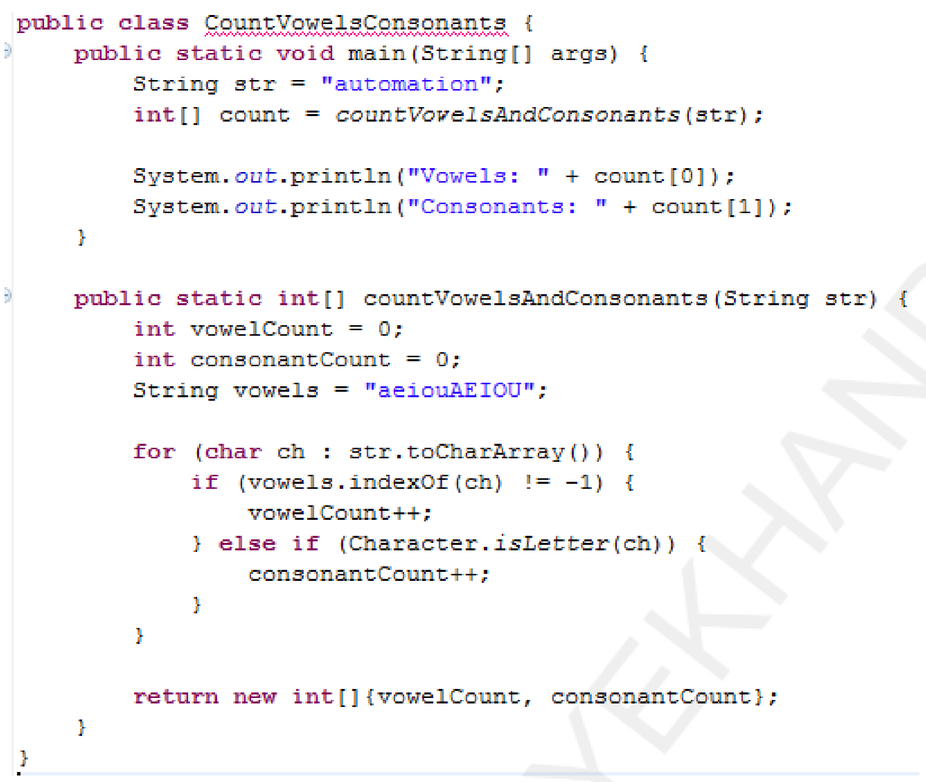


```
public class PalindromeCheck {
    public static void main(String[] args) {
        String str = "madam";

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

    public static boolean isPalindrome(String str) {
        int left = 0;
        int right = str.length() - 1;

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

Explanation:

- **while (left < right)**: Loops through the string comparing characters from the start and end.
- **str.charAt(left) != str.charAt(right)**: If characters don't match, it's not a palindrome.

Count the number of vowels and consonants in a string



```java
public class CountVowelsConsonants {
    public static void main(String[] args) {
        String str = "automation";
        int[] count = countVowelsAndConsonants(str);

        System.out.println("Vowels: " + count[0]);
        System.out.println("Consonants: " + count[1]);
    }

    public static int[] countVowelsAndConsonants(String str) {
        int vowelCount = 0;
        int consonantCount = 0;
        String vowels = "aeiouAEIOU";

        for (char ch : str.toCharArray()) {
            if (vowels.indexOf(ch) != -1) {
                vowelCount++;
            } else if (Character.isLetter(ch)) {
                consonantCount++;
            }
        }

        return new int[]{vowelCount, consonantCount};
    }
}
```

Explanation:

- **vowels.indexOf(ch) != -1**: Checks if the character is a vowel.
- **Character.isLetter(ch)**: Ensures that only letters are counted as consonants.

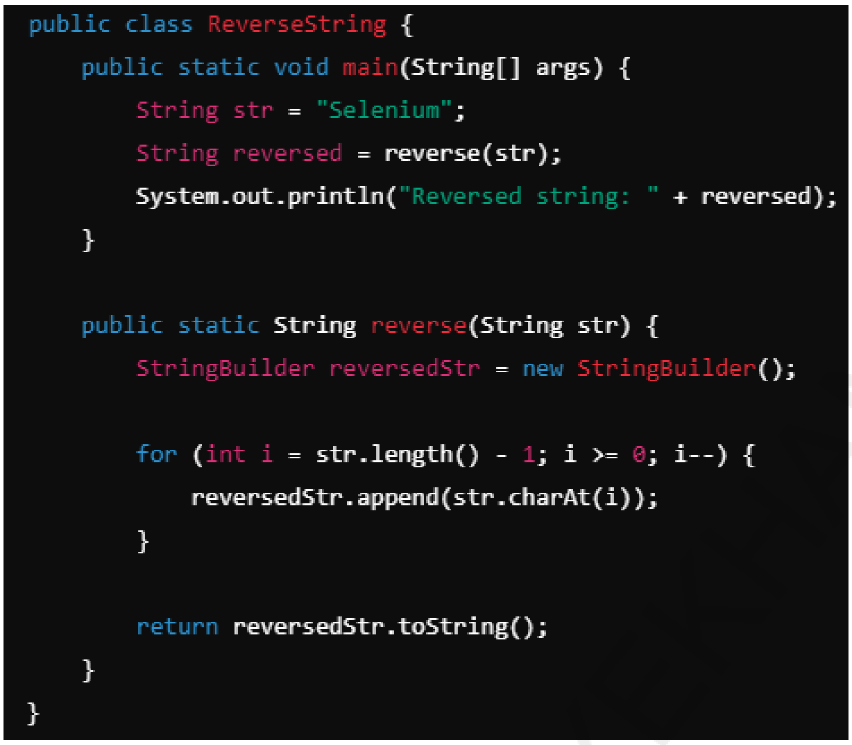
Find the first non-repeating character in a string

```
import java.util.LinkedHashMap;
import java.util.Map;

public class FirstNonRepeatingChar {
    public static void main(String[] args) {
        String str = "automation";
        char result = findFirstNonRepeating(str);
        System.out.println("First non-repeating character: " + result);
    }

    public static char findFirstNonRepeating(String str) {
        Map<Character, Integer> charCountMap = new LinkedHashMap<>();

        for (char ch : str.toCharArray()) {
            charCountMap.put(ch, charCountMap.getOrDefault(ch, 0) + 1);
        }

        for (Map.Entry<Character, Integer> entry : charCountMap.entrySet()) {
            if (entry.getValue() == 1) {
                return entry.getKey();
            }
        }
        return '\0';
    }
}
```

Explanation:

- **charCountMap.getOrDefault(ch, 0) + 1**: Increments the count of each character.
- **if (entry.getValue() == 1)**: Finds the first character that appears only once.

Reverse a string

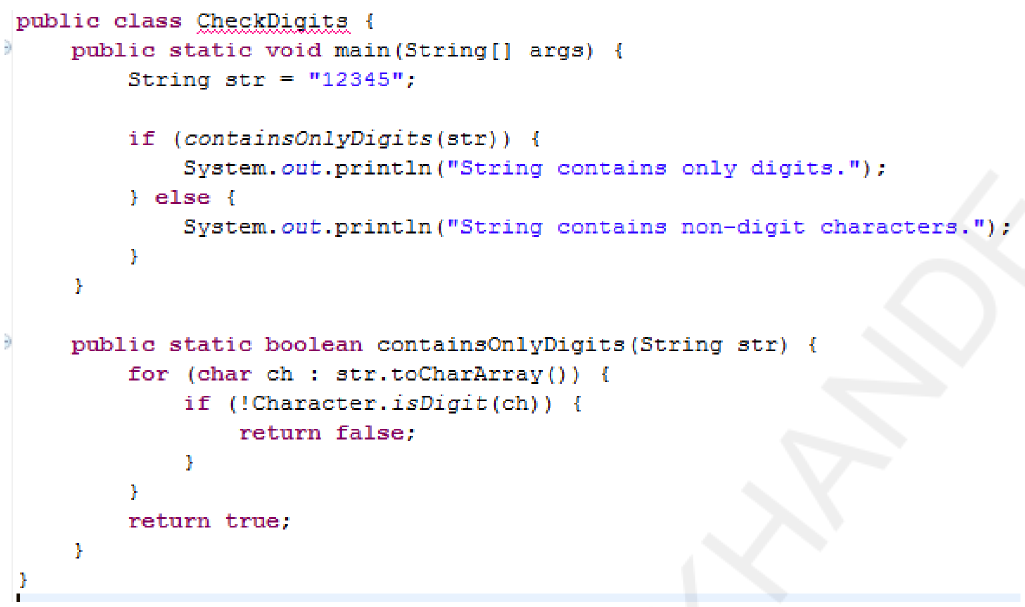


```java
public class ReverseString {
    public static void main(String[] args) {
        String str = "Selenium";
        String reversed = reverse(str);
        System.out.println("Reversed string: " + reversed);
    }

    public static String reverse(String str) {
        StringBuilder reversedStr = new StringBuilder();

        for (int i = str.length() - 1; i >= 0; i--) {
            reversedStr.append(str.charAt(i));
        }

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

Explanation:

- **for (int i = str.length() - 1; i >= 0; i--)**: Loops through the string from the end to the beginning.
- **reversedStr.append(str.charAt(i))**: Appends each character to the reversed string.

Check if a string contains only digits

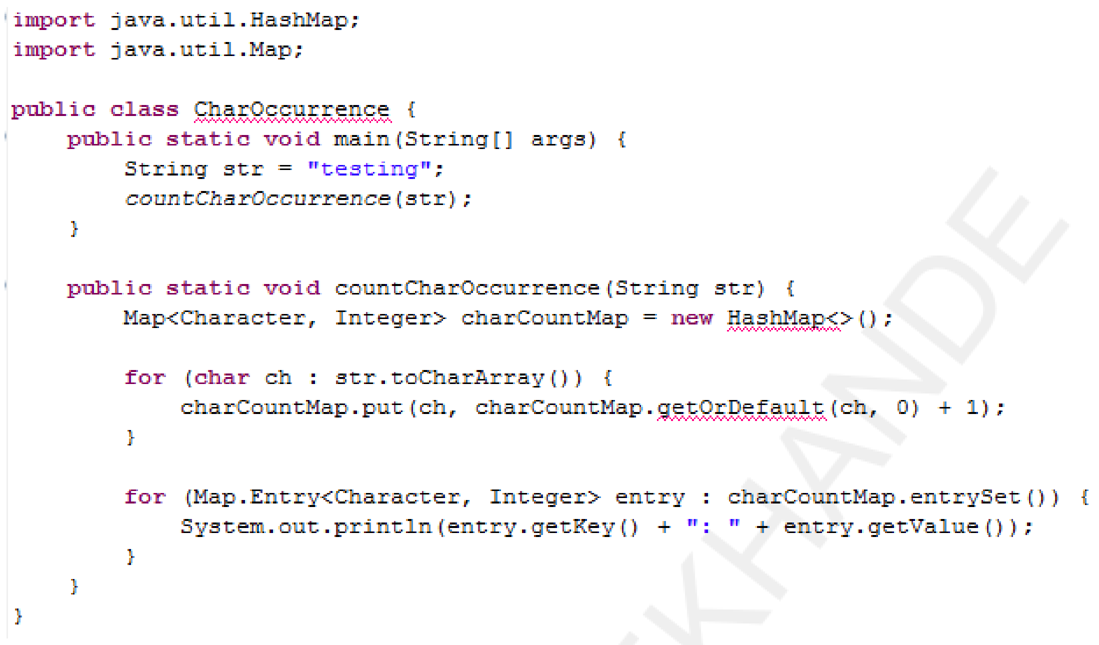


```java
public class CheckDigits {
    public static void main(String[] args) {
        String str = "12345";

        if (containsOnlyDigits(str)) {
            System.out.println("String contains only digits.");
        } else {
            System.out.println("String contains non-digit characters.");
        }
    }

    public static boolean containsOnlyDigits(String str) {
        for (char ch : str.toCharArray()) {
            if (!Character.isDigit(ch)) {
                return false;
            }
        }
        return true;
    }
}
```

Explanation:

- **Character.isDigit(ch)**: Checks if each character is a digit.
- If any character is not a digit, it returns false.

Count the occurrence of each character in a string

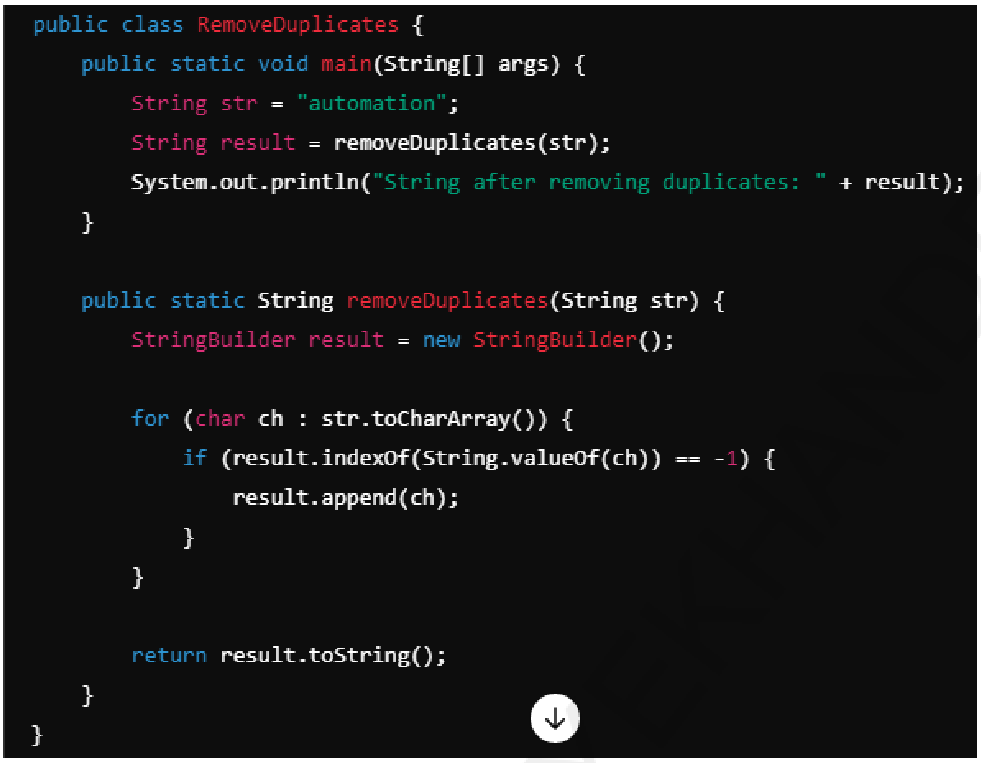


```java
import java.util.HashMap;
import java.util.Map;

public class CharOccurrence {
    public static void main(String[] args) {
        String str = "testing";
        countCharOccurrence(str);
    }

    public static void countCharOccurrence(String str) {
        Map<Character, Integer> charCountMap = new HashMap<>();

        for (char ch : str.toCharArray()) {
            charCountMap.put(ch, charCountMap.getOrDefault(ch, 0) + 1);
        }

        for (Map.Entry<Character, Integer> entry : charCountMap.entrySet()) {
            System.out.println(entry.getKey() + ": " + entry.getValue());
        }
    }
}
```

Explanation:

- **charCountMap.put(ch, charCountMap.getOrDefault(ch, 0) + 1)**: Increments the count of each character.
- **for (Map.Entry<Character, Integer> entry)**: Iterates through the map to print the count of each character.

Remove duplicate characters from a string

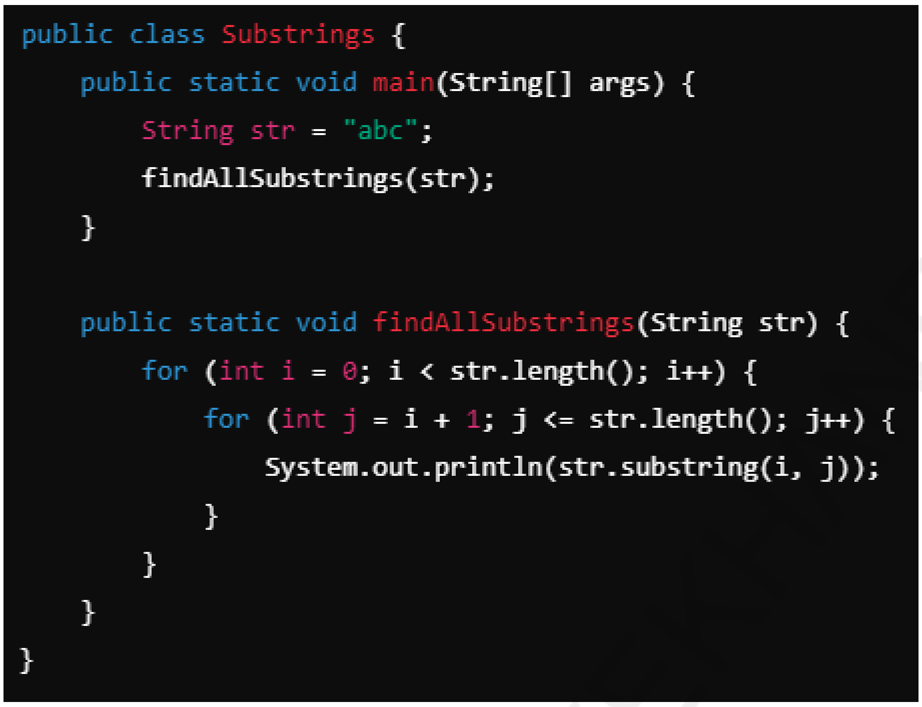


```java
public class RemoveDuplicates {
    public static void main(String[] args) {
        String str = "automation";
        String result = removeDuplicates(str);
        System.out.println("String after removing duplicates: " + result);
    }

    public static String removeDuplicates(String str) {
        StringBuilder result = new StringBuilder();

        for (char ch : str.toCharArray()) {
            if (result.indexOf(String.valueOf(ch)) == -1) {
                result.append(ch);
            }
        }

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

Explanation:

- **result.indexOf(String.valueOf(ch)) == -1**: Checks if the character is already present in the result.
- If not present, the character is appended to the result.

Find all substrings of a string

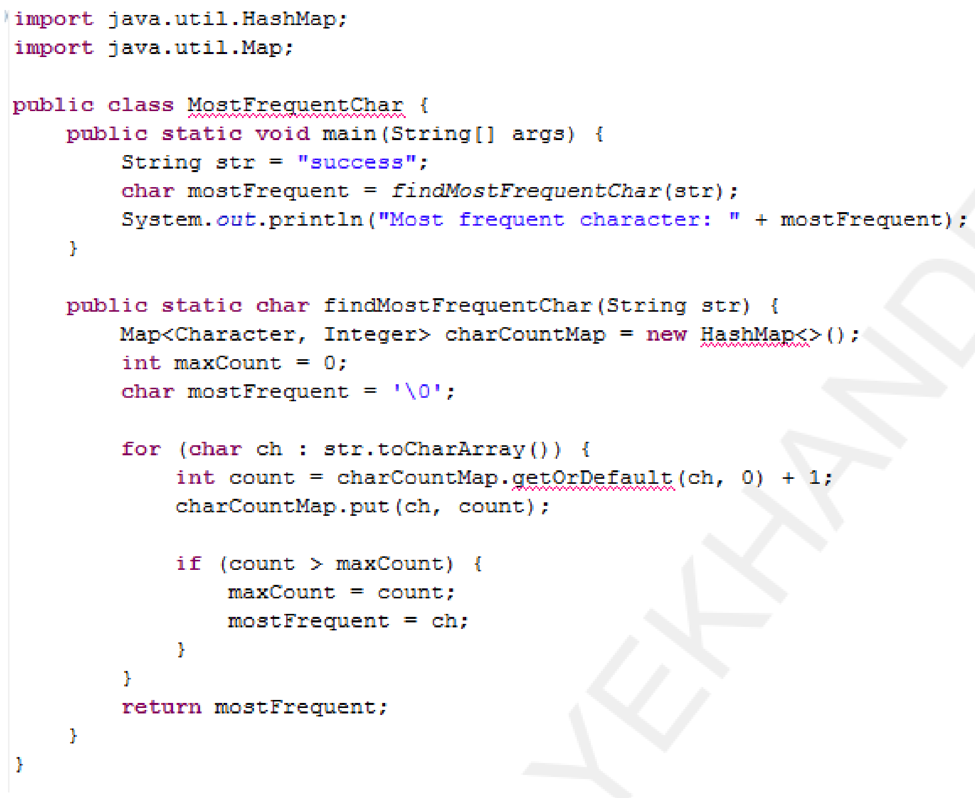


```java
public class Substrings {
    public static void main(String[] args) {
        String str = "abc";
        findAllSubstrings(str);
    }

    public static void findAllSubstrings(String str) {
        for (int i = 0; i < str.length(); i++) {
            for (int j = i + 1; j <= str.length(); j++) {
                System.out.println(str.substring(i, j));
            }
        }
    }
}
```

Explanation:

- **str.substring(i, j)**: Extracts all substrings starting from index i to j.
- Nested loops ensure that all possible substrings are printed.

Find the most frequent character in a string

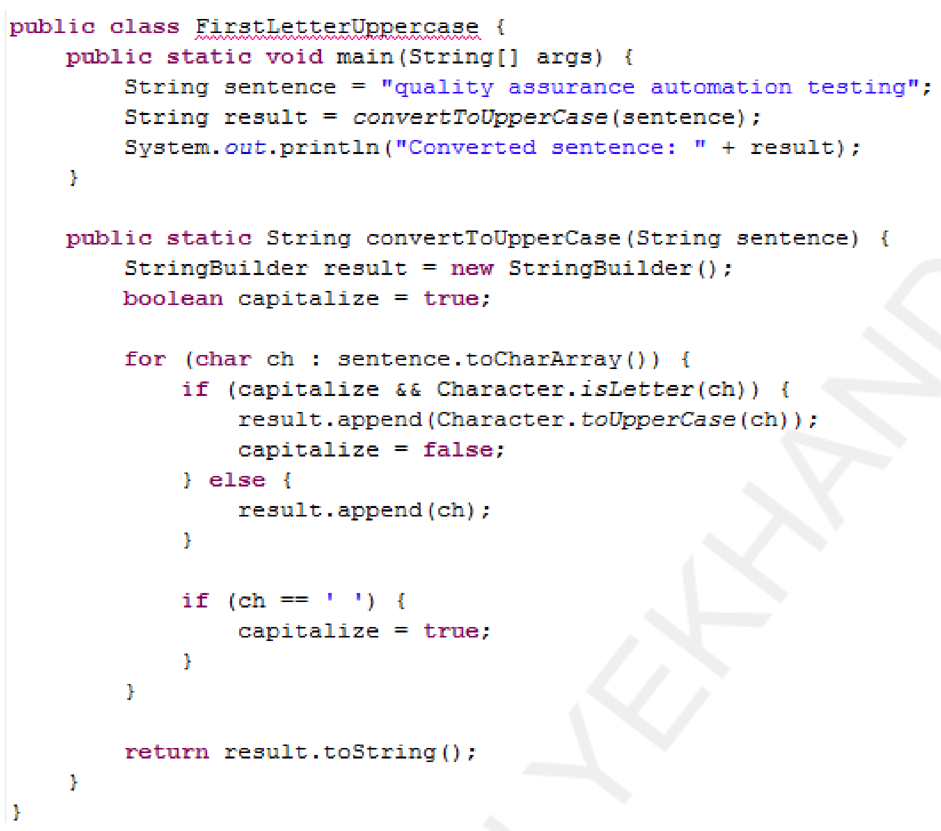


```java
import java.util.HashMap;
import java.util.Map;

public class MostFrequentChar {
    public static void main(String[] args) {
        String str = "success";
        char mostFrequent = findMostFrequentChar(str);
        System.out.println("Most frequent character: " + mostFrequent);
    }

    public static char findMostFrequentChar(String str) {
        Map<Character, Integer> charCountMap = new HashMap<>();
        int maxCount = 0;
        char mostFrequent = '\0';

        for (char ch : str.toCharArray()) {
            int count = charCountMap.getOrDefault(ch, 0) + 1;
            charCountMap.put(ch, count);

            if (count > maxCount) {
                maxCount = count;
                mostFrequent = ch;
            }
        }
        return mostFrequent;
    }
}
```

Explanation:

- **if (count > maxCount)**: Tracks the character with the highest frequency.
- Updates the most frequent character during iteration.

Convert the first letter of each word in a string to uppercase



```java
public class FirstLetterUppercase {
    public static void main(String[] args) {
        String sentence = "quality assurance automation testing";
        String result = convertToUpperCase(sentence);
        System.out.println("Converted sentence: " + result);
    }

    public static String convertToUpperCase(String sentence) {
        StringBuilder result = new StringBuilder();
        boolean capitalize = true;

        for (char ch : sentence.toCharArray()) {
            if (capitalize && Character.isLetter(ch)) {
                result.append(Character.toUpperCase(ch));
                capitalize = false;
            } else {
                result.append(ch);
            }

            if (ch == ' ') {
                capitalize = true;
            }
        }

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

Explanation:

- **boolean capitalize = true**: A flag to indicate when to capitalize a letter.
- **Character.toUpperCase(ch)**: Converts the character to uppercase if it is the first letter of a word.
- The flag is reset after every space character, allowing the first letter of the next word to be capitalized.