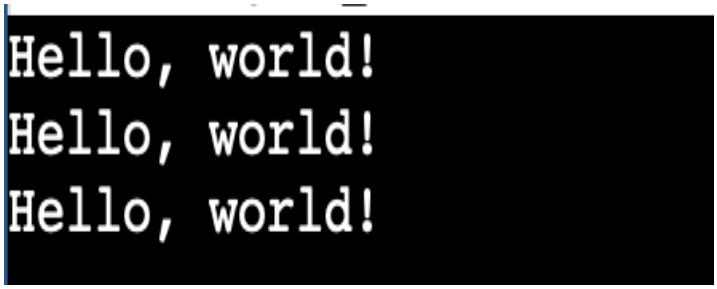
1.Demonstrate various string constructor with proper java programs.

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

        String string1 = "Hello, world!";
        System.out.println(string1);


        String string2 = new String("Hello, world!");
        System.out.println(string2);

        char[] charArray = {'H', 'e', 'l', 'l', 'o', ',', ' ', 'w', 'o', 'r', 'l', 'd', '!'};
        String string3 = new String(charArray);
        System.out.println(string3);
    }
}
```



2.Demonstrate string length, string literal, string concat

```
public class Main {

    public static void main(String[] args) {

        String str = "Hello, World!";
        System.out.println("The length of the string is: " + str.length());
        String str2 = " Goodbye, World!";
        String str3 = str + str2;
        System.out.println("The concatenated string is: " + str3);
        String literalStr = "Hello, I am a string literal!";
        System.out.println("The string literal is: " + literalStr);
    }
}
```

```
The length of the string is: 13
The concatenated string is: Hello, World! Goodbye, World!
The string literal is: Hello, I am a string literal!
```

3.Demonstrate tostring()

```
public class Main {

    public static void main(String[] args) {
        // Convert int to string using toString()
        int num = 42;
        String strNum = num + ""; // or Integer.toString(num);
        System.out.println("The number converted to string is: " + strNum);

        // Convert double to string using toString()
        double dbl = 3.14;
        String strDbl = dbl + ""; // or Double.toString(dbl);
        System.out.println("The double converted to string is: " + strDbl);

        // Convert boolean to string using toString()
        boolean bool = true;
        String strBool = bool + ""; // or Boolean.toString(bool);
        System.out.println("The boolean converted to string is: " + strBool);
    }
}
```

```
The number converted to string is: 42
The double converted to string is: 3.14
The boolean converted to string is: true
```

4. Using getchars() , extract Bmsce from “ Welcome to Bmsce college”

```
import java.lang.*;
import java.util.*;
public class Main {
    public static void main(String[] args) {

        String str = new String("welcome to bmsce college");
        System.out.println("The given string is: " + str);

        char[] chararr = new char[10];
```

```
    int srcBegin = 11, srcEnd = 16, dstBegin = 0;
    System.out.println("The srcBegin, srcEnd, and dstBegin values are: " + srcBegin + ", " +
srcEnd + ", and " + dstBegin);

    str.getChars(srcBegin, srcEnd, chararr, dstBegin);
    System.out.print("The Value of character array : " + Arrays.toString(chararr));
  }
}
```

```
The given string is: welcome to bmsce college
The srcBegin, srcEnd, and dstBegin values are: 11, 16, and 0
The Value of character array : [b, m, s, c, e, , , , , ]
```

5.Demonstrate getbytes(),tocharArray() with proper java programs

```
public class Main {
   public static void main(String[] args) {
      String originalString = "Java Programming";

      // Using getBytes() to convert string to byte array
      byte[] byteArray = originalString.getBytes();

      // Displaying the byte array
      System.out.println("Byte array representation:");
      for (byte b : byteArray) {
         System.out.print(b + " ");
      }

      System.out.println(); // New line

      // Using String constructor to convert byte array back to string
      String reconstructedStringFromBytes = new String(byteArray);

      // Displaying the reconstructed string from bytes
      System.out.println("Reconstructed string from bytes: " + reconstructedStringFromBytes);

      System.out.println(); // New line

      // Using toCharArray() to convert string to char array
      char[] charArray = originalString.toCharArray();

      // Displaying the char array
      System.out.println("Char array representation:");
      for (char c : charArray) {
```

```
            System.out.print(c + " ");
        }

        System.out.println(); // New line

        // Using String constructor to convert char array back to string
        String reconstructedStringFromChars = new String(charArray);

        // Displaying the reconstructed string from chars
        System.out.println("Reconstructed string from chars: " + reconstructedStringFromChars);
    }
}
```

```
Byte array representation:
74 97 118 97 32 80 114 111 103 114 97 109 109 105 110 103
Reconstructed string from bytes: Java Programming

Char array representation:
J a v a   P r o g r a m m i n g
Reconstructed string from chars: Java Programming
```

6.Check the following output and write the java programs using string function

Bmsce equals Bmsce - true
Bmsce equals College - false
Bmsce equals BMSCE - false
Bmsce equalsIgnoreCase BMSCE - true

```
class demo
{
  public static void main(String args[])
  {
    String s1="Bmsce";
    String s2="Bmsce";
    String s3="College";
    String s4="BMSCE";
    System.out.println(s1 + " equals " + s2 + " -> " +s1.equals(s2));
    System.out.println(s1 + " equals " + s3 + " -> " +s1.equals(s3));

    System.out.println(s1 + " equals " + s4 + " -> " +s1.equals(s4));

    System.out.println(s1 + " equalsIgnoreCase " + s4 + " -> " +s1.equalsIgnoreCase(s4));
  }
```

}

```
Bmsce equals Bmsce -> true
Bmsce equals College -> false
Bmsce equals BMSCE -> false
Bmsce equalsIgnoreCase BMSCE -> true
```

7. Using regionmatches() find the substring “Bmsce college “ from the string “Welcome to Bmsce College of Engineering” , if matches display substring is matched otherwise display not matched

```
class region
{
  public static void main(String args[])
  {
    String s1="Bmsce College";
    String s2="Welcome to Bmsce College of engineering";
    Boolean isMatch=s2.regionMatches(11,s1,0,4);
    if(isMatch)
      System.out.println("substring is matched");
    else
      System.out.println("substring is not matched");
  }
}
```

```
substring is matched
```

8. Demonstrate startwith() to give output true and false.

```
public class Main {
    public static void main(String[] args) {
        String testString = "Hello, World!";

        // Check if the string starts with "Hello"
        boolean startsWithHello = testString.startsWith("Hello");
        System.out.println("Starts with \"Hello\": " + startsWithHello);

        // Check if the string starts with "Java"
```

```
        boolean startsWithJava = testString.startsWith("Java");
        System.out.println("Starts with \"Java\": " + startsWithJava);
    }
}
```

```
Starts with "Hello": true
Starts with "Java": false
```

9. Demonstrate endswith() to give output true and false.

```
public class Main {
    public static void main(String[] args) {
        String testString = "Hello, World!";

        // Check if the string ends with "World!"
        boolean endsWithWorld = testString.endsWith("World!");
        System.out.println("Ends with \"World!\": " + endsWithWorld);

        // Check if the string ends with "Java"
        boolean endsWithJava = testString.endsWith("Java");
        System.out.println("Ends with \"Java\": " + endsWithJava);
    }
}
```

```
Ends with "World!": true
Ends with "Java": false
```

10. Demonstrate a java program to show the output for equals() versus ==

```
class wer
{
  public static void main(String args[])
  {
    String s="Hello";
    String s1=new String(s);
    System.out.println(s);
    System.out.println(s1);
    System.out.println(s + " equals " + s1 + " -> " +s.equals(s1));

    System.out.println(s + " == " + s1 + " -> " + (s == s1));
  }
}
```

```
Hello
Hello
Hello equals Hello -> true
Hello == Hello -> false
```

11)Write a java program to perform sorting for alphabets using compareto()
“van”, “watch”,”ball”, “cat”,”xmas”,”yatch”,” zee”,”
Apple”,”ice”,”jug”,”kite”,”lift”,”man”,”net”,”orange”,”dog”,”ent”,”free”,”gun”,”hen”,”parrot”,”queen”,”ring”,”star”,”tree”,”umbrella”

```
class Main {

static String arr[] = {

"van", "watch","ball", "cat","xmas","yatch","zee",
"apple","ice","jug","kite","lift","man","net","orange","dog","ent","free","gun","hen","parrot","queen",
"ring","star","tree","umbrella"};

public static void main(String args[]) {



for(int j = 0; j < arr.length; j++) {

for(int i = j + 1; i < arr.length; i++) {
if(arr[i].compareTo(arr[j]) < 0) {

String t = arr[j];

arr[j] = arr[i]; arr[i] = t;

}

} System.out.println(arr[j]); } } }
```

apple
ball
cat
dog
ent
free
gun
hen
ice
jug
kite
lift
man
net
orange
parrot
queen
ring
star
tree
umbrella
van
watch
xmas
yatch
zee

12. Write a Java program to perform sorting of numbers from 10 to 1 using compareto()

```
import java.util.Arrays;

public class Main
{
   public static void main(String[] args)
          {
          System.out.println("question 12 : ");
       Integer[] numbers = {10, 9, 8, 7, 6, 5, 4, 3, 2, 1};


       Arrays.sort(numbers);

       System.out.println("Sorted Numbers (Ascending Order): " + Arrays.toString(numbers));
   }
}
```

```
question 12 :
Sorted Numbers (Ascending Order): [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

13. Write a Java program using substring() , indexof(), + , for replacing “was” to “is”

```
public class Main {

    public static void main(String[] args) {

       String text = "I was a king. Now, I am a farmer.";
       System.out.println("Original Text: " + text);

       String replacementText = text.replace(" was ", " is ");
       System.out.println("Modified Text: " + replacementText);
   }
```

}

```
Original Text: I was a king. Now, I am a farmer.
Modified Text: I is a king. Now, I am a farmer.
```

14. Write a java program to demonstrate concat() for s1=”hello” and s2=”world”

```
class Main {
        public static void main(String[] args) {
                String s1 = new String("hello");
                String s2 = new String("world");
                String s3 = s1.concat(s2);
                System.out.println("s1 concat with s2 :" + s3);
        }
}
```

```
s1 concat with s2 :helloworld
```

15. Write a java program to demonstrate replace(). Replace “College” with “Commege”

```
public class Main {

   public static void main(String[] args) {

      String text = "I was a student at University College. Now, I am a student at BMSCE College.";
      System.out.println("Original Text: " + text);

      String replacementText = text.replace(" College ", " Commege ");
      System.out.println("Modified Text: " + replacementText);
   }
}
```

```
Original Text: I was a student at University College. Now, I am a student at BMSCE College.
Modified Text: I was a student at University College. Now, I am a student at BMSCE College.
```

16. Write a java program to demonstrate trim() for “ Hello Friends “

```
public class Main {

    public static void main(String[] args) {

        String text = " Hello Friends ";
        System.out.println("Original Text: " + text);

        String trimmedText = text.trim();
        System.out.println("Trimmed Text: " + trimmedText);
    }
}
```

```
Original Text:  Hello Friends
Trimmed Text: Hello Friends
```

17. Design a class which represents a student. Every student record is made up of the following fields. i) Registration number (int) ii) Full Name (String) iii) Semester (short) iv) CGPA (float)

Write member functions to do the following.
a) Provide default and parameterized constructors to this class
b) Write display method which displays the record. Test the class by writing suitable main method.
c) Create an array of student record to store minimum of 5 records in it.
Input the records and display them.
d. Perform the following operations by adding member functions to the program implemented in the above question i) Sort the student records with respect to CGPA. ii) Sort the student record with respect to name.

```
import java.util.Arrays;
import java.util.Scanner;

class student {
    int regno;
    String name;
    short sem;
```

```
    float cgpa;

    student() {
        sem = 3;
    }

    student(String name, int regno, float cgpa) {
        this.name = name;
        this.regno = regno;
        this.cgpa = cgpa;
    }

    public String toString() {
        return "name:" + name + " regno:" + regno + " sem:" + sem + " cgpa:" + cgpa;
    }
}

public class studMain {
    public static void main(String args[]) {
        Scanner s = new Scanner(System.in);
        System.out.println("enter the no of students:");
        int n = s.nextInt();
        student[] stud;
        stud = new student[n];
        for (int i = 0; i < n; i++) {
            System.out.println("enter the name:");
            String name = s.next();
            System.out.println("enter the regno:");
            int regno = s.nextInt();
            System.out.println("enter the cgpa:");
            float cgpa = s.nextFloat();
            stud[i] = new student(name, regno, cgpa);
        }

        // Sorting based on cgpa
        Arrays.sort(stud, (a, b) -> Float.compare(a.cgpa, b.cgpa));
        System.out.println("Sorted by cgpa:");
        for (student st : stud) {
            System.out.println(st);
        }

        // Sorting based on name
        Arrays.sort(stud, (a, b) -> a.name.compareTo(b.name));
        System.out.println("Sorted by name:");
```

```
        for (student st : stud) {
            System.out.println(st);
        }
    }
}
```

```
enter the no of students:
3
enter the name:
rushila
enter the regno:
1234
enter the cgpa:
9.6
enter the name:
ravi
enter the regno:
4567
enter the cgpa:
8.5
enter the name:
sara
enter the regno:
6789
enter the cgpa:
9.0
Sorted by cgpa:
name:ravi regno:4567 sem:0 cgpa:8.5
name:sara regno:6789 sem:0 cgpa:9.0
name:rushila regno:1234 sem:0 cgpa:9.6
Sorted by name:
name:ravi regno:4567 sem:0 cgpa:8.5
name:rushila regno:1234 sem:0 cgpa:9.6
name:sara regno:6789 sem:0 cgpa:9.0
```

18. Demonstrate string buffer functions like Setlength(), Charat(), setcharat() , getchars() ,append() ,Insert(), reverse(),delete(),deletecharat(), Replace(),substring() with simple java programs.

```
class StringBufferDemo {
    public static void main(String[] args) {
        // Creating a StringBuffer
        StringBuffer stringBuffer = new StringBuffer("Hello, World!");

        // Set length of the buffer
        stringBuffer.setLength(5);
        System.out.println("Set Length: " + stringBuffer);

        // charAt() - Accessing character at a specific index
        char charAtIndex = stringBuffer.charAt(1);
        System.out.println("Char at index 1: " + charAtIndex);
```

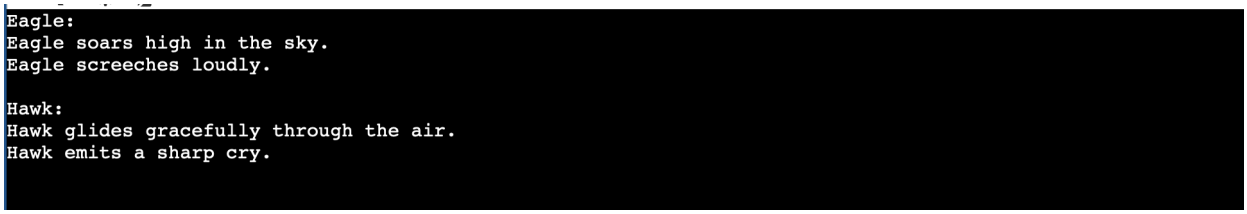
```
        // setCharAt() - Modifying character at a specific index
        stringBuffer.setCharAt(1, 'i');
        System.out.println("After setCharAt: " + stringBuffer);
        // getChars() - Copying characters to a char array
        char[] charArray = new char[5];
        stringBuffer.getChars(0, 5, charArray, 0);
        System.out.print("getChars: ");
        System.out.println(charArray);

        // append() - Concatenating a string
        stringBuffer.append(" How are you?");
        System.out.println("After append: " + stringBuffer);

        // insert() - Inserting a string at a specific position
        stringBuffer.insert(7, "Awesome ");
        System.out.println("After insert: " + stringBuffer);



        // delete() - Deleting a portion of the content
        stringBuffer.delete(7, 15);
        System.out.println("After delete: " + stringBuffer);

        // deleteCharAt() - Deleting a character at a specific index
        stringBuffer.deleteCharAt(0);
        System.out.println("After deleteCharAt: " + stringBuffer);

        // replace() - Replacing characters within a range
        stringBuffer.replace(0, 5, "Hola");
        System.out.println("After replace: " + stringBuffer);

        // substring() - Extracting a portion of the content
        String substring = stringBuffer.substring(0, 4);
        System.out.println("Substring: " + substring);

        // reverse() - Reversing the content
        stringBuffer.reverse();
        System.out.println("After reverse: " + stringBuffer);

    }
}
```

```
Set Length: Hello
Char at index 1: e
After setCharAt: Hillo
getChars: Hillo
After append: Hillo How are you?
After insert: Hillo HAwesome ow are you?
After delete: Hillo How are you?
After deleteCharAt: illo How are you?
After replace: HolaHow are you?
Substring: Hola
After reverse: ?uoy era woHaloH
```

19.Write a Java program to create an abstract class Bird with abstract methods fly() and makeSound(). Create subclasses Eagle and Hawk that extend the Bird class and implement the respective methods to describe how each bird flies and makes a sound.

```
abstract class Bird {

    public abstract void fly();

    public abstract void makeSound();
}


class Eagle extends Bird {

    public void fly() {
        System.out.println("Eagle soars high in the sky.");
    }
    public void makeSound() {
        System.out.println("Eagle screeches loudly.");
    }
}

class Hawk extends Bird {

    public void fly() {
        System.out.println("Hawk glides gracefully through the air.");
    }

    public void makeSound() {
        System.out.println("Hawk emits a sharp cry.");
    }
}
```

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

        Eagle eagle = new Eagle();
        Hawk hawk = new Hawk();

        System.out.println("Eagle:");
        eagle.fly();
        eagle.makeSound();

        System.out.println("\nHawk:");
        hawk.fly();
        hawk.makeSound();
    }
}
```



20. Write a Java program to create an abstract class Shape with abstract methods calculateArea()
and calculatePerimeter(). Create subclasses Circle and Triangle that extend the Shape class and
implement the respective methods to calculate the area and perimeter of each shape

```
abstract class Shape {

    public abstract double calculateArea();

    public abstract double calculatePerimeter();
}

class Circle extends Shape {
    private double radius;

    public Circle(double radius) {
        this.radius = radius;
    }
```

```
    public double calculateArea() {
        return Math.PI * radius * radius;
    }


    public double calculatePerimeter() {
        return 2 * Math.PI * radius;
    }
}

class Triangle extends Shape {
    private double side1, side2, side3;

    public Triangle(double side1, double side2, double side3) {
        this.side1 = side1;
        this.side2 = side2;
        this.side3 = side3;
    }

\
    public double calculateArea() {
\
        double s = (side1 + side2 + side3) / 2;
        return Math.sqrt(s * (s - side1) * (s - side2) * (s - side3));
    }


    public double calculatePerimeter() {
        return side1 + side2 + side3;
    }
}

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

        Circle circle = new Circle(5.0);
        Triangle triangle = new Triangle(3.0, 4.0, 5.0);

        System.out.println("Circle:");
        System.out.println("Area: " + circle.calculateArea());
        System.out.println("Perimeter: " + circle.calculatePerimeter());

        System.out.println("\nTriangle:");
```

```
        System.out.println("Area: " + triangle.calculateArea());
        System.out.println("Perimeter: " + triangle.calculatePerimeter());
    }
}
```

```
Circle:
Area: 78.53981633974483
Perimeter: 31.41592653589793

Triangle:
Area: 6.0
Perimeter: 12.0
```