

## Practical No. - 11

**Aim:** Demonstration of various reader and writer subclasses in listing

**Program:**

```
import java.io.*;

public class ReaderWriter {
    public static void main(String args[]) throws IOException {
        System.out.println("With InputStreamReader");
        int a;
        String s;

        // Create an InputStreamReader to read input from the console
        InputStreamReader inr = new InputStreamReader(System.in);
        System.out.print("Enter a line: ");

        // Read characters until Enter (ASCII 13) is pressed
        while ((a = inr.read()) != 13) {
            System.out.print((char) a);
        }

        System.out.println(); // Print a newline
        System.out.println("\nWith BufferedReader and
        InputStreamReader");

        // Create a BufferedReader to read input from the console using
        InputStreamReader
        BufferedReader br = new BufferedReader(new
        InputStreamReader(System.in));
        System.out.print("Enter a line: ");

        // Read a line of text from the console
        String inputLine = br.readLine();
        System.out.println("You entered: " + inputLine);

        System.out.println("\nOutput With PrintWriter and
        FileWriter");

        // Create a BufferedReader to read input from the console
        using InputStreamReader
        BufferedReader br1 = new BufferedReader(new
        InputStreamReader(System.in));

        // Create a PrintWriter to write output to a file named
        "Output.txt"
        PrintWriter p = new PrintWriter(new FileWriter("Output.txt"));

        System.out.print("Enter lines (Ctrl+C to exit): ");

        // Read lines from the console and write them to the file with a
        prefix
```

```

        while ((s = br1.readLine()) != null) {
            p.println("Output: " + s);
        }

        // Close the PrintWriter to save the changes to the file
        p.close();
    }
}

```

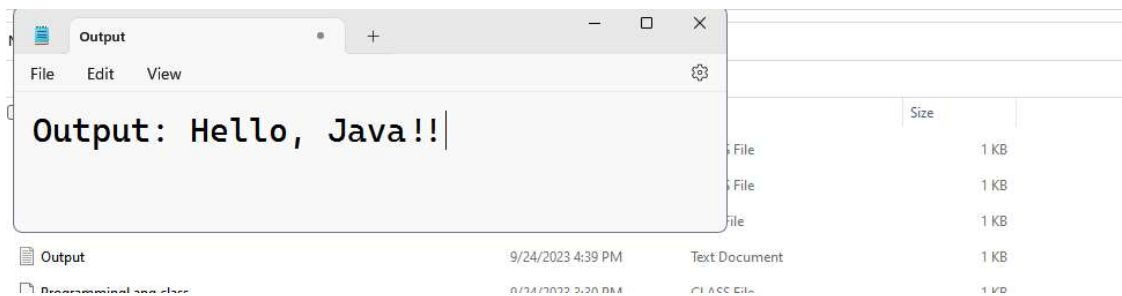
### Output:

With InputStreamReader  
 Enter a line: Hello, Java!!  
 Hello, Java!!

With BufferedReader and InputStreamReader  
 Enter a line: Hello, Java!!  
 You entered: Hello, Java!!

Output With PrintWriter and FileWriter  
 Enter lines (Ctrl+C to exit): Hello, Java!!

### Output on file:



## Practical No. - 12

**Aim :** Write a java program using runnable interface and with the help of thread class , create three threads. Run each thread 3 times and then stop thread execution.

**Program:**

```
// Define a class A that implements the Runnable interface
class A implements Runnable {
    public void run() {
        int i;
        for (i = 1; i <= 3; i++) {
            System.out.println("Thread A : " + i);
        }
    }
}

// Define a class B that implements the Runnable interface
class B implements Runnable {
    public void run() {
        int i;
        for (i = 1; i <= 3; i++) {
            System.out.println("Thread B : " + i);
        }
    }
}

// Define a class C that implements the Runnable interface
class C implements Runnable {
    public void run() {
        int i;
        for (i = 1; i <= 3; i++) {
            System.out.println("Thread C : " + i);
        }
    }
}

// Define a class RunnableDemo
class RunnableDemo {
    public static void main(String hello[]) throws Exception {
        System.out.println("Main starts");

        // Create three thread objects (t1, t2, t3) associated with A,
        B, and C
        Thread t1 = new Thread(new A());
        Thread t2 = new Thread(new B());
        Thread t3 = new Thread(new C());

        // Start the threads
        t1.start();
        t2.start();
    }
}
```

```
        t3.start();

        // Wait for all threads to finish
        t1.join();
        t2.join();
        t3.join();

        System.out.println("Main ends");
    }// end main()
} // end class
```

**Output:**

```
Main starts
Thread C : 1
Thread C : 2
Thread A : 1
Thread B : 1
Thread B : 2
Thread C : 3
Thread A : 2
Thread A : 3
Thread B : 3
Main ends
```

## Practical No. - 13

**Aim:** Write a program to create 4 threads to perform 4 different arithmetic operations like addition, subtraction, multiplication and division. Accept two numbers from command line arguments and perform the operations using thread.

**Program:**

```
import java.util.Scanner;

// Create a class called 'Add' that extends the Thread class
class Add extends Thread {
    int n1, n2;

    // Constructor for the 'Add' class
    public Add(int x, int y) {
        n1 = x;
        n2 = y;
    }

    // Override the 'run' method to perform addition and print the result
    @Override
    public void run() {
        System.out.println("Addition is : " + (n1 + n2));
    }
}

// Create a class called 'Sub' that extends the Thread class
class Sub extends Thread {
    int n1, n2;

    // Constructor for the 'Sub' class
    public Sub(int x, int y) {
        n1 = x;
        n2 = y;
    }

    // Override the 'run' method to perform subtraction and print the result
    @Override
    public void run() {
        System.out.println("Subtraction is : " + (n1 - n2));
    }
}

// Create a class called 'Mul' that extends the Thread class
class Mul extends Thread {
    int n1, n2;

    // Constructor for the 'Mul' class
```

```

    public Mul(int x, int y) {
        n1 = x;
        n2 = y;
    }

    // Override the 'run' method to perform multiplication and print
    the result
    @Override
    public void run() {
        System.out.println("Multiplication is : " + (n1 * n2));
    }
}

// Create a class called 'Div' that extends the Thread class
class Div extends Thread {
    int n1, n2;

    // Constructor for the 'Div' class
    public Div(int x, int y) {
        n1 = x;
        n2 = y;
    }

    // Override the 'run' method to perform division and print the
    result or handle division by zero
    @Override
    public void run() {
        if (n2 != 0) {
            System.out.println("Division is : " + (n1 / n2));
        } else {
            System.out.println("Division by zero is not allowed.");
        }
    }
}

// Create a class called 'ThreadDemo' to demonstrate the usage of the above
thread classes
class ThreadDemo {
    public static void main(String ar[]) {
        try {
            Scanner scanner = new Scanner(System.in);

            // Prompt the user to enter two numbers
            System.out.print("Enter 1st number: ");
            int a = scanner.nextInt();
            System.out.print("Enter 2nd number: ");
            int b = scanner.nextInt();

            // Create instances of the thread classes and start them
            new Add(a, b).start();
            new Sub(a, b).start();
            new Mul(a, b).start();
            new Div(a, b).start();
        } catch (Exception e) {

```

```
        // Handle exceptions that may occur during user input or thread
execution    System.err.println("An error occurred: " + e.getMessage());
            }
        }
    }
```

**Output:**

```
Enter 1st number: 4
Enter 2nd number: 5
Subtraction is : -1
Division is : 0
Addition is : 9
Multiplication is : 20
```

## Practical No. - 14

**Aim:** Write a client socket that will accept n names from user and send them to the server. After receiving the names , the server socket should send the message “names received: and close the connection.

### Program:

#### Server code:

```
import java.io.*;
import java.net.*;

public class Server {
    public static void main(String[] args) {
        final int port = 12345; // Specify the port you want to use
        try {
            ServerSocket serverSocket = new ServerSocket(port);
            System.out.println("Server is listening on port " + port);

            while (true) {
                // Wait for a client to connect
                Socket clientSocket = serverSocket.accept();
                System.out.println("Client connected: " +
                    clientSocket.getInetAddress());

                // Create a BufferedReader to read data from the
                // client
                BufferedReader reader = new BufferedReader(new
                    InputStreamReader(clientSocket.getInputStream()));
                // Create a PrintWriter to send data to the client
                PrintWriter writer = new
                    PrintWriter(clientSocket.getOutputStream(), true);

                // Read a line of text (names) sent by the client
                String receivedNames = reader.readLine();
                System.out.println("Received names from client: " +
                    receivedNames);

                // Send a confirmation message back to the client
                writer.println("NAMES RECEIVED: " + receivedNames);

                // Close the writer, reader, and the client socket
                writer.close();
                reader.close();
                clientSocket.close();
            }
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```



**Client code:**

```
import java.io.*;
import java.net.*;
import java.util.Scanner;

public class Client {
    public static void main(String[] args) {
        final String serverAddress = "localhost"; // Change to the
        server's IP if needed
        final int serverPort = 12345; // Specify the server's port

        try {
            // Create a socket and connect to the server at the
            // specified address and port
            Socket socket = new Socket(serverAddress, serverPort);
            System.out.println("Connected to server: " + serverAddress
                + ":" + serverPort);

            // Create a BufferedReader to read data from the server
            BufferedReader reader = new BufferedReader(new
                InputStreamReader(socket.getInputStream()));
            // Create a PrintWriter to send data to the server
            PrintWriter writer = new
                PrintWriter(socket.getOutputStream(), true);
            // Create a Scanner to read input from the user
            Scanner scanner = new Scanner(System.in);

            // Prompt the user to enter names separated by commas
            System.out.print("Enter names (separated by commas): ");
            String names = scanner.nextLine();

            // Send the names to the server
            writer.println(names);

            // Receive and display the server's confirmation message
            String confirmationMessage = reader.readLine();
            System.out.println("Server says: " + confirmationMessage);

            // Close the socket, reader, and writer
            socket.close();
            reader.close();
            writer.close();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```

## Output:

```
○ PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\14th
  prac> javac Server.java && java Server
  Server is listening on port 12345
  Client connected: /127.0.0.1
  Received names from client: Tom, Jerry, Pintya, Sonya
  ya
  □

● PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\14t
  h prac> javac Client.java && java Client
  Connected to server: localhost:12345
  Enter names (separated by commas): Tom, Jerry, Pi
  ntya, Sonya
  Server says: NAMES RECEIVED: Tom, Jerry, Pintya,
  Sonya
○ PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\14t
  h prac> □
```

## Server Output:

```
⊗ PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\14th prac> javac Server.java && java Server
  Server is listening on port 12345
  Client connected: /127.0.0.1
  Received names from client: Tom, Jerry, Pintya, Sonya
○ PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\14th prac> □
```

## Client Output:

```
● PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\14th prac> javac Client.java && java Client
  Connected to server: localhost:12345
  Enter names (separated by commas): Tom, Jerry, Pintya, Sonya
  Server says: NAMES RECEIVED: Tom, Jerry, Pintya, Sonya
○ PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\14th prac> □
```

## Practical No. - 15

**Aim:** Create a client socket which sends a number to the server. The server socket returns the sum of digits of the number if the number is positive, otherwise it sends an error message and close the connection.

**Program:**

**Server code:**

```
import java.io.*;
import java.net.*;

public class Server {
    public static void main(String[] args) {
        final int port = 12345; // Specify the port you want to use
        try {
            ServerSocket serverSocket = new ServerSocket(port);
            System.out.println("Server is listening on port " + port);

            while (true) {
                // Wait for a client to connect
                Socket clientSocket = serverSocket.accept();
                System.out.println("Client connected: " +
                    clientSocket.getInetAddress());

                // Create a BufferedReader to read data from the
                // client
                BufferedReader reader = new BufferedReader(new
                    InputStreamReader(clientSocket.getInputStream()));
                // Create a PrintWriter to send data to the client
                PrintWriter writer = new
                    PrintWriter(clientSocket.getOutputStream(), true);

                // Read a line of text sent by the client
                String clientInput = reader.readLine();

                try {
                    // Attempt to parse the client input as an integer
                    int number = Integer.parseInt(clientInput);
                    System.out.println("Received number from client: " +
                        number);

                    if (number >= 0) {
                        // Calculate the sum of digits if the number
                        // is non-negative
                        int sumOfDigits =
                            calculateSumOfDigits(number);
                        writer.println("Sum of digits: " +
                            sumOfDigits);
                    } else {
                        // Send an error message if the number is
```

```

        negative
        writer.println("Error: Negative number not
        allowed");
    }
} catch (NumberFormatException e) {
    // Send an error message for invalid input
    writer.println("Error: Invalid input");
}

// Close the writer, reader, and the client socket
writer.close();
reader.close();
clientSocket.close();
}
} catch (IOException e) {
    e.printStackTrace();
}
}

// Helper method to calculate the sum of digits in a number
private static int calculateSumOfDigits(int number) {
    int sum = 0;
    while (number != 0) {
        sum += number % 10;
        number /= 10;
    }
    return sum;
}
}

```

#### Client code:

```

import java.io.*;
import java.net.*;
import java.util.Scanner;

public class Client {
    public static void main(String[] args) {
        final String serverAddress = "localhost"; // Change to the
        server's IP if needed
        final int serverPort = 12345; // Specify the server's port

        try {
            // Create a socket and connect to the server at the
            specified address and port
            Socket socket = new Socket(serverAddress, serverPort);
            System.out.println("Connected to server: " + serverAddress
            + ":" + serverPort);

            // Create a BufferedReader to read data from the server
            BufferedReader reader = new BufferedReader(new
            InputStreamReader(socket.getInputStream()));
            // Create a PrintWriter to send data to the server

```

```

        PrintWriter writer = new
        PrintWriter(socket.getOutputStream(), true);
        // Create a Scanner to read input from the user
        Scanner scanner = new Scanner(System.in);

        // Prompt the user to enter a number
        System.out.print("Enter a number: ");
        String input = scanner.nextLine();

        // Send the entered number to the server
        writer.println(input);

        // Receive and display the server's response
        String serverResponse = reader.readLine();
        System.out.println("Server says: " + serverResponse);

        // Close the socket, reader, and writer
        socket.close();
        reader.close();
        writer.close();
    } catch (IOException e) {
        e.printStackTrace();
    }
}
}
}

```

### Output:

<pre> PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\15th pr ac&gt; javac Server.java &amp;&amp; java Server Server is listening on port 12345 Client connected: /127.0.0.1 Received number from client: 123456 PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\15th pr ac&gt; </pre>	<pre> PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\15th prac&gt; javac Client.java &amp;&amp; java Client Connected to server: localhost:12345 Enter a number: 123456 Server says: Sum of digits: 21 PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\15th prac&gt; </pre>
--	--

### Server output:

```

PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\15th prac> javac Server.java && java Server
Server is listening on port 12345
Client connected: /127.0.0.1
Received number from client: 123456

```

### Client output:

```

PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\15th prac> javac Client.java && java Client
Connected to server: localhost:12345
Enter a number: 123456
Server says: Sum of digits: 21
PS F:\CS\SEM 3\P2 - Core JAVA\java practicals\15th prac>

```