PROGRAM 15

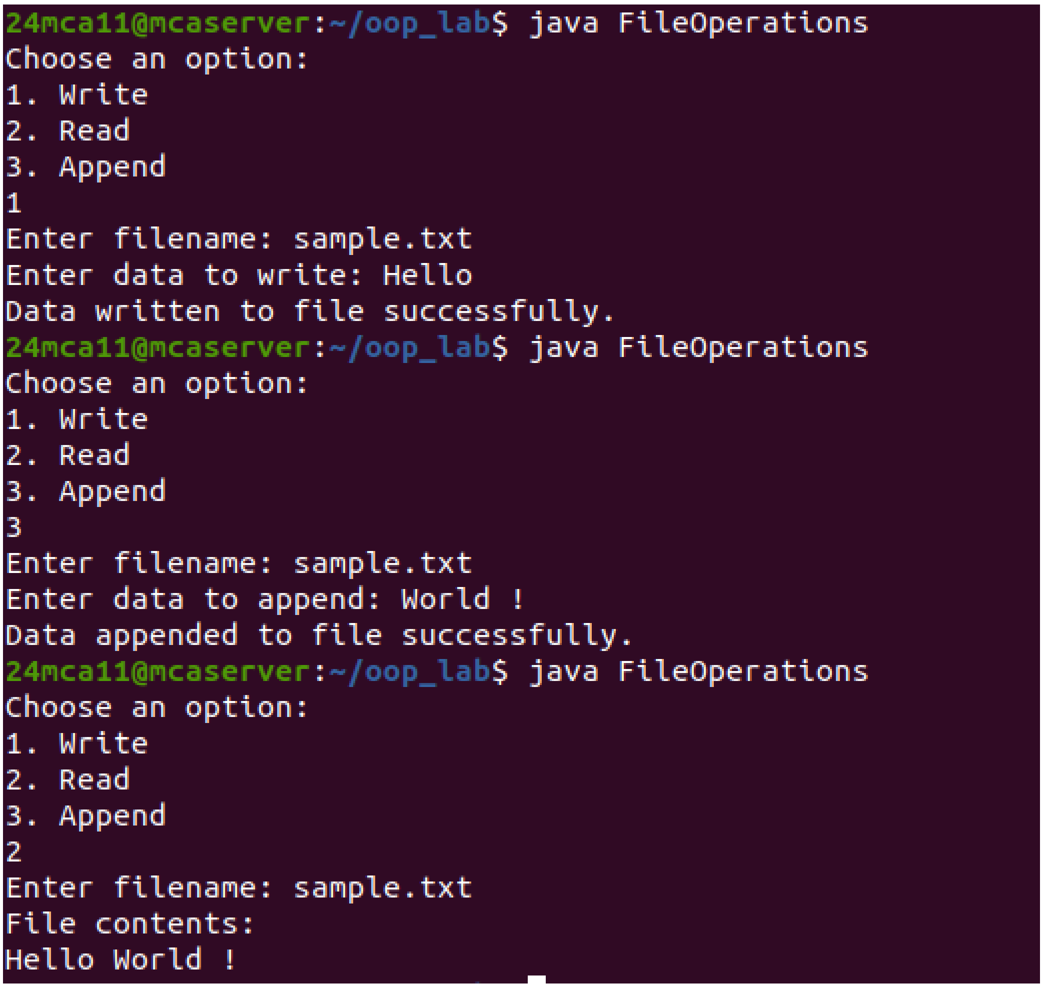
AIM : File Operations in Java

DATE : 17/03/2025

SOURCE CODE :

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

public class FileOperations {
    public static void writeFile(String filename, String data) throws IOException {
        FileWriter writer = new FileWriter(filename);
        writer.write(data);
        writer.close();
        System.out.println("Data written to file successfully.");
    }


    public static void readFile(String filename) throws IOException {
        File file = new File(filename);
        if (!file.exists()) {
            throw new FileNotFoundException("File not found.");
        }
        BufferedReader reader = new BufferedReader(new FileReader(filename));
        String line;
        System.out.println("File contents:");
        while ((line = reader.readLine()) != null) {
            System.out.println(line);
        }
        reader.close();
    }


    public static void appendToFile(String filename, String data) throws IOException {
        FileWriter writer = new FileWriter(filename, true);
        writer.write(data);
        writer.close();
        System.out.println("Data appended to file successfully.");
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Choose an option:\n1. Write\n2. Read\n3. Append");
        int choice = scanner.nextInt();
        scanner.nextLine();

        System.out.print("Enter filename: ");
        String filename = scanner.nextLine();

        try {
            switch (choice) {
                case 1:
                    System.out.print("Enter data to write: ");
                    String writeData = scanner.nextLine();
                    writeFile(filename, writeData);
                    break;
                case 2:
                    readFile(filename);
                    break;
                case 3:
                    System.out.print("Enter data to append: ");
                    String appendData = scanner.nextLine();
                    appendToFile(filename, appendData);
                    break;
                default:
                    System.out.println("Invalid choice.");
            }
        } catch (IOException e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

OUTPUT :



```
24mca11@mcaserver:~/oop_lab$ java FileOperations
Choose an option:
1. Write
2. Read
3. Append
1
Enter filename: sample.txt
Enter data to write: Hello
Data written to file successfully.
24mca11@mcaserver:~/oop_lab$ java FileOperations
Choose an option:
1. Write
2. Read
3. Append
3
Enter filename: sample.txt
Enter data to append: World !
Data appended to file successfully.
24mca11@mcaserver:~/oop_lab$ java FileOperations
Choose an option:
1. Write
2. Read
3. Append
2
Enter filename: sample.txt
File contents:
Hello World !
```

PROGRAM 16

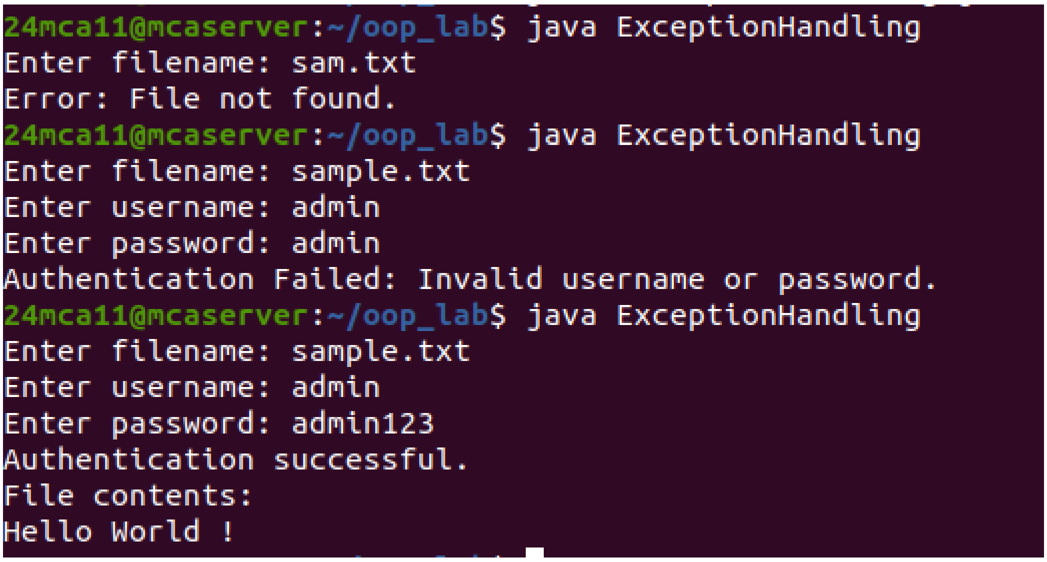
AIM : System-Defined and User-Defined Exception for Authentication

DATE : 17/03/2025

SOURCE CODE :

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

class AuthenticationException extends Exception {
    public AuthenticationException(String message) {
        super(message);
    }
}


public class ExceptionHandling {
    public static void readFile(String filename) throws IOException {
        File file = new File(filename);
        if (!file.exists()) {
            throw new FileNotFoundException("File not found.");
        }
        BufferedReader reader = new BufferedReader(new FileReader(filename));
        String line;
        System.out.println("File contents:");
        while ((line = reader.readLine()) != null) {
            System.out.println(line);
        }
        reader.close();
    }


    public static void authenticate(String username, String password) throws
AuthenticationException {
        if (!username.equals("admin") || !password.equals("admin123")) {
            throw new AuthenticationException("Invalid username or password.");
        }
        System.out.println("Authentication successful.");
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter filename: ");
        String filename = scanner.nextLine();
        try {
            readFile(filename);
        } catch (FileNotFoundException e) {
            System.out.println("Error: " + e.getMessage());
        } catch (IOException e) {
            System.out.println("IO Error: " + e.getMessage());
        }

        System.out.print("Enter username: ");
        String username = scanner.nextLine();
        System.out.print("Enter password: ");
        String password = scanner.nextLine();

        try {
            authenticate(username, password);
        } catch (AuthenticationException e) {
            System.out.println("Authentication Failed: " + e.getMessage());
        }
    }
}
```

OUTPUT :



```
24mca11@mcaserver:~/oop_lab$ java ExceptionHandling
Enter filename: sam.txt
Error: File not found.
24mca11@mcaserver:~/oop_lab$ java ExceptionHandling
Enter filename: sample.txt
Enter username: admin
Enter password: admin
Authentication Failed: Invalid username or password.
24mca11@mcaserver:~/oop_lab$ java ExceptionHandling
Enter filename: sample.txt
Enter username: admin
Enter password: admin123
Authentication successful.
File contents:
Hello World !
```

PROGRAM 17

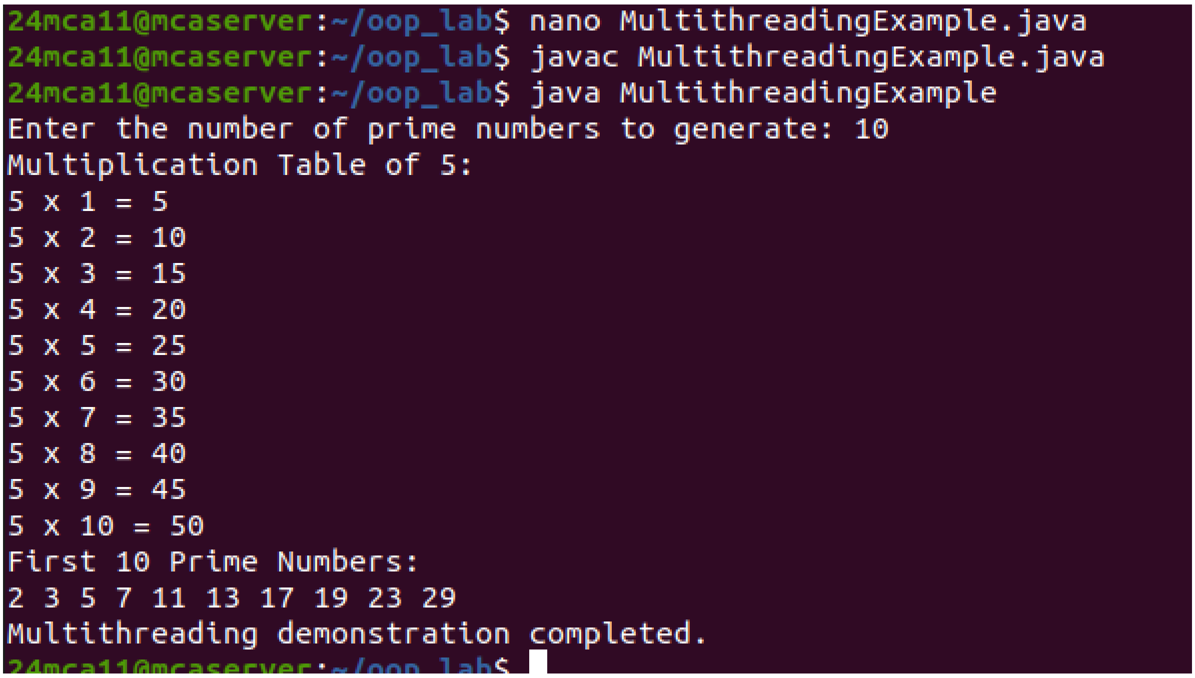
AIM : Java Program to Perform Multithreading

DATE : 17/03/2025

SOURCE CODE :

```
import java.util.Scanner;

class MultiplicationTable extends Thread {
    public void run() {
        System.out.println("Multiplication Table of 5:");
        for (int i = 1; i <= 10; i++) {
            System.out.println("5 x " + i + " = " + (5 * i));
            try {
                Thread.sleep(500);
            } catch (InterruptedException e) {
                System.out.println(e.getMessage());
            }
        }
    }
}

class PrimeNumbers implements Runnable {
    private int N;

    public PrimeNumbers(int N) {
        this.N = N;
    }

    public void run() {
        int count = 0, num = 2;
        System.out.println("First " + N + " Prime Numbers:");
        while (count < N) {
            if (isPrime(num)) {
                System.out.print(num + " ");
                count++;
            }
            num++;
            try {
                Thread.sleep(300);
            } catch (InterruptedException e) {
                System.out.println(e.getMessage());
            }
        }
        System.out.println();
    }

    private boolean isPrime(int num) {
        if (num < 2) return false;
        for (int i = 2; i <= Math.sqrt(num); i++) {
            if (num % i == 0) return false;
        }
        return true;
    }
}

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

        System.out.print("Enter the number of prime numbers to generate: ");
        int N = scanner.nextInt();

        MultiplicationTable tableThread = new MultiplicationTable();
        PrimeNumbers primeTask = new PrimeNumbers(N);
        Thread primeThread = new Thread(primeTask);

        tableThread.start();

        try {
            tableThread.join();
        } catch (InterruptedException e) {
            System.out.println(e.getMessage());
        }

        primeThread.start();

        try {
            primeThread.join();
        } catch (InterruptedException e) {
            System.out.println(e.getMessage());
        }

        System.out.println("Multithreading demonstration completed.");
        scanner.close();
    }
}
```

OUTPUT :



```
24mca11@mcaserver:~/oop_lab$ nano MultithreadingExample.java
24mca11@mcaserver:~/oop_lab$ javac MultithreadingExample.java
24mca11@mcaserver:~/oop_lab$ java MultithreadingExample
Enter the number of prime numbers to generate: 10
Multiplication Table of 5:
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
First 10 Prime Numbers:
2 3 5 7 11 13 17 19 23 29
Multithreading demonstration completed.
24mca11@mcaserver:~/oop_lab$
```