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Distributed Information Systems

Lab №4 Synchronization

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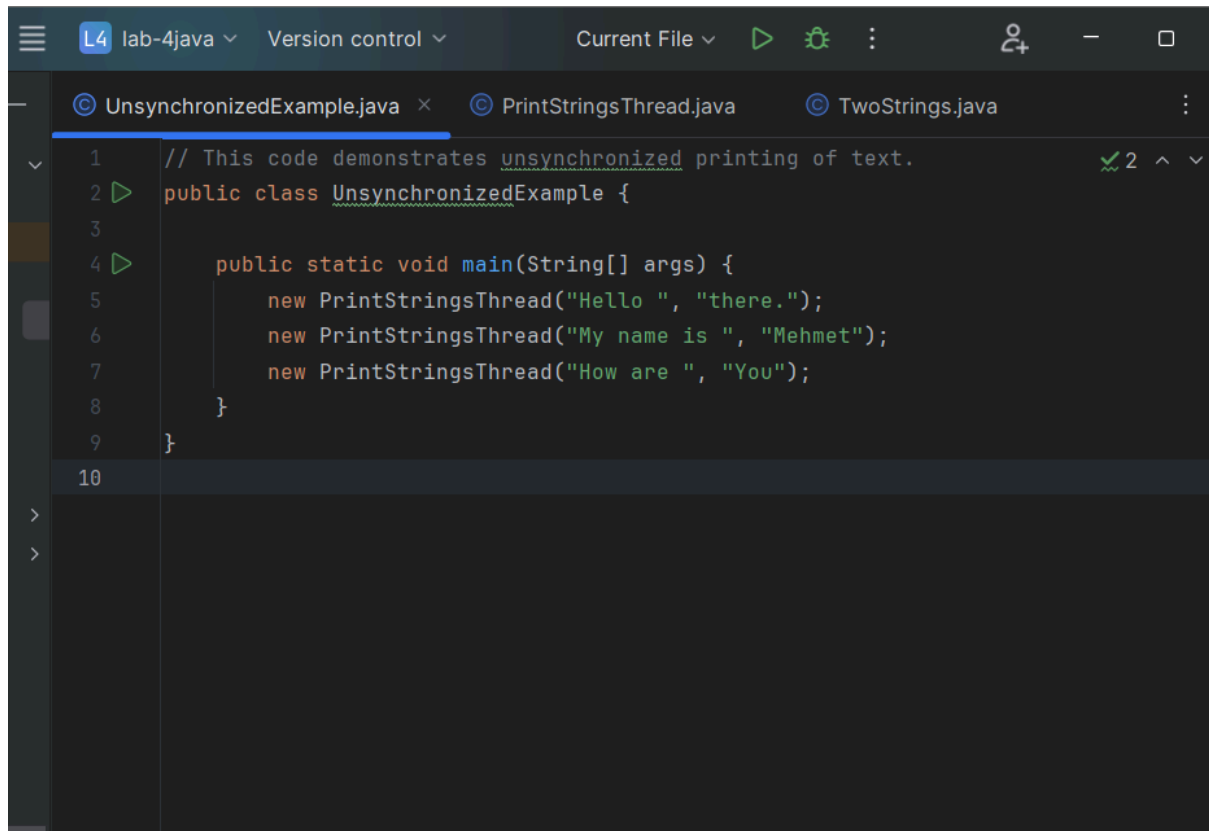
Code Explanation Report (With Examples)

This report explains the code in `UnsynchronizedExample.java`, `PrintStringsThread.java`, and `TwoStrings.java` step by step. Examples from the relevant code are also provided at each step.

1. `UnsynchronizedExample.java`:

This file contains an example code that prints text unsynchronized.

Example:



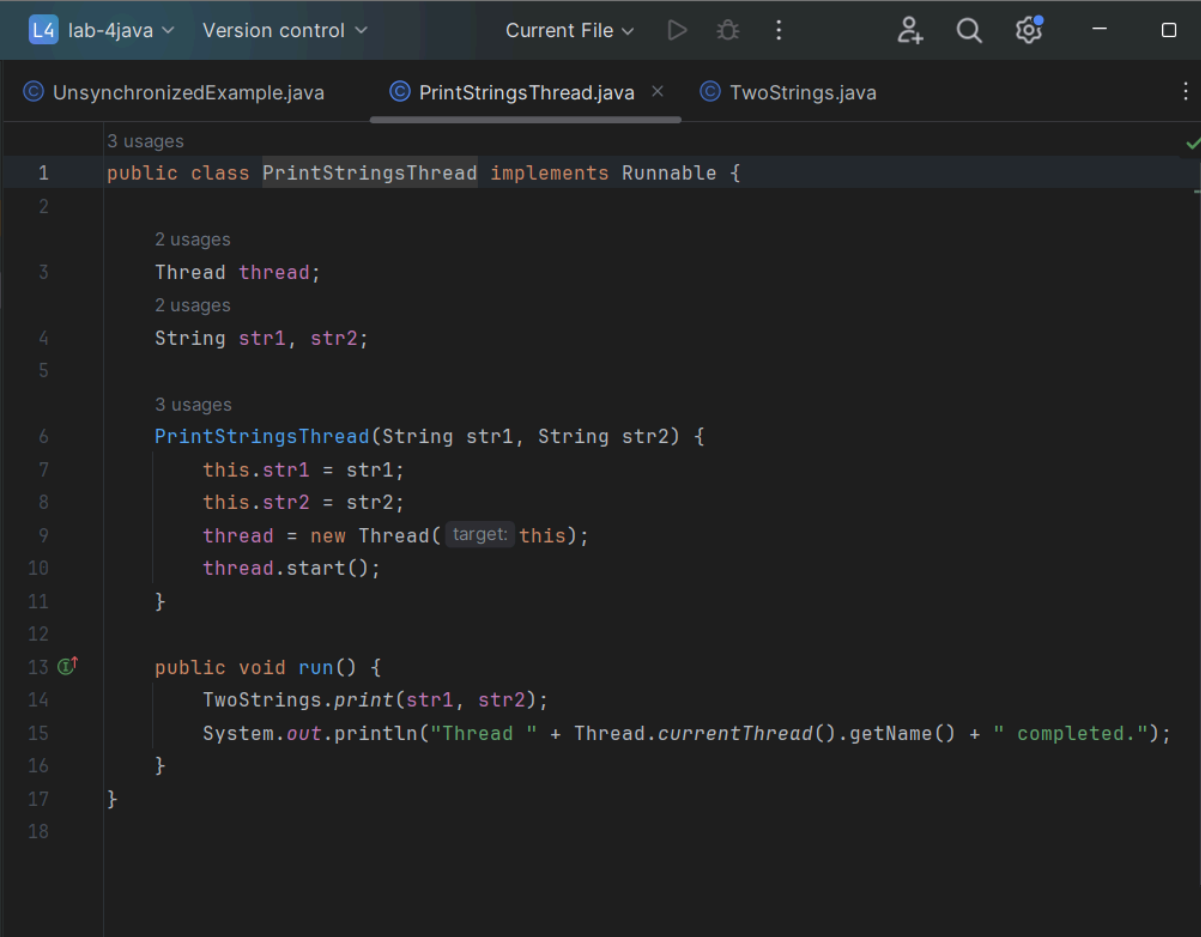
```
1 // This code demonstrates unsynchronized printing of text.
2 public class UnsynchronizedExample {
3
4     public static void main(String[] args) {
5         new PrintStringsThread("Hello ", "there.");
6         new PrintStringsThread("My name is ", "Mehmet");
7         new PrintStringsThread("How are ", "You");
8     }
9 }
10
```

In this code, the main method creates three `PrintStringsThread` objects and starts each one. Each `PrintStringsThread` object calls the `print` method of the `TwoStrings` class.

2. PrintStringsThread.java:

This file contains a class that implements the Runnable interface.

Example:



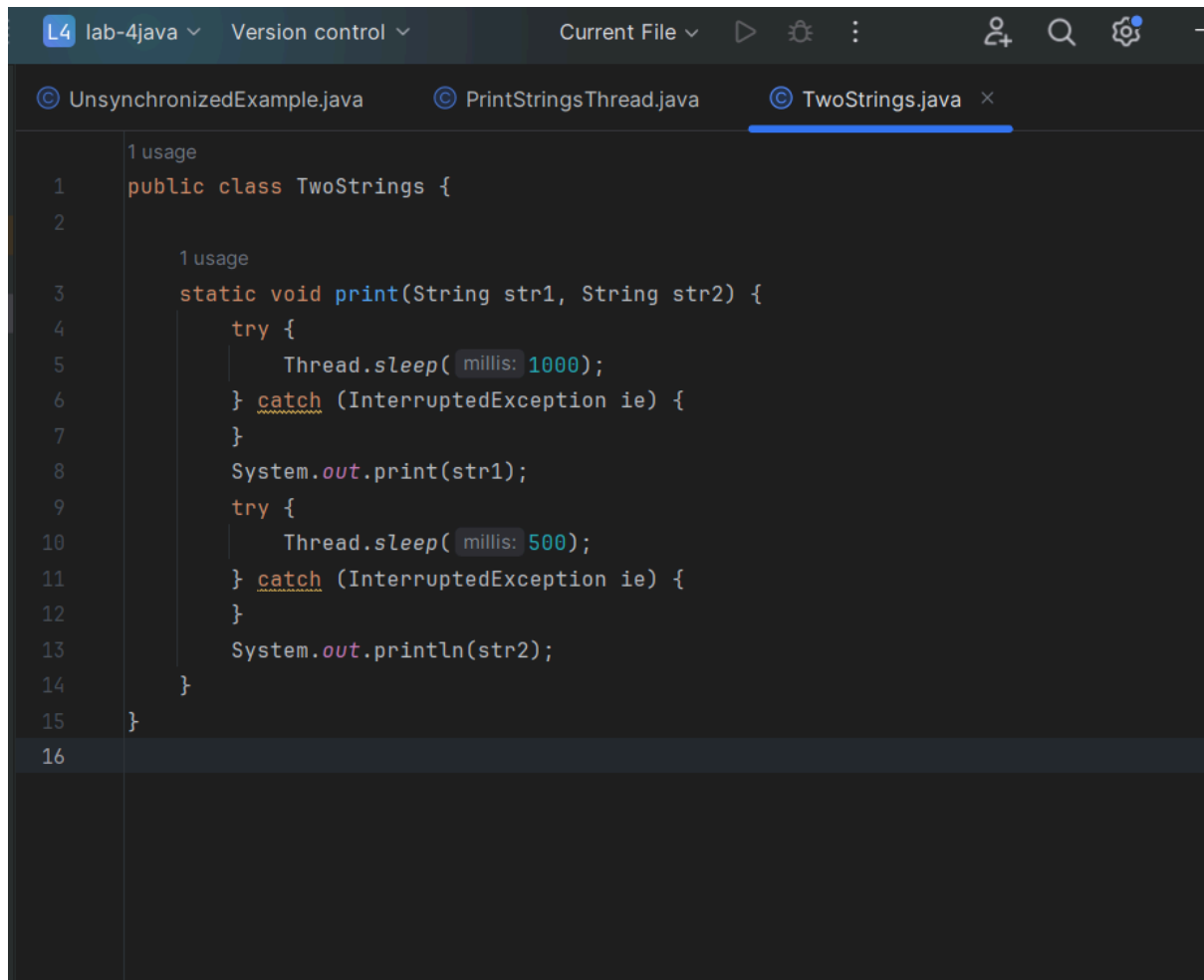
```
1 public class PrintStringsThread implements Runnable {
2
3     Thread thread;
4     String str1, str2;
5
6     PrintStringsThread(String str1, String str2) {
7         this.str1 = str1;
8         this.str2 = str2;
9         thread = new Thread(target: this);
10        thread.start();
11    }
12
13    public void run() {
14        TwoStrings.print(str1, str2);
15        System.out.println("Thread " + Thread.currentThread().getName() + " completed.");
16    }
17 }
18
```

In this code, the constructor of the PrintStringsThread class takes two strings and assigns them to the str1 and str2 variables. The run method calls the print method of the TwoStrings class and then prints a message with the name and completion time of the thread.

3. TwoStrings.java:

This file contains a static print method that prints two strings.

Example:



```
1 usage
2 public class TwoStrings {
3     1 usage
4     static void print(String str1, String str2) {
5         try {
6             Thread.sleep( millis: 1000 );
7         } catch (InterruptedException ie) {
8         }
9         System.out.print(str1);
10        try {
11            Thread.sleep( millis: 500 );
12        } catch (InterruptedException ie) {
13        }
14        System.out.println(str2);
15    }
16 }
```

In this code, the print method waits for one second before printing each string.

Below is the step-by-step explanation of the code with examples from the relevant code at each step:

1. The main method in `UnsynchronizedExample.java` is executed.

Example:

```
2 public class UnsynchronizedExample {
3
4     public static void main(String[] args) {
5         new PrintStringsThread("Hello ", "there.");
6         new PrintStringsThread("My name is ", "Mehmet");
7         new PrintStringsThread("How are ", "You");
8     }
```

This code creates three `PrintStringsThread` objects and starts each one.

2. Each of the `PrintStringsThread` objects executes the run method.

Example:

```
public void run() {
    TwoStrings.print(str1, str2);
    System.out.println("Thread " + Thread.currentThread().getName() + " completed.");
}
```

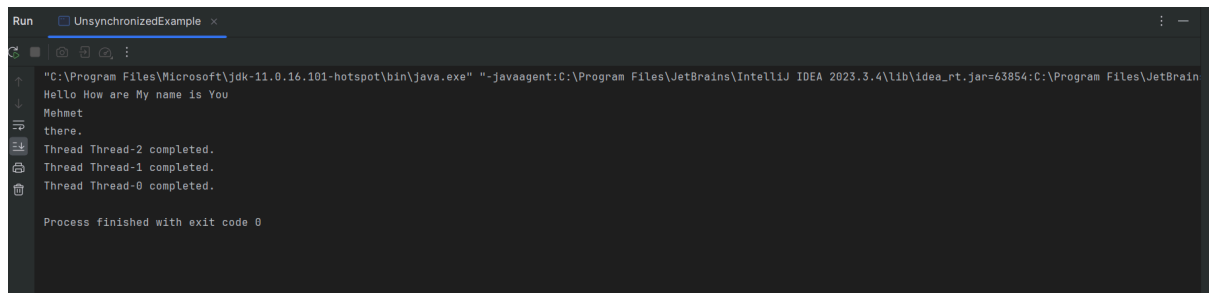
This code calls the print method of the `TwoStrings` class.

3. The print method of the `TwoStrings` class waits for one second before printing each string.

Example:

```
3     static void print(String str1, String str2) {
4         try {
5             Thread.sleep(1000);
6         } catch (InterruptedException ie) {
7         }
8         System.out.print(str1);
9         try {
10            Thread.sleep(500);
11        } catch (InterruptedException ie) {
12        }
13        System.out.println(str2);
14    }
```

The output of this code will vary depending on the order in which each thread prints the string.



```
Run  UnsynchronizedExample x
"C:\Program Files\Microsoft\jdk-11.0.16-hotspot\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2023.3.4\lib\idea_rt.jar=63854:C:\Program Files\JetBrain
Hello How are My name is You
Mehmet
there.
Thread Thread-2 completed.
Thread Thread-1 completed.
Thread Thread-0 completed.

Process finished with exit code 0
```