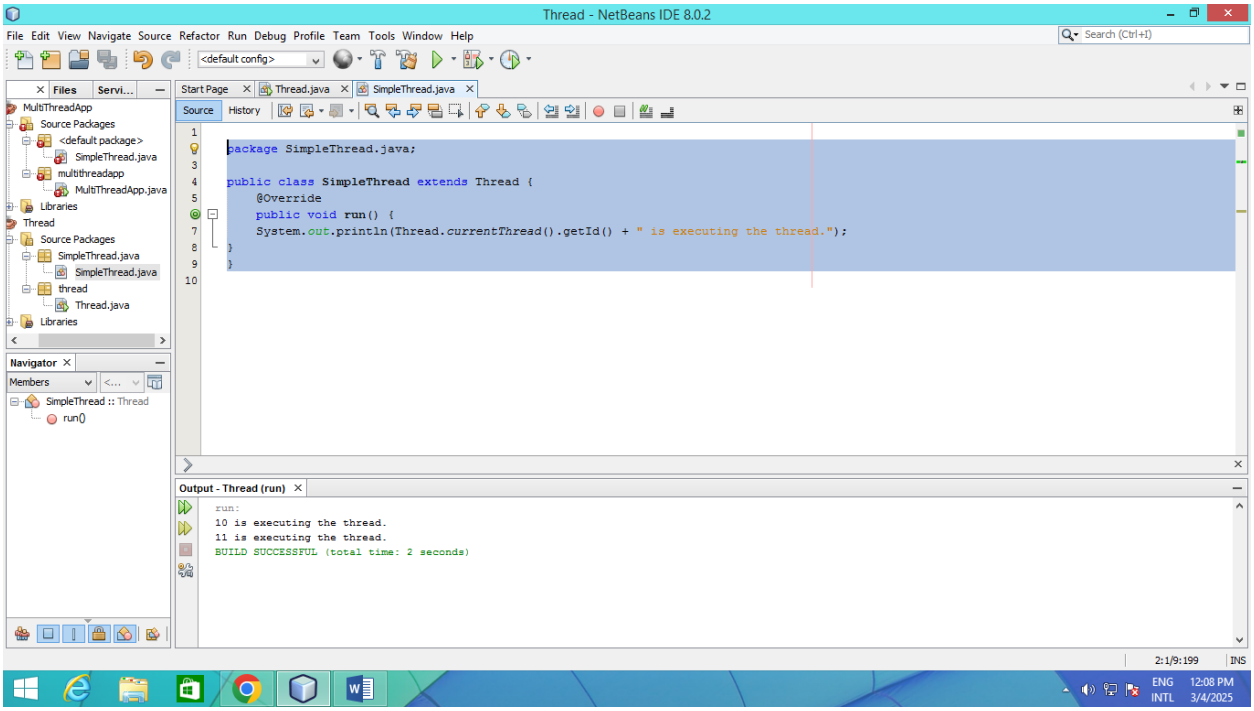
Labseet 01: Multi-threaded Java Application

Task 01: Create a Simple Thread Class

```
package thread;
import SimpleThread.java.SimpleThread;
public class Thread
        public static void main (String[] args) {
           SimpleThread thread1 = new SimpleThread ():
          SimpleThread thread2 = new  SimpleThread ();
        thread1.start();
         thread2.start();
   }
}
```

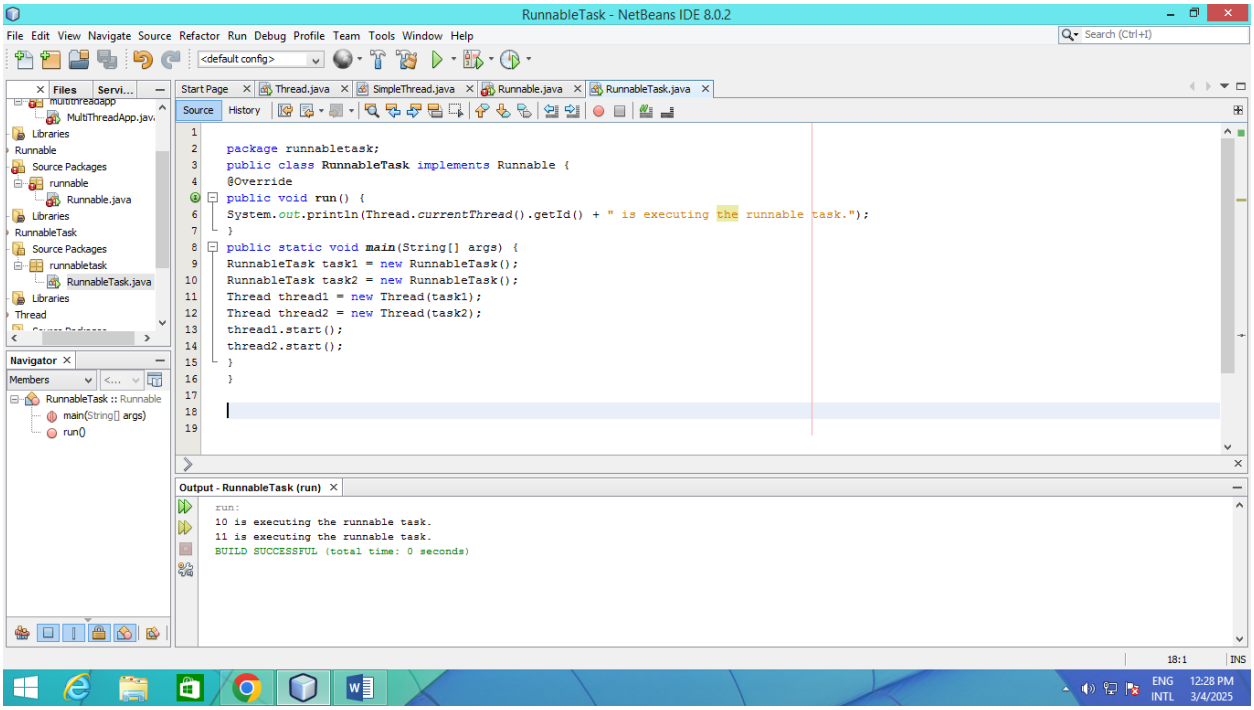
```
package SimpleThread.java;
public class SimpleThread extends Thread {
   @Override
   public void run () {
   System.out.println (Thread.currentThread ().getId () + “is executing the thread.");
}
}
```



Task 02: Create a Runnable Class

```
package runnabletask;
public class RunnableTask implements Runnable {
@Override
public void run () {
System.out.println (Thread.currentThread ().getId () + “is executing the runnable task.");
}
public static void main (String [] args) {
RunnableTask task1 = new RunnableTask ();
RunnableTask task2 = new RunnableTask ();
Thread thread1 = new Thread (task1);
Thread thread2 = new Thread(task2);
thread1.start ();
thread2.start ();
}
```

}



Task 03: Synchronizing Threads

class Counter {

private int count = 0;

// Synchronized method to ensure thread-safe access to the counter

public synchronized void increment() {

count++;

}

public int getCount() {

return count;

}

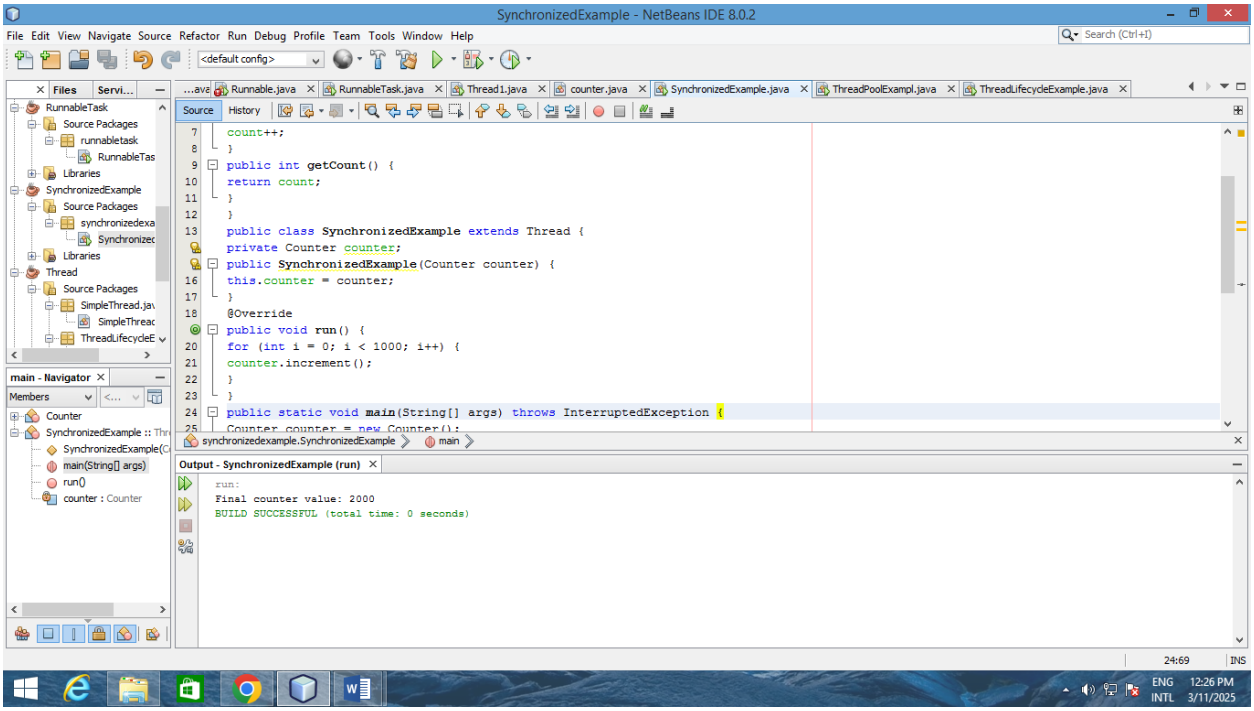
}

public class SynchronizedExample extends Thread {

private Counter counter;

public SynchronizedExample(Counter counter) {

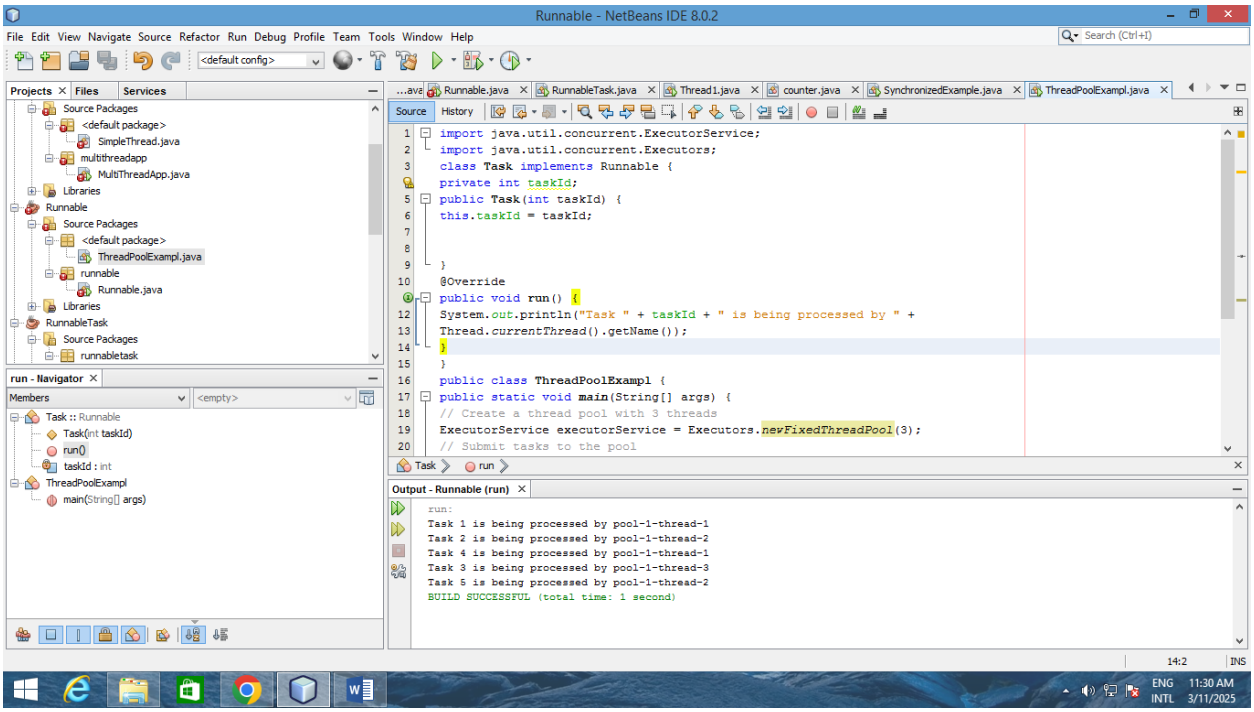
```
this.counter = counter;
}
@Override
public void run() {
for (int i = 0; i < 1000; i++) {
counter.increment();
}
}
public static void main(String[] args) throws InterruptedException {
Counter counter = new Counter();
// Create and start multiple threads
Thread thread1 = new SynchronizedExample(counter);
Thread thread2 = new SynchronizedExample(counter);
thread1.start();
thread2.start();
// Wait for threads to finish
thread1.join();
thread2.join();
System.out.println("Final counter value: " + counter.getCount());
}
}
```



Task 04: Thread Pooling

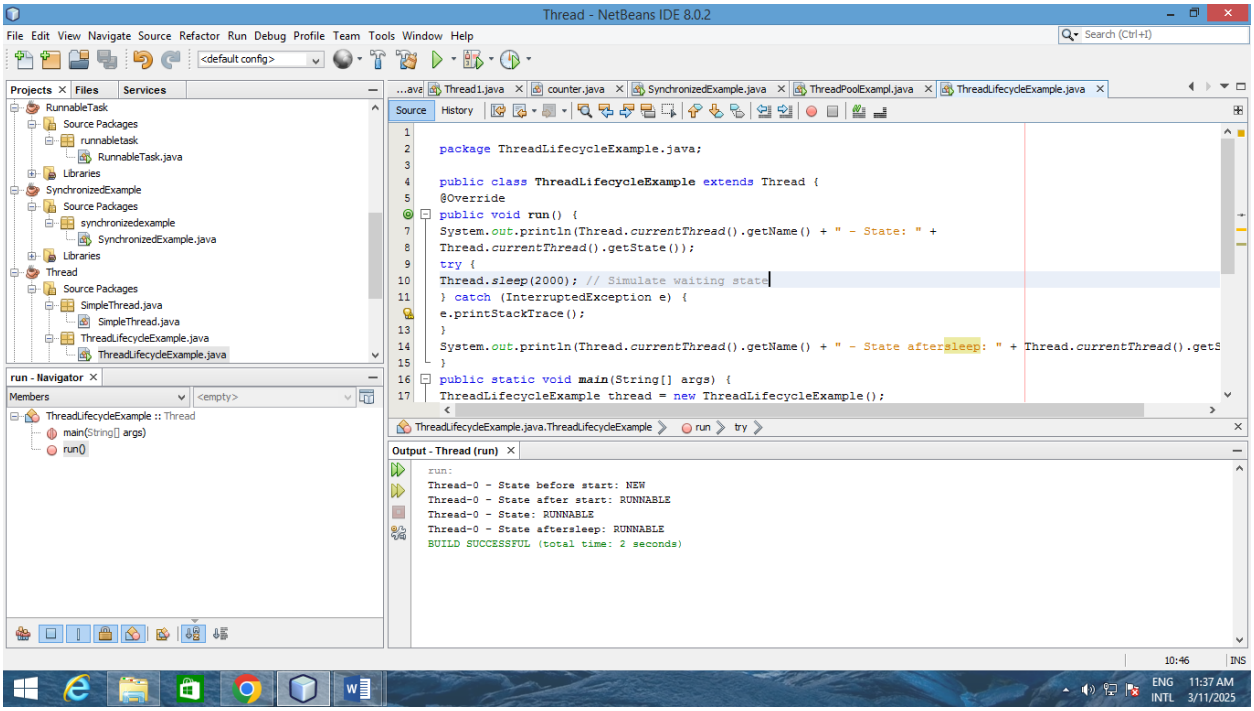
```
import java.util.concurrent.ExecutorService;

import java.util.concurrent.Executors;

class Task implements Runnable {

private int taskId;

public Task(int taskId) {

this.taskId = taskId;

}


@Override

public void run() {

System.out.println("Task " + taskId + " is being processed by " +

Thread.currentThread().getName());

}

}
```

```
public class ThreadPoolExample {
public static void main(String[] args) {
// Create a thread pool with 3 threads
ExecutorService executorService = Executors.newFixedThreadPool(3);
// Submit tasks to the pool
for (int i = 1; i <= 5; i++) {
executorService.submit (new Task (i));
}
// Shutdown the thread pool
executorService.shutdown ();
}
}
```



Task 05: Thread Lifecycle Example

```
public class ThreadLifecycleExample extends Thread {
@Override
public void run() {
System.out.println (Thread.currentThread ().getName() + " - State: " +
Thread.currentThread ().getState());
try {
Thread. Sleep (2000); // Simulate waiting state
} catch (InterruptedException e) {
e.printStackTrace ();
}
System.out.println(Thread.currentThread().getName() + " - State after
sleep: " + Thread.currentThread().getState());
}
public static void main(String[] args) {
ThreadLifecycleExample thread = new ThreadLifecycleExample();
System.out.println(thread.getName() + " - State before start: " +
thread.getState());
thread.start(); // Start the thread
System.out.println(thread.getName() + " - State after start: " +
thread.getState());
}
}
```



Task 06

```
public class ThreadLifecycleExample extends Thread {
@Override
public void run() {
System.out.println(Thread.currentThread().getName() + " - State: " +
Thread.currentThread().getState());
try {
Thread.sleep(2000); // Simulate waiting state
} catch (InterruptedException e) {
e.printStackTrace();
}
System.out.println(Thread.currentThread().getName() + " - State after
sleep: " + Thread.currentThread().getState());
}
public static void main(String[] args) {
```

```
ThreadLifecycleExample thread = new ThreadLifecycleExample();
System.out.println(thread.getName() + " - State before start: " +
thread.getState());
thread.start(); // Start the thread
System.out.println(thread.getName() + " - State after start: " +
thread.getState());
}
}
```