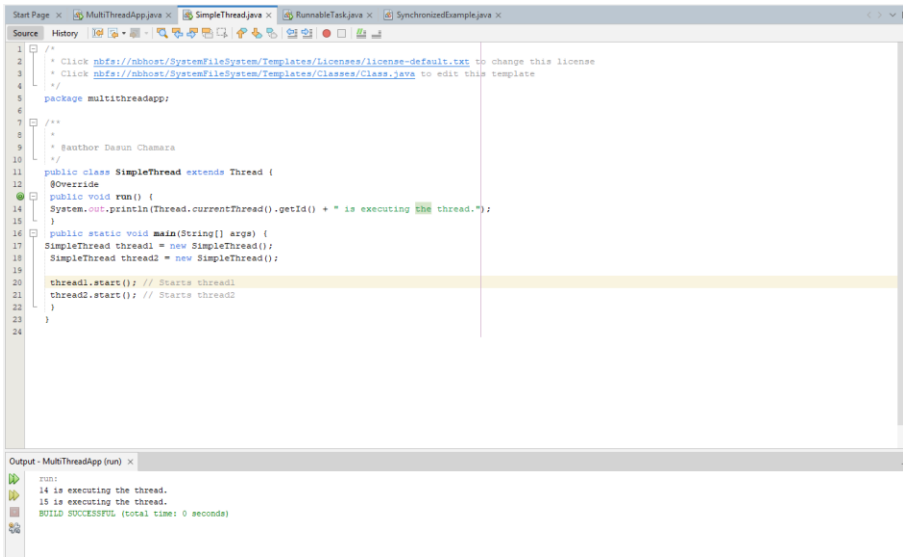
GAM/IT/2022/F/0024

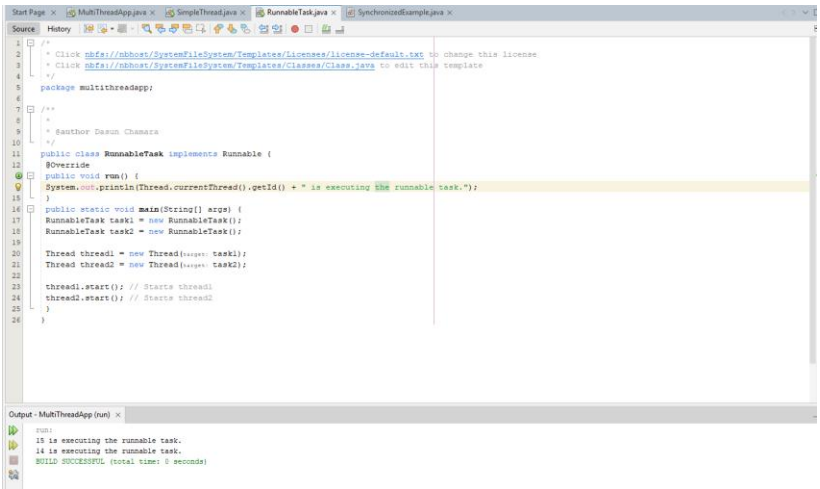
1. Create a Simple Thread Class

```
public class SimpleThread extends Thread {
 @Override
 public void run() {
 System.out.println(Thread.currentThread().getId() + " is executing
the thread.");
 }
 public static void main(String[] args) {

SimpleThread thread1 = new SimpleThread();

 SimpleThread thread2 = new SimpleThread();


 thread1.start(); // Starts thread1
 thread2.start(); // Starts thread2
 }
}
```



2. Create a Runnable Class

```
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(); // Starts thread1
 thread2.start(); // Starts thread2
 }
}
```



3. Synchronizing Shared Resources

```
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());
 }
}
```

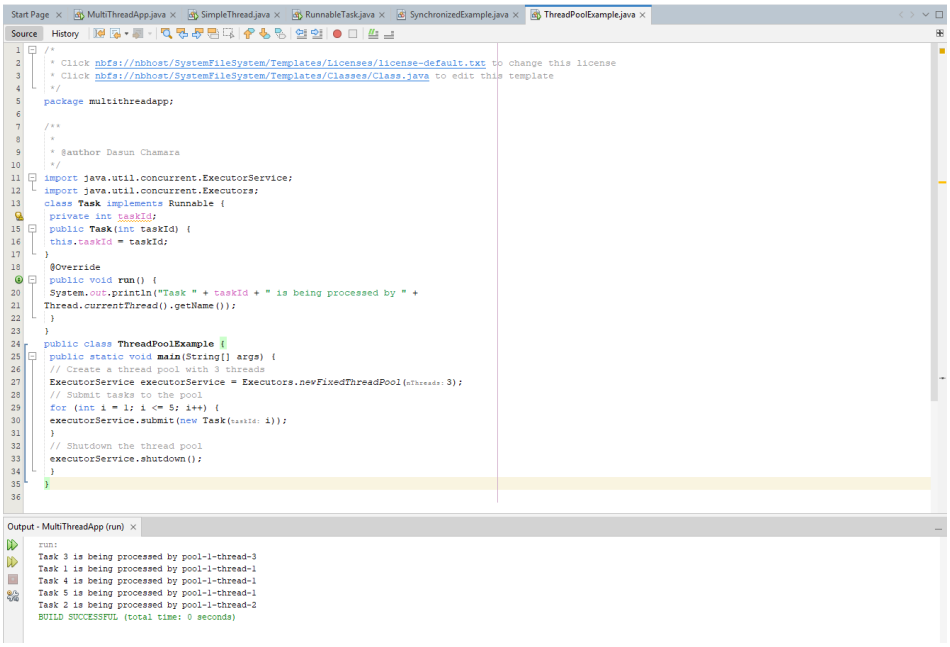
```java
 */
package multithreadapp;

/**
 *
 * @author Dasun Chamara
 */
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());
 }
}
```

```
run:
Final counter value: 2000
BUILD SUCCESSFUL (total time: 0 seconds)
```

4. 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();
 }
}
```



5. 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());
 }
```

}

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Source | History

```java
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
 */
package multithreadapp;

/**
 *
 * @author Dasun Chamara
 */
public class ThreadLifecycleExample extends Thread {
 @Override
 public void run() {
 System.out.println(Thread.currentThread().getName() + " - State: " +
Thread.currentThread().getState());
 try {
 Thread.sleep(millis: 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());
 }
}
```

Output - MultiThreadApp (run)

```
Thread-0 - State before start: NEW
Thread-0 - State after start: RUNNABLE
Thread-0 - State: RUNNABLE
Thread-0 - State after sleep: RUNNABLE
BUILD SUCCESSFUL (total time: 2 seconds)
```

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