Threads and Concurrency
Self-review Questions

24.1 Would removing the synchronized statement, and just leaving the statement body, ever make any difference to the execution of the program TestThread7?

Programming Exercises

24.1 Amend program ThreadTest4 to include a thread running at a higher priority that periodically runs and displays the status of each Calculate thread.

24.2 Amend the following program so that PrimeFilter extends Thread and each filter object runs as a separate thread. Think very carefully about how the filter objects have to communicate and how the run method might work.

```java
// Class to represent a filter object.
class PrimeFilter {
  private final int prime; // Prime number held by filter object.
  private PrimeFilter next; // Reference to next filter object.
  public PrimeFilter() { this(2); }
  private PrimeFilter(final int prime) {
    this.prime = prime;
    System.out.println(prime + " is prime");
  }
  // Process the test value to see if it is divisible by the prime held by the current
  // object. If it is then it can be rejected, otherwise it is passed on to the next prime in
  // the list. If there is no object to pass it on to then we have found a new prime so create
  // a new object.
  public void process(final int i) {
    if ((i % prime) != 0) {
      if (next != null) { next.process(i); }
      else { next = new PrimeFilter(i); }
    }
  }
}
public class SieveOfEratosthenes {
  public static void main(final String[] args) {
    final PrimeFilter two = new PrimeFilter();
    for (int i = 3; i < 10000; i += 2) { two.process(i); }
  }
}
```

24.3 Write a test program to test the SimpleThreadSafeQueue class and demonstrate that it works correctly.