

24

*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.*

```
// 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.*