## Clock Exercises In Class

Starting with the **clock-display** project from the chapter03 directory ...

1. Include seconds in your clock display by adding an additional NumberDisplay instance to track seconds.
    a. Make sure you update both constructors and all affected methods.
    b. *timeTick*() should now move ahead one second at a time (rather than one minute)
    c. *setTime* should include a parameter for seconds
    d. *updateDisplay* should include seconds in the *displayString*.
    e. Make sure you test your *timeTick*() method carefully to verify that the seconds, minutes and hours roll over at appropriate times.
2. Add alarm capabilities to the ClockDisplay class.
    a. To set the alarm, use a method signature like "public void setAlarm(int hour, int minute, int second)".
    b. You'll need 3 new *int* fields to store the time the alarm is set to go off.
    c. You also need a fourth field to keep track of whether or not the alarm is set.
    d. Implement a *cancelAlarm*() method to turn the alarm off.
3. Add a method named *isAlarmGoingOff* which takes no input parameters and has a *boolean* return type. It should return *true* if the alarm is set to be on and the value of the hours, minutes and seconds is the same as the alarm settings, *false* otherwise.
4. Update your clock so that when the time rolls over to the alarm time, if the alarm is set it should "go off" (i.e. print something like "Wake up").
5. Make the clock display the time as a 12 hour clock (hh:mm:ss AM/PM) - see Exercises 3.38 and 3.39.
6. Now create a new class in the ClockDisplay project called *ClockTester*.
    a. Add a method named *testClock*.
    b. It should take three ints as input parameters: hours, minutes and seconds.
    c. It should create a new ClockDisplay object using these values.
    d. It should check that *setAlarm* and *isAlarmGoingOff* work correctly, so that the alarm goes off when the it is set the same as the ClockDisplay, and does not go off when it is set differently.
    e. The *testClock* method should return *true* if *isAlarmGoingOff* worked correctly in both cases, and *false* otherwise.