

Computer Science A, Spring 2007

NATBAS, Roskilde University

Miniproject 1

February 16, 2007

This miniproject asks you to implement (parts of) an alarm clock in Java. A real alarm clock can be set to make an alert sound at a specific time. The alarm clocks you are asked to implement should be somewhat simpler: Instead of making an alert sound at a specific time, it should, when requested, respond with the number of seconds left until the time to which it has been set.

The answer to this exercise should consist of a Java program that you develop yourself. You must hand in a small report that presents your program, that shows at least a few example runs, and that explains the limitations of your solution, if any. (You are welcome to extend the program with additional features.)

The program should be designed and implemented by you alone. This implies that **you may not** work together in groups. It also implies that **you may not** ask someone else to implement your solution **nor may you** download parts of your solution from the internet.

Your answer should be handed in before Friday, March 2, at 9:00.

Morten Rhiger
mir@ruc.dk

1 An alarm clock

The program that you are asked to develop in this exercise is part of an alarm clock. Such a clock can be set to make an alert sound *at a specific time*. For example, we may set the alarm clock to make an alert sound at 9:30.

Some alarm clocks can also be set to make the alert sound *after a specific amount of time*. For example, we may set the alarm clock to make an alert after one hour.

Your alarm clock should be able to do both. Besides, your alarm clock should, when

requested, respond with the number of seconds left until the alarm should sound. (You are not asked to make your alarm clock make alert sounds at the specified time.)

More precisely, you should design a class `AlarmClock` with (at least) the following constructors and methods:

```
AlarmClock(int m, int s)
```

Constructs a new alarm clock that will make an alert sound after `m` minutes and `s` seconds (starting from now).

```
AlarmClock(int hh, int mm, ss)
```

Constructs a new alarm clock that will make an alert sound at the time specified as `hh:mm:ss`.

```
int secondsRemaining()
```

Returns the number of seconds left until this alarm clock makes an alert sound.

```
void set(int m, s)
```

Set this alarm clock so that it will make an alert sound after `m` minutes and `s` seconds (starting from now).

```
void set(int hh, int mm, ss)
```

Set this alarm clock so that it will make an alert sound at the time specified as `hh:mm:ss`.

Hint 1 You may have to use the classes `Calendar` and `GregorianCalendar` found in the package `java.util`. You can include these classes in your program by entering the following lines at the top:

```
import java.util.Calendar;
import java.util.GregorianCalendar;
```

Hint 2 When you test your program, you may find it necessary to insert a *delay* between setting an alarm clock and prompting it. An easy way to achieve this is to open an input dialog that waits until the user closes the dialog. For example

```
set an alarm clock
JOptionPane.showConfirmDialog(null, "Press a button");
prompt the alarm clock
```