Tutorial problems – Wed 27 Nov and Fri 29 Nov 2019

10min Ask whether there are any questions. Collect these by writing them on the board and decide with the whole group which of these to address in the 10 minutes available for question answering. The answering of the question may also be put to the end of the tutorial.

5min What is the value of x after this line is executed?

```
double x = 7 / 2 + 1.5 ;
```

(From the UG Examination - Summer 2006)

5min The following `for`-loop has three parts missing from its first line. Write down that first line with the three parts filled in so that when the for loop runs it will print out the numbers 80, 40, 20, 10, and 5.

```
for (??? ; ??? ; ??? ) {
    System.out.println(i);
}
```

(From the UG Examination - Summer 2010)

5min The following method is intended to calculate the minimum value in a double array (assumed non-empty).

```
public static double min(double[] a) {
   int i = 0;
   int m = a[0];
   while (i <= a.length) {
       if (a[i+1] < m) {
          m = a[i];
       }
       i = i+1;
   }
   return m;
}
```

The method contains **three mistakes**. Find those mistakes and state how they could be corrected.
(From the UG Examination - Summer 2012)

10 min A programmer has to write a program for a GPS tracking program. They have recognized that both the Latitudinal and Longitudinal values are based on the same underlying coordinate data structure of degrees, minutes, seconds and direction. As a result, they have written the following JUnit test code.

Note: This exercise is not about understanding how GPS coordinates are defined. It is about knowing what the Java testing code is telling you about how the Java source code should be written.

```
@ Test
public void testSetDegrees() {
       Coordinate aLatitude = new Latitude (-1,0,0,'S');
       assertEquals(-1,aLatitude.getDegrees());
       assertEquals(0,aLatitude.getMinutes());
       assertEquals(0.0,aLatitude.getSeconds(),0.001);
       assertEquals('S',aLatitude.getDirection());
}
```

Based on this code:

(i) Write the interface for `Coordinate`.

(ii) Write the class header for `Latitude`.

(Idea taken from the UG Examination - Summer 2011)

10min Discuss a class `EmailMessage` with the four field variables `private String sender`, `private String recipient`, `private String subject`, and `private String body`. How would you represent a class `Mailbox`?

(From Horstmann - Java for Everyone, p.409f)

5min How would you create a sub-class `EmailMessageWithPriority`?

[Use an extra field variable `private String priority`.]