Informatik für Mathematiker und Physiker   HS13

Exercise Sheet 2

Submission deadline: 15:15 - Tuesday 1st October, 2013

`Course URL`: http://www.ti.inf.ethz.ch/ew/courses/Info1_13/

Assignment 1 - Skript-Aufgaben 2,3 & 4 (4 points)

(i)	a=(b=5)	(ii)	1=a
(iii)	(a=5)*(b=7)	(iv)	(a=b)*(b=5)

a) Which of the above character sequences are not $C++$ expressions, and why not? Here, a and b are variables of type `int`.

b) For all of the expressions that you have identified, decide whether these are lvalues or rvalues, and explain your decisions.

c) Determine the values of the expressions that you have identified and explain how these values are obtained. Which of these values are unspecified and can therefore not be determined uniquely?

Assignment 2 - Skript-Aufgabe 22 (4 points)

Write a program `celsius.cpp` that converts temperatures from degrees Fahrenheit into degrees Celsius. An example run of this program might look like this:

```
Temperature in degrees Fahrenheit =?
2
2 degrees Fahrenheit are -16 -6/9 degrees Celsius.
```

You may for this exercise assume that the integer division rounds towards zero for all operands: for example, $-5/2$ then rounds the exact result -2.5 to -2.

The program should output the *correct* result in degrees Celsius as a mixed rational number of the form $x\frac{y}{9}$ (meaning $x + y/9$), where $x, y \in \mathbb{Z}$ and $|y| \le 8$. For example, $13\frac{4}{9}$ could be output simply as $13\ 4/9$. We also allow for example the output $-1\ -1/9$ (meaning $-1-1/9 = -10/9$).

Assignment 3 - Skript-Aufgabe 21 (4 points)

Suppose that someone drives from A to B at an average speed of 50 km/h. On the way back from B to A, there is a traffic jam, and the average speed is only 30 km/h. What is the average speed over the whole roundtrip?

When confronted with this question, many people would answer "40 km/h," but this is wrong. Write a program that lets the user enter two average speeds in km/h ($A \rightarrow B$ and $B \rightarrow A$) and computes from this the average speed over the whole roundtrip ($A \rightarrow B \rightarrow A$). Both inputs should be positive integers, and the output should be rounded down to the next smaller integer.

Challenge - Skript-Aufgabe 12

Note: On some weeks we will add Challenge Exercises to the exercise sheet. Challenge Exercises are typically slightly more difficult than the normal exercises. If you have solved all of the regular exercises or if they are too easy for you, try the Challenges!