

Informatik für Mathematiker und Physiker **Serie 4** **HS 10**URL: http://www.ti.inf.ethz.ch/ew/courses/Info1_10/**Skript-Aufgabe 2 & 3 (4 Punkte)**

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

- (a) $1*(2*3)$ (b) $a=(b=5)$ (c) $1=a$ (d) $(a=1)$
(e) $(a=5)*(b=7)$ (f) $(1$ (g) $(a=b)*(b=5)$ (h) $(a*3)=(b*5)$

For all character sequences that you have identified as valid expressions, decide whether these are lvalues or rvalues, and explain your decisions.

Skript-Aufgabe 8 (4 Punkte)

Write a program `power20.cpp` that reads an integer `a` from standard input and outputs a^{20} using at most five multiplications.

Skript-Aufgabe 13 (4 Punkte)

Parenthesize the following expressions and then evaluate them step by step. This means that types and values of all intermediate results that are computed during the evaluation should be provided.

- a) $-2-4*3$ b) $10\%6*8\%3$ c) $6-3+4*5$
d) $5u+5*3u$ e) $31/4/2$ f) $-1-1u+1-(-1)$

Skript-Aufgabe 22 (4 Punkte)

Write a program `celsius.cpp` that converts temperatures from degrees Fahrenheit into degrees Celsius.

The initial output that prompts the user to enter the temperature in degrees Fahrenheit should also contain *lower* and *upper* bounds for the allowed inputs. These bounds should be chosen such that no over- and underflows can occur in the subsequent computations, given that the user respects the bounds. 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 $|y| \leq 8$. 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 $-1 - 1/9 = -10/9$).

Die Aufgaben 12 und 25 aus den Vorlesungsunterlagen sind **Challenge Aufgaben** und geben jeweils 8 Punkte, wenn sie vollständig gelöst werden.

Abgabe: Bis 26. Oktober 2010, 15.15 Uhr.