

Informatik für Mathematiker und Physiker HS14

Exercise Sheet 2

Submission deadline: 15:15 - Tuesday 30th September, 2014

Course URL: <http://lec.inf.ethz.ch/ifmp/2014/>

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

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

- Which of the above character sequences are not C++ expressions, and why not? Here, a and b are variables of type int.
- For all of the expressions that you have identified, decide whether these are lvalues or rvalues, and explain your decisions.
- 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-Aufgaben 17,18 & 20 (3 points)

Convert the following numbers:

From	To
15_{dec}	$?_{bin}$
329_{dec}	$?_{bin}$
110111_{bin}	$?_{dec}$
11101001_{bin}	$?_{dec}$

Assuming a 4-bit representation, compute the binary two's complement representations of the following decimal numbers:

From	To
6_{dec}	?
0_{dec}	?
12_{dec}	?
-4_{dec}	?

Compute the hexadecimal representations of the following decimal numbers:

From	To
12_{dec}	$?_{\text{hex}}$
75_{dec}	$?_{\text{hex}}$

Hint: The conversion into the hexadecimal system works similarly to the conversion into the binary system. What do you have to change compared to the conversion into the binary system?

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 (8 points)

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!