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## Informatik für Mathematiker und Physiker

Serie 2

HS 07

URL: <http://www.ti.inf.ethz.ch/ew/courses/Info1.07/>

### Skript-Aufgabe 2 (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)  $(a*3)=(b+5)$

### Skript-Aufgabe 3 (4 Punkte)

For all of the expressions that you have identified in Exercise 2, decide whether these are lvalues or rvalues, and explain your decisions.

### Skript-Aufgabe 4 (4 Punkte)

Determine the values of the expressions that you have identified in Exercise 2 and explain how these values are obtained. Which of these values are unspecified and can therefore not be determined uniquely?

### Skript-Aufgabe 6 (4 Punkte)

Write a program `power20.C` that reads an integer `a` from standard input and outputs  $a^{20}$  using at most five multiplications. For reference, you may use the program `power8.C`, that was presented in the lecture.

### Challenge

Students who are interested in more advanced exercises can replace two of the ordinary exercises on this sheet by exercise 7, which can be found in the script. Exercise 7 will be awarded with a maximum of 8 points. Note that, it is not possible to achieve more points than the sum of points of the normal exercises. It should be made clear which exercises have been replaced.

## Programm: power8.C

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```
// Program: power8.C
// Raise a number to the eighth power.

#include <iostream>

int main()
{
    // input
    std::cout << "Compute a^8 for a =? ";
    int a;
    std::cin >> a;

    // computation
    int b = a * a; // b = a^2
    b = b * b;     // b = a^4

    // output b * b, i.e., a^8
    std::cout << a << "^8 = " << b * b << ".\n";
    return 0;
}
```