Assignment 1 - Skript-Aufgabe 28 (4 points)

Prove or disprove that for all $x, y, z \in B$

c) $(x \lor y) \land z = (x \land z) \lor (y \land z)$. (i.e., (OR, AND) is distributive)

d) $(x \uparrow y) \uparrow z = x \uparrow (y \uparrow z)$. (i.e., NAND is associative)

Assignment 2 - Skript-Aufgabe 35 (4 points)

Find the logical parentheses in lines 9 and 12 of the following program. What can you say about the output of the following program? Characterize it depending on the input and explain your reasoning.

```cpp
#include <iostream>

int main ()
{
    unsigned int a;
    std::cin >> a;

    unsigned int b = a;
    b /= 2 + b / 2;
    std::cout << b << "\n";

    const bool c = a < 1 || b != 0 && 2 * a / (a - 1) > 2;
    std::cout << c << "\n";

    return 0;
}
```
Assignment 3 - (5 points)

Write a program reverseDigits.cpp that takes as an input an arbitrary non-negative integer \( n \) computes and outputs an integer \( m \) such that \( m \) has the same digits as \( n \) but in the reversed order; e.g if \( n = 123 \), then \( m = 321 \) and if \( n = 10 \) then \( m = 1 \) (as the leading zero is implicit), and output \( m \).

Assignment 4 - Skript-Aufgabe 46 (3 points)

Write a program fak-1.cpp to compute the factorial \( n! \) of a given input number \( n \).

Hint: Use ifm::integer to get the exact evaluation of \( n! \).

Challenge - Skript-Aufgabe 36 (8 points)

The exercise can be found on the page 77 of the lecture notes.