C++ Programming

Exercise Sheet 0
Secure Software Engineering Group
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Solutions to this sheet are due on 23.04.2021 at 16:00. Please hand-in a digital version of your answers via PANDA at `https://panda.uni-paderborn.de/course/view.php?id=22691`.
Note: If you copy text or code elements from other sources, clearly mark those elements and state the source. Copying solutions from other students is prohibited.

This exercise sheet allows you to familiarize yourself with GCC and Clang. You can achieve 16 points in total.

Exercise 1.

  a) Name three large software projects that are developed in C++! (1 P.)

  b) Why is there such a great demand for the C++ language? (1 P.)

  c) How and by whom was C++ created? (1 P.)

  d) Name five characteristics of C++! (1 P.)

Exercise 2.
I recommend the following setup for this course (you do not have to prove that you solved this exercise):

  a) Go to `https://www.virtualbox.org/wiki/Downloads` and install `Virtual Box` and the `VirtualBox Extension Pack` on your computer. (2 P.)

  b) Download the virtual machine image for this course at `https://uni-paderborn.sciebo.de/s/VKRtFN88P23PMCs`, import and run it using `Virtual Box`. You may wish to adjust the amount of RAM that the virtual machine should use, before you start the machine. (2 P.)

Please note that you do not have to use the above setup. If you are a Linux user anyway or you endure the pain of using some C++ compiler on MS Windows, you are free to use whatever works for you. However, I cannot provide tech support if things do not work out using your custom setup.

Yet another route is to use an online integrated development environment (IDE) for this course. Unfortunately, I have too little experience with those and thus cannot recommend one to you.

Exercise 3.

Edit a file with the following contents, compile and run it! (1 P.)

```cpp
#include <iostream>

int main() {
    std::cout << "Hello, World!\n";
    return 0;
}
```

a) Extend the program such that it prints your name as well! (1 P.)

b) Write a small program that reads an integer value from the command-line (provided by the user) into a variable and prints the variable's value afterwards! Which data type is a reasonable default when working with integer values? (1 P.)

c) Extend the program from b) such that is performs the same procedure but with a real number, rather than an integer. Which data type is a reasonable default when dealing with floating point values? (1 P.)

Exercise 4.

a) What is a compiler and what is its job? (1 P.)

b) What is the difference between a compiler and an interpreter? (1 P.)

c) Convert the number $101101_{(2C)}$ (two's complement) into decimal representation. (1 P.)

d) Convert $-42_{(10)}$ into 8-bit 2C representation. (1 P.)