C++ Lecture 2

After Lecture 2 the student should know:

* How to create a multidimensional array (statically)
* How to use a multidimensional array as input for a function
* How a multidimensional array is stored in memory
* The difference between a c-string and a string
* That ‘\0’ terminates a c-string
* That c-strings have a fixed length whilst strings do not
* The difference between call by value and call by reference
* How to pass arguments to a function using call by value or call by reference
* What a stream is
* What the source and target location of a stream can be
* How to create a stream
* How to open/close a stream
* How to read/write a file
* The difference between text files and binary files
* How to create a struct
* How to access elements in a struct
* How to read/write structs from/to a file
* What the use is of header files
* How to create header files with their .cpp/.cc file
* How to create a static library

Exercises for Lecture 2

For these exercises one can only include <iostream> and <fstream>. Make sure to check each function in the main().

1. Follow the step-by-step guide to create a library for the functions you made last time.
2. Create a function that gets two integers ‘numerator’ and ‘denominator’ that form a fraction. Alter these integers so that the new fraction is a simplified version of the first.
3. Create a two dimensional character array and fill it with several names of different length. Print the names in a for-loop.
4. Create a function that gets a c-string as input and checks whether it is a palindrome. One can assume the word in the c-string ends with ‘\0’.
5. Create a function that reads a txt-file and prints it to the console.
6. Create a struct ‘PlayerState’ with the following attributes:

name (type: char[20])

level (type: int)

health (type: double)

experience (type: int)

1. Create an array with 3 PlayerStates, fill and print them
2. Save the array with PlayerStates to a binary file with name: “game.dat”
3. Load the file: “game.dat” and create a textfile that stores the names from the PlayerStates.

Useful Links for Lecture 2

How to use 2D and 3D arrays:

<https://www.programiz.com/cpp-programming/multidimensional-arrays>

strcpy vs strcpy\_s:

<http://www.cplusplus.com/forum/beginner/118771/>

call by value:

<https://www.tutorialspoint.com/cplusplus/cpp_function_call_by_value.htm>

call by reference:

<https://www.tutorialspoint.com/cplusplus/cpp_function_call_by_reference.htm>

streams:

<http://www.cplusplus.com/reference/iolibrary/>

struct:

<http://www.cplusplus.com/doc/tutorial/structures/>

Libraries in C++

<http://en.wikibooks.org/wiki/C%2B%2B_Programming/Compiler/Linker/Libraries>

<http://www.flipcode.com/archives/Creating_And_Using_DLLs.shtml>

Random number generation

<http://www.daniweb.com/forums/thread1769.html>

<http://www.dreamincode.net/forums/topic/14057-producing-random-numbers/>

<http://engineering.mit.edu/ask/can-computer-generate-truly-random-number>