Exercise 00 - Theory Answers

1. **What is the purpose of a Makefile?**

A Makefile is used to automate the compilation and build process of a project. It defines rules and dependencies to compile code, link files, and generate the final executable. Using Makefiles also makes it possible to efficiently manage complex builds, only recompiling parts of the project that have changed. The best benefits of a Makfeile are that it saves time and reduces manual errors.

2. **What is a pointer in C?**

A pointer is a data type whose value refers directly to (or "points to") another value stored elsewhere in the computer memory using its address. It allows for direct memory access and manipulation, enabling efficient handling of arrays, dynamic memory allocation, and functions that modify data passed to them.

3. **What does the -O3 flag do when compiling C code?**

The -O3 flag in C code compilation with the GNU Compiler Collection (GCC) enables maximum optimization. This flag instructs the compiler to apply various aggressive optimization techniques to minimize code size and execution time.

4. **How can you pass a value by reference to a function in C?**

To pass a value by reference, the address of an argument is passed to the function instead of the argument itself during the function call. Due to this, any changes made in the function will be reflected in the original arguments. The address operator (&) and indirection operator (*) provide an argument to a function via reference. When any argument is passed by reference in the function call as a parameter, it is passed using the address of(&) operator from the main

function. In the function definition, the function takes the value of the parameter by using (*) operator. By using this, it can directly access the value of the parameter directly from its original location. There will be no need for extra memory or copying the same data into some other fields.