

# Lab 5 - Exercises

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You should attempt this tutorial by using the examples in the lecture notes.

You can also ask ChatGPT for help with these exercises, but you should understand any code it generates. If you don't then ask! **I would also attempt them first yourself.**

The point is you understand what structs and pointers are!

## Useful Links

[W3schools C++ Tutorial](#)

[Programiz C++ Tutorial](#)

[Programiz C++ Online Compiler](#)

## Exercise 1: Struct Basics

Create a C++ program that defines a struct representing a **Person** with **name**, **age**, and **address** fields. Initialize an instance of this struct and print its values.

## Exercise 2: Passing a Struct to a Function

Write a C++ function that takes the **Person** struct as a parameter and prints out the person's **name** and **age**. Call this function from the main program. You should pass the struct as a read-only reference.

## Exercise 3: Struct Array 1

Declare a struct called **Product** with fields for the **name**, **price**, and **quantity**. Create an array of **Product** structs, populate it with data, and display the products in the array.

## Exercise 4: Pointer Basics

Create a C++ program with an integer variable. Use a pointer to modify the value of the variable and print the modified value.

## Exercise 5: Struct and Pointer Interaction

Define a **Rectangle** struct with fields for **length** and **width**. Create a pointer to a **Rectangle** and use it to calculate and display the area of the rectangle.

This link will help you - <https://www.programiz.com/cpp-programming/structure-pointer>

## Exercise 6: Struct Array 2

Define a struct `Student` with fields for the `name`, `age`, `email` and `studentNo`. Create an array of `Student` structs called `classList` to represent a class of students. Populate the array with information for at least five students and write a function that takes the student array as a parameter and prints out the details of all the students in the class.

You should look at this before attempting this. Arrays are passed by reference as a default.

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

## Exercise 7: Dynamic Memory Allocation

Write a C++ program that dynamically allocates an array of integers to store the Fibonacci sequence. Generate the first 10 Fibonacci numbers and print them.

Your program should take in the number of Fibonacci numbers to generate and then dynamically allocated an array of that size.

See example 3 on this link - <https://www.programiz.com/cpp-programming/input-output>

## Exercise 8: Pointer to Struct

Define a struct named `Employee` with fields for `name` and `salary`. Create an array of `Employee` structs, and then use a pointer to find and print the employee with the highest salary.

You have already found the maximum in a list. Here you need to iterate (loop) over the array and keep track of the maximum salary. Your pointer should track the memory location of the struct, not the highest salary.