

## Summer 2025 Final Project Exam

A CPU (Central Processing Unit) is the primary component of a computer that performs most of the processing tasks in a computer system. CPUs can execute a wide variety of instructions, depending on their instruction set architecture (ISA) and design. Here are some basic instructions that a CPU typically supports:

1. **MOV:** Loads a value from memory into a register
2. **ADD:** Adds two values and stores the result in a register.
3. **SUB:** Subtracts one value from another and stores the result in a register.
4. **MUL:** Multiplies two values and stores the result in a register.
5. **DIV:** Divides one value by another and stores the result in a register.
6. **CMP:** Compares two values and sets flags in the register.
7. **PUSH:** Save data to the stack
8. **POP:** Remove data from the stack

You will be writing your own simple simulated programming language using a variety of classes. You must write and use a CPU class that uses the instructions above. These instructions are to be used by your other classes, not the user. Use a classes/STL's to manage memory, registers/accumulators (you may need to research what these are). Create classes for your own data types (inheritance may be useful here). Be sure to handle "language errors". You may find it useful to use namespaces, and templates as well. But you may NOT use typedef, enum, and #define in place of classes.

**You will NOT be creating an actual compiled language, in fact, you may NOT do so.** A person should be able to write a simple program using your commands from your classes. The code for which will be in your #include files.

For the Final Project I expect a fully functional program.

Functions and classes must be minimal meaning that every module, class, or function in a computer program should have responsibility over a single part of that program's functionality.

**You must include a readme.txt file** that includes a description of your project, and how you incorporated ALL of your elements into your program. Also list anything new you learned and any challenges you may have had.

**You must include an instructions.txt file** that includes all of the "syntax" of your language.

**You must be prepared to defend your project if requested to do so! If there is ANY evidence or reasonable suspicion of violating the Academic Integrity policy, you will receive a zero and possibly fail the class. You may research topics/concepts but be careful!** If you decide to use internet resources, such as Chat-GPT/AI or StackOverflow, you MUST identify in your code, via comments, which segment of code came from where AND you must understand the code itself. Additionally, ALL code from external sources may **not** exceed 30% of your own code AND must have the same identifying qualities as your code.

Additionally, you must adhere to the best practices of writing code. Please see the document in Moodle for more information.

### **Your Final Project Exam grade has many parts:**

The Progress check-in, the final project (including the required elements, best practices, appropriate level of difficulty, required .txt files), and the presentation.

Please remember that your grade on the final exam project is not based solely on whether your program works, but on how well you demonstrate your understanding of the course material. Your submission must meet the **minimum requirements** and use relevant concepts **appropriately**.

Grades will also reflect the **quality of your approach**—not just the final result. Effective use of **higher-level concepts** we have studied throughout the course (such as classes, inheritance, polymorphism, abstraction, modular design, and data structures) will elevate your grade beyond the minimum.

### **Due Dates:**

06/19 Thursday ~ Progress Check-in:

You must show me, during class, your progress in your project AND submit the cpp files to moodle.

06/26 Thursday ~ C++ Final Project is Due, uploaded to our online class on Moodle

You **MUST** upload your project **NO LATER THAN** Thursday, June 26th @ 10:00 AM – **No Exceptions!**

(The link to turn in your project will **NOT** be available after this time. I will **NOT** accept ANY late projects and I will **NOT** accept any via email).

**You will be required to attend class** (it is your final exam day) to showcase your project. Be sure that your project works in Dev-C++.