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Homework 3

C++ programming language

C++ is a compiled, statically typed general-purpose language. What does it mean? Let's start in order.

To run a program in C++, compilation of the code is required. Without this, you will not be able to execute the program. Thanks to compilation, C++ programs are efficient and optimized, both in time and in memory.

Static typing means that all objects that the programmer works with must be spelled out as language types. Otherwise, the program will not compile. This helps to catch a lot of errors even at the compilation stage.

C++ is a general purpose language. This means that it can be used for a wide range of tasks. Basically, C++ is used for high-load systems, systems requiring low latency, real-time systems, games. If you need to write a web server that will be able to withstand up to several thousand requests per second, then C++ is your choice.

C++ supports various programming paradigms. For example, C++ supports all the concepts of object-oriented programming. It also allows you to write code in an imperative and functional style. C++ is a very flexible language, it practically does not limit the programmer in the style of writing code and in the approaches used. This allows you to implement many different programs, while not losing performance.

The syntax is quite simple and is found in many languages. When declaring a variable, its type is first specified, then its name, and then its value. When declaring a function, the type of the return value is first specified, then its name and arguments. All assignment, initialization, and function call expressions must end with a semicolon.

Consider an example. Let's say we want to write a function that adds one to the passed value, that is, an increment function. To do this, first we need to write

the type of the return value. Let it be int. Then we need to write the name of the function, let's call it 'increment'. After that, we need to write the arguments of the function. Arguments start with an opening bracket. Then the type and name are specified for each argument. Arguments are separated by commas. For the increment function, it is enough for us to have one argument. We will also choose int as the type and name it as 'arg'. After specifying all the arguments, there is a closing bracket. Then the body of the function is in curly brackets. For the increment function, you need to assign the value 'arg' plus 1 to 'arg', and then return this value using the keyword 'return'.

The 'main' function acts as the entry point to the program in C++. It is called first when the program starts. The std::cin and std::cout functions are used for input and output. With the help of double angle brackets, arguments are passed that need to be output or read into. So, for the increment function, we have to write std::cout, two left angle brackets, word 'increment', the value to be incriminated in brackets and a semicolon.

```
int increment(int arg) {
  arg = arg + 1;
  return arg;
}

int main() {
  std::cout << increment(1) << '\n';
}
```

C++ is a worthy candidate as a programming language of choice for many tasks. I believe that in most cases C++ will look advantageous against the background of other programming languages.