

Programming with C and C++ Course – PROGRAM

0. Primitive data types. Variables

- Integer types
- Floating-point types
- Boolean type
- Char
- Pointers
- C style strings
- Variables. Using variables
- Literals

1. Operators. Expressions

- Arithmetic operators
- Comparison operators
- Other operators
- Implicit and explicit type conversion
- Expressions

2. Using console

- Printing to the console (cout stream)
- Reading from the console (cin stream)

3. Conditional statements

- **if** and **if-else** statements
- Nested **if** statements
- **switch-case** statement

4. Loops

- **while** loops
- **do ... while** loops
- **for** loops
- Nested loops

5. Functions

- Declaring functions
- Calling functions
- Using parameters
- Returning values

6. Pointers and Arrays

- Declaring and using pointers
- Declaring and creating arrays
- Accessing array elements
- Address arithmetic

- Inputting and outputting arrays
- Processing arrays with for loops
- Multidimensional arrays

7. Object-oriented programming – classes and objects

- Defining simple classes. Declaring fields
- Using classes
- Constructors
- Destructors
- Accessing fields
- Calling static and instance methods

8. Strings and string manipulation

- C style strings and the STL `std::string` class
- Basic operations with STL strings – comparison, concatenation, extracting substring, searching
- More operations with strings – replacing substrings, deleting substrings

9. Basic data structures

- Lists – `std::vector` class
- Stacks – `std::stack` class
- Queues – `std::queue` class
- Sets – `std::set` class
- Maps / hash tables – `std::map` class

10. Basic input/output – text files

- Streams
- Reading text files
- Writing text files
- Handling I/O errors

11. Object-oriented programming – fundamental concepts

- Inheritance
- Encapsulation and abstraction
- Cohesion and coupling
- Polymorphism

Training Duration – 45 hours