

Brooklyn College
Department of Computer and Information Science

CISC 1110 (CIS 1.5) Introduction to Programming Using C++

3 hours lecture, 2 hours lab; 4 credits

Algorithms, computers and programs. Writing, debugging, and testing programs. Loops and conditional control structures. Functions and parameter passing. Arrays, strings and simple classes. Sorting, searching and other basic algorithms. Input and output. Programming applications selected from various disciplines. History and basic concepts of computer science.

Objectives

By the end of this course, students should be able to:

1. Understand the concept of a program (i.e., a computer following a series of instructions)
2. Declare a variable with an appropriate data type (either character or numeric), initialize the variable's value, and change the value when appropriate
3. Use control structures, including a loop to repeat the execution of a series of statements and a conditional statement to select one from a series of alternatives
4. Write a function to perform a subtask and use the function as part of a larger program
5. Use an array to store multiple pieces of homogeneous data, and to use a simple class to store multiple pieces of heterogeneous data
6. Trace the execution of a program and predict the results of the execution
7. Write an algorithm for a simple task

Topics Outline

I Introductory concepts -- simple programs, declaration and assignment statements, printing using cout, for loops, simple conditional statements, data types int, char, and double, arithmetic ops, precedence rules, standard library of functions

II Reading Data -- reading using cin, interactive I/O, while loops, if-else statement, use of files for input/output

III Functions -- introduction to functions in C++, programmer-defined functions, prototypes, parameters, return types, void and parameterless functions, reference parameters

IV Additional Control Structures -- do-while loops, nested loops, nested if, logical and relational operators (optional: break, continue, and switch statements)

V Arrays -- one-dimensional arrays, using arrays with functions

VI Strings -- using the C++ string class, string manipulation using functions of the string class and programmer-defined functions

VII Sorting and Searching -- simple sorting and searching algorithms

VIII Simple Classes -- defining and using a behavior-less class (a class without member functions)

IX Base Systems -- binary, decimal, and hexadecimal systems

X Additional Computer Science Topics -- compilation and execution, parts of a computer system, history of computing, etc.

Students should expect to spend at least 10-15 hours per week preparing and running programming assignments. There will be two class exams, plus a final exam.

Textbook

- Problem Solving With C++ (authors: J. Jones and K. Harrow)
- Workbook for C++ (author: Langsam)

Detailed Syllabus

TOPIC	Hours	Chapter in text
Intro to C++ and the IDE	1/2 hour	Getting Started
Elementary data types (int, double, char) simple programs, arithmetic precedence loop constructs, cout, conditional statements	5 1/2 hours	1 and 2
Intro to the history of computing, parts of a computer system, compilation vs. execution	1 1/2 hours	
Interactive data entry, cin for input, while loops, if-else statements using files	3 1/2 hours 3 hours 2 hours	3
Top-down programming, stepwise refinement Programming style	1 hour 1 hour	4
Introduction to functions in C++ Function prototypes, parameter transmission by value, reference parameters	7 hours	5
Nested ifs, do-while, (opt: switch, break, continue statements) Logical and relational operators	4 1/2 hours	6
One-dimensional arrays	6 hours	7
Introduction to operating systems, database, programming languages, etc.	1 1/2 hours	
Strings, using library functions, programmer-defined functions	4 hours	8
Sorting and searching	4 hours	9
Decimal, binary, and hexadecimal base systems	2 hours	
Introduction to simple classes (without member functions)	3 hours	10
Class exams and review	<u>6 hours</u>	
Total	56 hours	