Introduction to Computers and Programming

* + Why Program? Computer Systems
    - Hardware
    - Software
  + Program and Programming Languages
  + What is a Program is Made of?
  + Input, provessing, and Output
  + The Programming Process
  + procedural and Object-Oriented Programming
  + What is an IDE?
  + Web resource

Introduction to C++

* + The Parts of C++ program
  + The cout Object
  + The #include Directive
  + Variables and Literals
  + Identifiers
  + Data Types
    - Integers
    - Char
    - string Class
    - bool
    - float
    - double
  + Determining the Size of data Type
  + Scope
  + Arithmetic Operators
  + Comments
  + Named Constants
  + Programming Style
  + Standard and Prestandard C++

Expressions and Interactivity

* + The cin Object
  + Mathematical Expressions
  + When You Mix Apples and Oranges
  + Overflow and Underflow
  + Type Casting
  + Multiple Assignments and Combined Assignments
  + Formatting Output
  + Working with Characters and string Objects
  + More Mathematical Library Functions
  + Hand Tracing a Program

Making Decisions

* + Relational Operators
  + The if Statement
  + The if/ else Statement
  + The if / else if /elce Statement
  + Flags
  + Logical Operators
  + Checking Numeric Ranges with Logical Operators
  + Menu
  + Validating User Input
  + Comparing Characters and Strings
  + The COnditional Operator
  + The switch Statement
  + Blocks and Scope

Loops and Files

* + The Increment and Decrement Operators
  + The while Loop
  + The for Loop
  + The do-while Loop
  + Loop Counters
  + Keeping a Running Total
  + Sentinels
  + Which Loop to use?
  + Nested Loops
  + Using Files for Data Storage
  + Breaking and Continuing a Loop

Functions

* + Modular programming
  + Defining Functions
  + Calling Functions
  + Function Prototypes
  + Function Parameters
  + Passing Data by Value
  + Passing Data by reference
  + Fnctions and Menu-Driven Programs
  + The return Statement
  + Static Local variables
  + Global Variables
  + Local Vvariables
  + Default Arguments
  + Library Functions
  + Overloading Functions
  + The exit () Function
  + Stubs and Drivers

Arrays

* + What are Arrays?
  + Single dimensional Arrays
  + Multiple dimensional arrays
  + Passing arrays as arguments
  + Array Initialization
  + Processing Array Contents
  + Parallel Arrays
  + Array index, subscript
  + returning array from a method
  + Searching Arrays
  + Sorting Arrays
  + Variable length argument list
  + Using command line arguments

Searching and Sorting

* + Search Algorithms
    - Linera Serach
    - Binary Search
  + Sort Algorithms
    - Selection Sort
    - Bubble Sort
  + Vectors

Pointers

* + Variable Address
  + Pointer Variable
  + Array and Pointer Relationship
  + Pointer arithmatic
  + Pointer Initialization
  + Comparing Pointers
  + Pointers as Function Parameters
  + Dynamic Memory Allocation
  + Returning Pointers from Functions

Characters, C-strings, and More About string Class

* + Character Testing
  + Character Case Conversion
  + C-Strings
  + Library Functions for Working with C-Strings
  + Writeing Your own C-String Functions
  + C++ string Class

Structured Data

* + Abstract Data Types (ADT)
  + Combining Data into Structures
  + Accessing Structure Members
  + Initializing a Structure
  + Arrays of Structure
  + Nested Structures
  + Structures as Function Arguments
  + Returning a Structure from a Function
  + Pointers to Structures
  + Unions
  + Enumerated Data Types
  + When to Use (.), and when to use (->) and when to use (\*)

Advanced File Operations

* + File Operations
  + File Output Formatting
  + Passing File Stream Object to Functions
  + Error Testing
  + Member Functions for Reading and Writting Files
  + Working with Multiple Files
  + Binary Files
  + Creating Records with Structures
  + Random-Access Files
  + Opening a File for Both Input and OutputWindows Forms
  + Event Handling
  + Delegates and the Event-Handling Mechanism
  + Event Information
  + Control properties and layout
  + GUI components
  + Tool Tips
  + Mouse-Event Handling

 Introduction to Classes

* + Procedural and Object-Oriented Programming
  + Introduction to Classes
  + Defining and Instance of a Class
  + Why Have Private Members
  + Class Specification and Implementation
  + Inline Member Functions
  + Constructors
  + Constructor Arguments
  + Constructor Overloading
  + Private Member Functions
  + Array of Objects
  + Abstract Data Types
  + Unified Modeling Language (UML)
  + Class Responsibilities

More About Classes

* + Instance and Static Members
  + Friends of Classes
  + Memberwise Assignment
  + Copy Constructors
  + Operator Overloading
  + Object Conversion
  + Aggregation
  + Class Collaboration

Inheritance, Polymorphism, and Virtual Functions

* + What Is Inhertitance?
  + Protected Members and Class Access
  + Constructors and Destructors in Base and Drived Classes
  + Class Hierarchies
  + Polymorphism and Virtual Members Functions
  + Multiple Inheritance