Module 40: Programming C++

Closing Comments

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Module Objectives

- Review C++ Course
- Information for Examination
- What next?

Module Outline

- Course Summary
- Key Take-back
- Prepare for Examination
- Road Forward

What we covered

- **Programming in C++ is Fun**: Build and execute a C programs in C++, Write equivalent programs in C++
- **C++ as Better C**: Procedural Extensions of C
- **Object-Oriented Programming in C++**: Classes, Encapsulation, Overloading, friend, static, and namespace
- **Inheritance**: Generalization / Specialization of Object Modeling in C++
- **Polymorphism**: Static and Dynamic Binding, Virtual Function Table, Multiple Inheritance
- **Type Casting**: Cast Operators
- **Exceptions**: Error Handling in C & C++
- **Templates**: Generic Programming in C++

What we did not cover?

- **Functors**: Function Objects
- **STL**: Standard Template Library of C++
- **Resource Management**: Smart Pointers, Memory Handling
- **C++ Coding Styles**: How to write good code?
- **Design Patterns**: Reusable Designs
- **Mixing C and C++**: Smart Pointers, Memory Handling
- **Source Code Management**: How to organize files, libraries?
- **C++ Tools**: Analysis, Version Control etc.
- ...

What have we learnt?

- C++ is multi-paradigm
  - Procedural: Better C
  - Object-Oriented: Encapsulation, Inheritance, and Polymorphism
  - Generic: Templates
- Reuse is Key
  - Macros
  - Library functions
  - Function Overloading (Static Polymorphism)
  - Inheritance & Dynamic Polymorphism
  - Templates & STL
  - Design Patterns
- Designing good data types is a key for good programming in C++
- While programming in C++, we should keep an eye on:
  - Efficiency
  - Safety
  - Clarity

Do not write C-style programs using C++ compiler

Prepare for Examination

- Watch the Videos
- Revise the Assignments and Solutions
- Practice lots and lots of coding with every feature
- Design and implement complete data types – Complex, Fraction, Vector, Matrix, Polynomial etc.
- Study Books, try examples
  - The C++ Programming Language by Bjarne Stroustrup
  - Effective C++ & More Effective C++ by Scott Meyers

Road Forward

- Learn the topics not covered
- Breathe programming – regularly code and implement systems
- Read lots and lots of programs by good coders
- Learn Python / Java
- Study **Object Oriented Analysis and Design**
- Study **Unified Modeling Language**
- Study **Software Engineering**
- Study Books
  - The C++ Programming Language by Bjarne Stroustrup
  - Effective C++ & More Effective C++ by Scott Meyers
  - Exceptional C++ & More Exceptional C++ by Herb Sutter
  - Modern C++ Design by Andrei Alexandrescu
  - Design Patterns: Elements of Reusable Object-Oriented Software by Erich Gamma, Richard Helm, Ralph Johnson, & John Vlissides
  - Learning UML 2.0 – A Pragmatic Introduction to UML by Russ Miles & Kim Hamilton (O'Reilly)

Module Summary

- Course on C++ concluded

Instructor and TAs

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