

CS 311: OBJECT ORIENTED PROGRAMMING AND DESIGN (3-0-2: 4)

Introduction

Introduction to object oriented programming, user defined types, structures, unions, polymorphism, encapsulation; getting started with C++ syntax, data types, variables, strings, functions, default values in functions, recursion, namespaces, operators, flow control, arrays and pointers.

Abstraction mechanism

Classes, private, public, data members, member functions, inline function, friend functions, static members, and references, constructors, destructors.

Inheritance

Class hierarchy, derived classes, single inheritance, multiple, multilevel, hybrid inheritance, role of virtual base class, constructor and destructor execution, base initialization using derived class constructors.

Polymorphism

Binding, Static binding, Dynamic binding, Static polymorphism: Function Overloading, Ambiguity in function overloading, Dynamic polymorphism: Base class pointer, object slicing, late binding, method overriding with virtual functions, pure virtual functions, abstract classes.

Operator Overloading

This pointer, applications of this pointer, Operator function, member and non-member operator function, operator overloading, I/O operators.

Exception handling

Try, throw and catch, exceptions and derived classes, function exception declaration, unexpected exceptions, exception when handling exceptions, resource capture and release.

Memory management

Dynamic memory management, new and delete operators, object copying, copy constructor, assignment operator, virtual destructor.

Templates

template classes, template functions.

Standard Template Library

Fundamental idea about string, iterators, hashes, iostreams and other types.

Namespaces

User defined namespaces, namespaces provided by library.

Files: Working with files.

Object Oriented Design: design and programming, role of classes.

Suggested list of Experiments:

- 01) Programs on concept of classes and objects
- 02) Programs using inheritance.
- 03) Programs using static polymorphism
- 04) Programs on dynamic polymorphism
- 05) Programs on operator overloading.
- 06) Programs on dynamic memory management using new, delete operators.
- 07) Programs on copy constructor and usage of assignment operator.
- 08) Programs on exception handling.
- 09) Programs on generic programming using template function and template class.
- 10) Programs on file handling.

Text Books

1. E. Balagurusamy, "Object Oriented Programming with C++", TMH
2. Ashoke N. Kamthane, "ANSI and Turbo C++", Pearson Education

References

1. Big C++ - Wiley India
2. C++: The Complete Reference-Schildt, McGraw-Hill Education (India)
3. Jana, "C++ and Object Oriented Programming", PHI Learning.
4. Rajiv Sahay, "Object Oriented Programming with C++ ", Oxford
5. Mastering C++ - Venugopal, McGraw-Hill Education (India)