CPT106

C++ Programming and Software Engineering II

Lecture 13 Review

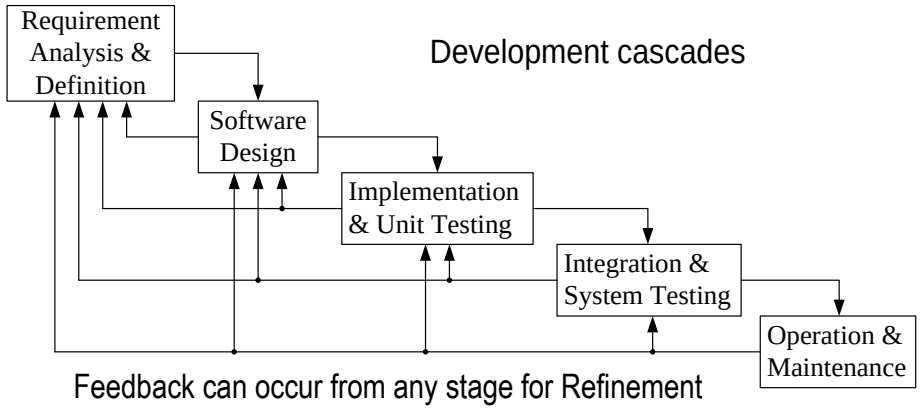
Dr. Xiaohui Zhu

Xiaohui.zhu@xjtlu.edu.cn

Office: SD535

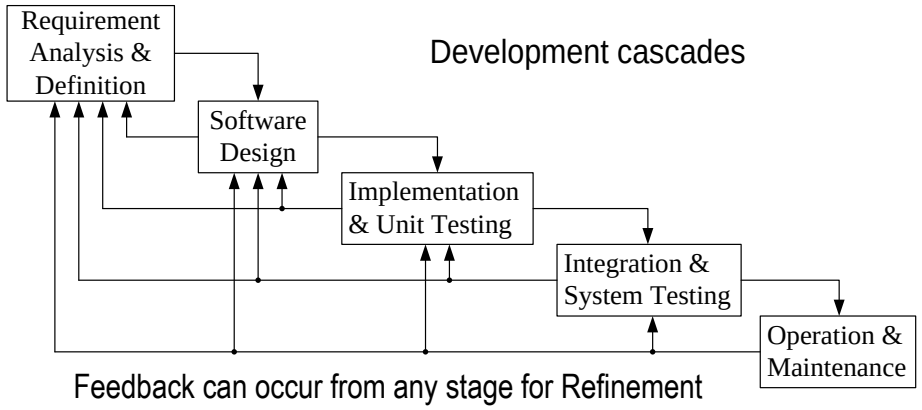
Week 1- Introduction

- Software engineering
  - Software, software engineering
- Principles for software design(abstraction, modularity, information hiding)
- Software lifecycle (waterfall model)



Week 1- Introduction

- Software engineering
  - Software, software engineering
- Principles for software design(abstraction, modularity, information hiding)
- Software lifecycle (waterfall model)



Week 1- Introduction

- Coupling and cohesion:
  - Less coupling between modules (week coupling)
  - More cohesion within a module (strong cohesion)
- Typical structure of C++ source code.

Week 2- From C to C++

- Variable and constant
  - Rules for variable name
  - Defined literals (#define) and declared literals (const)
- Datatype in C++.
  - Built-in type, derived type and user-defined type
- Variable declaration and initialization
  - array, string
  - reference and pointer
  - enum, struct, class

Week 2- From C to C++

- Basic input and output, operators(++,--)
  - cin, cout, getline(cin, str)
- Logical structures
  - If, for, while, do while
- Visual studio 2019

Week 3- Class and Objects

- Object and class
- Class definition
  - Public, private, protected
  - Class declaration in header file
  - Constructor and destructor
  - Object declaration and initialisation

Week 4- Class and Objects 2

- Default constructor, multiple constructors, copy constructor
- Reference
  - int i=5; int &k=i;
- Class composition, constructors, destructor
- Const objects and methods
- Class diagram

Week 5- Functions

- Types of functions
- Function parameters and arguments
- Information exchanging
  - Pass by value
  - Pass by pointer
  - Pass by reference
- Function overloading
- Operator overloading
- Function default argument

Week 6- Array and Pointers

- Array, multidimensional array
  - Declaration and initialization
- Pointers
  - Pointers pointing to arrays, objects or sturctures
  - This pointer
- Vector
  - Declaration, initialization, front(), back(),size(), push_back(), pop_back(),
- Dynamic memory allocation (new, delete)

Week 8- Friendship and Inheritance

- Friend functions and class
  - Friend function and operator overloading
  - Friend class
- Inheritance
  - Base class
  - Sub-class
  - Inheritance specifiers (private, protected, public)
- Difference of class composition and inheritance
- Class hierarchy chart

Week 9- Polymorphism

- Pointers to objects and derived objects
  - Friend function and operator overloading
  - Friend class
- Polymorphism
  - Overlapping methods (not overloading)
  - Static binding and dynamic binding
  - Virtual methods
  - Pure virtual method
  - Virtual destructor

Week 10- File Operation

- Class for stream operations
  - ifstream
  - ofstream
  - Fstream
  - Absolute path, relative path
  - The end of file: eof()
  - File modes: ios::in ios::out ios::app ios:ate ios::trunc ::ios::binary
  - Input and output operations: << , >>, put(), get(), getline()
  - file pointers: seekg(), seekp(), tellg(), tellp();

Week 11- Exception

- Exception handling
  - Try, catch throw
  - Exception classes
  - User-defined exception class
  - What()