0. Introduction

Slides: [02 Presentation of the course](#)

Key concepts

We are moving from Object Oriented Model to Component Oriented Model. That allows the reuse of code and to structure a complex application into pieces.

Frameworks

With frameworks we have the Inversion of control: the program flow of control is dictated by the framework instead of by the caller. The framework provide a default behaviour, the programmer just have to override functions and handle events.

- Software framework: collection of common code providing generic functionality that can be overridden or specialized.
- Application framework: software framework used to implement the standard application structure for a specific environment.

Examples of frameworks:

- .NET
- Android SDK
- Spring (Java)
- Cocoa (Apple's native OO API for MacOS that includes the Objective-C runtime.
- IDEs
- MFC: Microsoft Foundation Class Library (C++ GUI)
- Gnome (Linux GUI library in C)

Design Patterns

FM Factory Method								**A** Adapter
PT Prototype	**S** Singleton	the holy behaviors				**CR** Chain of Responsibility	**CP** Composite	**D** Decorator
AF Abstract Factory	**TM** Template Method	**CD** Command	**MD** Mediator	**O** Observer	**IN** Interpreter	**PX** Proxy	**FA** Façade
BU Builder	**SR** Strategy	**MM** Memento	**ST** State	**IT** Iterator	**V** Visitor	**FL** Flyweight	**BR** Bridge

Course objectives

- Programming language technology
    - Executions models
    - Runtime
- Virtual Execution Environment
    - Memory Management
    - Thread Management
    - Exception Handling
    - Security
    - Debugging Support
    - AOT and JIT Compilation
    - Dynamic Link/Load
    - Reflection
    - Verification
- Programming metaphors
    - Objects
    - Components
    - Patterns
- Advanced Programming Techniques
    - Generic Programming: Java Generics, C++ templates, C# Generics, Scala generics
    - Lambda Calculus and Functional Programming: Haskell, Type classes and Monads, Metaprogramming
    - Functional Programming: Lambdas and Stream API in Java 8
    - Scripting languages: Python