

Reactive Programming – From OOP to FRP

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About the Presenter

- Co-Author of Books, “.NET Design Patterns” and “C++ Reactive Programming” (writing) for Packt Publishing
- Has Written a university level accredited paper on “Ontology”
- Has created a course on “Philosophical Tools for Software Engineering” (Presented @ Rubyconf India – Preconference)
- Presented in more than 200 events
- “Father” of SLANG Compiler Infrastructure
 - Slang4.net, Slang4Jvm, Slang4CPP (LLVM), SlangJs,
 - Slang4Py, Slang4VB.net
- A budding expert on comparative philosophy (Indian/Western)
- A Critique of Digital Solutioning and Technology Fads
- Sr. Solutions Architect @ UST Global

Who is an Architect?

Architect (n) – Any person who has “fooled” around in the Software Industry for sizeable time (ever shrinking span) who is past his prime, as a Programmer Or Engineer, Systematically moved up in the hierarchy to obey “Peter Principle”.

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Perils of “Polyglot Programming”



Hackathons – Is Programming a Combat sport?



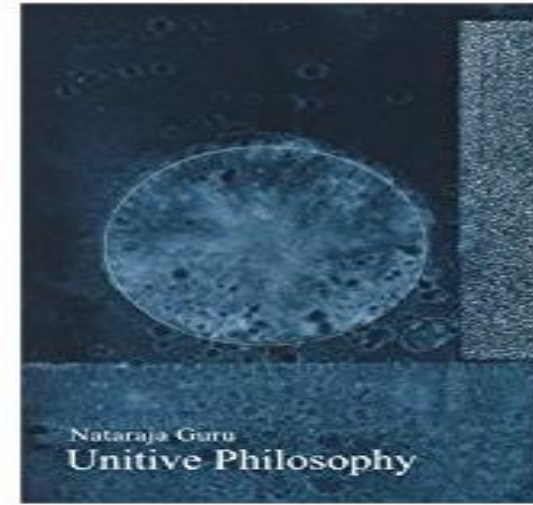
A Travel and Its aftermath



सत् चित् आनन्द

Sat - Chit - Anand

Truth - Consciousness - Bliss



***Existence-Essence-Bliss
Ontology-Epistemology
- Axiology***

Why this session?

SAT	CHIT	ANANDA
Existence	Essence	Bliss
Ontology	Epistemology	Axiology
Who am I?	What Can I know?	What should I do?
Matter	Mind	Bliss
Structure	Behavior	Function

Three Pillars of any System

- Structure, Behavior and Function are three pillars of the system
- How these things appear in Economics?
- How these things appear in Cognitive Psychology?
- How these things appear in Computer Programming?

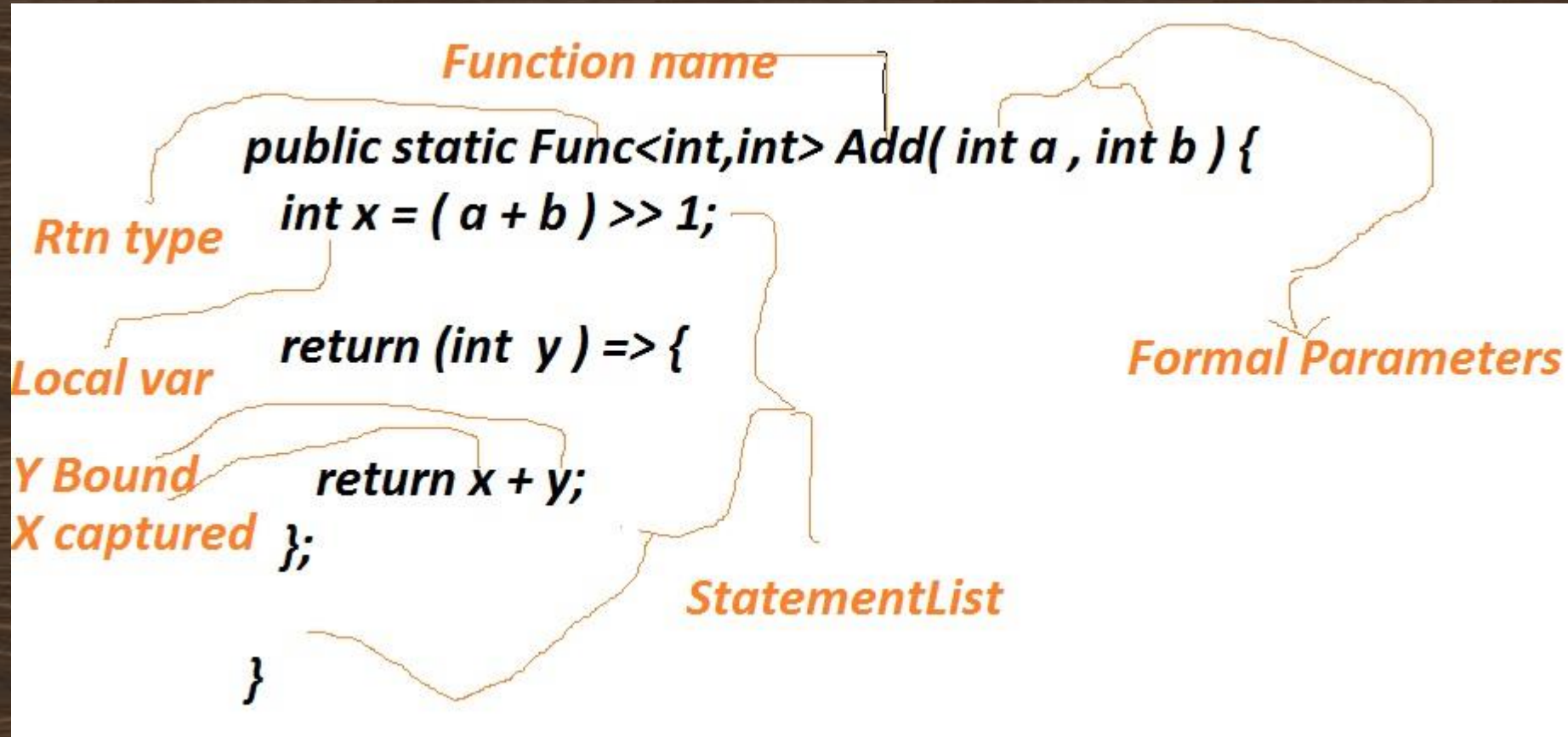
OOP – A quick introduction

- A class has got a structure (instance variable) and behaviors (methods) to provide some functionality
- For large programs , Structure and Behavior needs to be separated for SOC

OOP – Core Concepts

- Abstraction, Encapsulation , Polymorphism, Inheritance
- Interface and abstract classes
- Factory Method, Template method , Prototype, Abstract Factory, Chain of Responsibility

FP – Prologue



FP – A quick introduction

- LISP is one of the oldest functional programming language
- ML is the first typed functional programming language
- The Lambda Calculus and FP
- C# - an Object/Functional Programming language

FP – Core Concepts

- FP is Programming with Pure Functions
- Immutability , Side effects, Composition, Map/Reduce, Behavioral Parametrization , Variable Capture, Referential Transparency, Currying etc

Comparitive Study of Programming Languages



In India, it is like this, I do
not know how it is in
Punjab?
- Punjabi House

OOP – What is the Essence?

- Which is the canonical structure of a OOP program?

The Answer

- Hierarchical Structures
- They are modelled using Gang of Four Composite Pattern
- The Composite models Part/Whole Hierarchy
- The Composite/Visitor duo

Patterns are Golden Hammers – at least for some



The Composite/Visitor Pair from OOP

- The Hierarchies are modelled using Composites (Structural)
- Processing Composites through Visitor (Behavior)
- Evaluation of Expression using AST (Structural) and Visitor
- Directory Traversal and Processing using Composite/Visitor
- Problems with the Composite/Visitor

The Problem with Composite/Visitor and its Rectification

- The Visitor needs to understand the structure of the Composites
- Is there any Pattern which helps us to navigate the content in a Structure agnostic manner?
- Flattening the Composite and navigation of the data using Iterator pattern
- Demerits of Iterator Pattern

Reversing the Gaze through Observable/Observer

- The Fire/Forget solution to the Blocking problem
- Notification to people who have subscribed
- Threads, Pools and Asynchrony management
- Scheduling Execution

In Short, the Reactive Programming model is

- Modelling Hierarchical Structures using the Composite
- Behavioral processing using the Visitor Pattern
- Flattening the Hierarchy and navigating them through Iterator
- Notification to the subscribers using Observable/Observer pattern
- Functional Composition and Immutability
- Schedulers and Asynchrony

Who is more important?



Aaj mere paas building(C++) hai,
property(C#) hai ,
bank balance (Java) hai,
bungla(Python) hai,gaadi hai(PHP)
Kya hai, Kya hai tumhare paas?

....Mere Paas Maa (JavaScript) hai

Rx.Net

- Example One
- Example Two
- Example Three
- Example Four
- Example Five
- Example Six

Q&A

- If any!