# Object Oriented Analysis and Design with Java

**Prof . Vinay Joshi**

Department of Computer Science and Engineering

# Object Oriented Analysis and Design with Java

## Overview

**Prof . Vinay Joshi**

Department of Computer Science and  Engineering

**What we Know?**

## Traditional SDLC

- We have seen in Software Engineering course, the design step falls between understanding your requirements and building the product.

## Structured Systems Analysis & Design( SSAD)

Structured Systems Analysis & Design (SSAD) is a framework of activities and tasks that need to be accomplished to develop an information system. This approach is also known as top-down design, modular programming, and stepwise refinement.

## What will we study?

### What is OOAD?

One approach to help make the design process easier is the object-oriented(OO) approach. This allows for the description of **concepts** in the problem and solution spaces as **objects.**

### What is Object Oriented Approach?

- In software development lifecycle we can apply and implement OO concepts by following three steps.

*OO Analysis --> OO Design --> OO implementation by using OO languages(Java )*

## Software Crisis

- ❑ Developments in software technology continue to be dynamic.
- ❑ New tools and techniques are announced in quick succession.
- ❑ This has forced the software engineers and industry to continuously look for new approaches to software design and development.
- ❑ These rapid advances appear to have created a situation of crisis within  the industry

**The following issues need to be addressed to face the crisis:**

- ▪ How to represent real-life entities of problems in system design?
- ▪ How to design system with open interfaces?
- ▪ How to improve the quality of software?
- ▪ How to ensure reusability and extensibility of modules?
- ▪ How to develop modules that are tolerant of any changes in future?
- ▪ How to improve software productivity and decrease software cost?

## Software Evolution concepts: Programming Knowledge

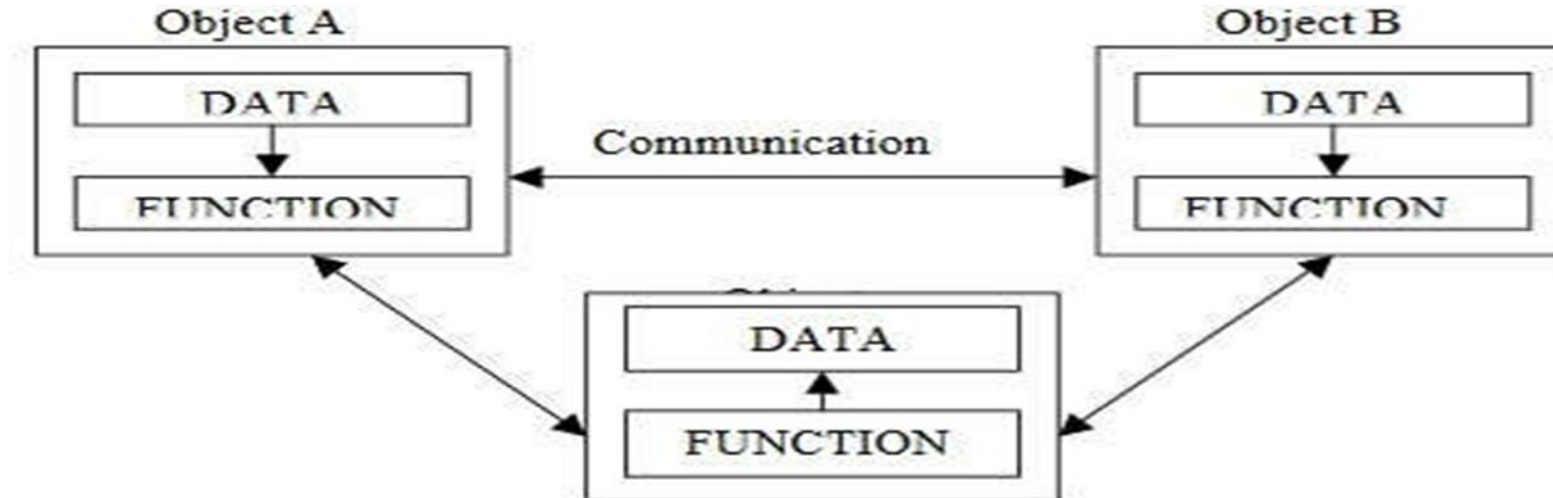# Object Oriented Analysis and Design with Java
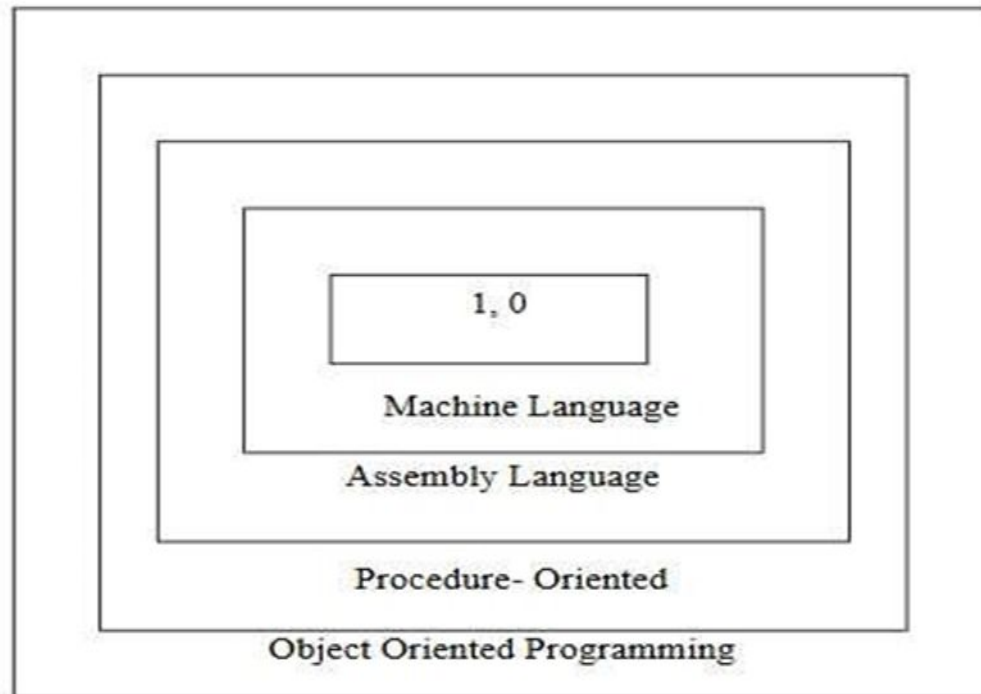
## Procedure-oriented programming

❏ Conventional programming, using high level languages such as COBOL, FORTRAN and C, is commonly known as procedure- oriented programming (POP) .

❏ In the procedure-oriented approach, the problem is viewed as a sequence of things to be done such as reading, calculating and printing. A number of functions are written to accomplish these tasks .

❏ The primary focus is on **functions** :
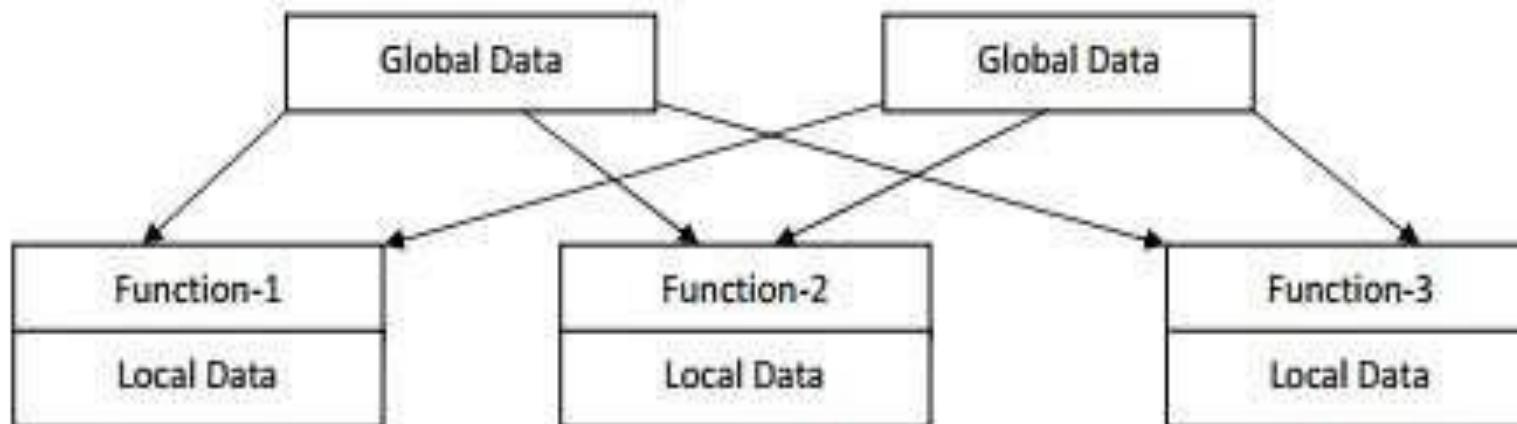
## Object-oriented Programming

❏ Emphasis is on data rather than procedure.
❏ Programs are divided into what are known as objects.
❏ Data may be hidden and may not be accessed by external functions.
❏ Objects may communicate with each other through functions.
❏ New data and functions can be easily added whenever necessary.
❏ Follows bottom-up approach in program design

# Object Oriented Analysis and Design with Java

## Object-based Programming

| Object-oriented Programming Language | Object-based Programming Language |
|---|---|
| All the characteristics and features of object-oriented programming are supported. | All characteristics and features of object-oriented programming, such as **inheritance and polymorphism** are not supported. |
| These types of programming languages don't have a built-in object. Example: C++. | These types of programming languages **have built-in objects**. Example: JavaScript has a window object. |
| Java is an example of object-oriented programing language which supports creating and inheriting (which is reusing of code) one class from another. | VB is another example of object-based language as you can create and use classes and objects, but inheriting classes is not supported. |

# Syllabus

**Unit 2: Object Oriented Analysis and Static Models and Diagrams**

**Unit 1: Introduction to Object Oriented Programming**

**Unit 3: Architecture design and principles, OO Design Principles**

**Unit 4: OO Design Patterns with Sample implementation in Java**

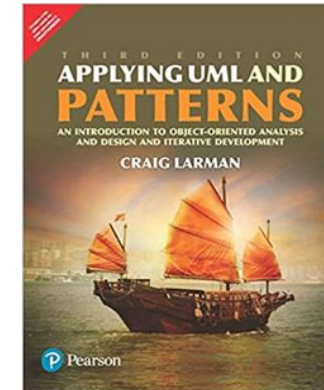**Unit 5: OO Design Patterns with Sample implementation in Java & Anti-Patterns**

## Text  and Reference Books



**T1:**"Java the Complete Reference", Herbert Schildt ,McGraw-Hill ,11th Edition, 2018.

**T2:** "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", by Craig Larman, 3rd Edition, Pearson 2015.



References:
1: "Object-Oriented Modelling and Design with UML", Michael R Blaha and James R Rumbaugh, 2nd Edition, Pearson 2007.
2: "Design Patterns: Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides, 1st Edition, Pearson 2015.

# Evaluation Policy

| Evaluation Component | | Marks |
|---|---|---|
| ISA | ISAs – CBT | 30 |
| | Lab Assignment (10 Nos.) | 10 |
| | Hands on Assignment on MVC Framework using Spring | 2 |
| | Mini Project | 8 |
| | **Total** | **50** |
| **ESA** | **Pen and Paper Mode (100 marks)** | **50** |

# THANK YOU

**Vinay Joshi**

Department of Computer Science and Engineering

**vinayj@pes.edu**