MUST

Wisdom & Virtue

MIRPUR UNIVERSITY OF SCIENCE AND TECHNOLOGY (MUST)

DEPARTMENT OF SOFTWARE ENGINEERING

Object Oriented Programming

Lecture 2: Introduction to Object Oriented Modeling

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Last Lecture

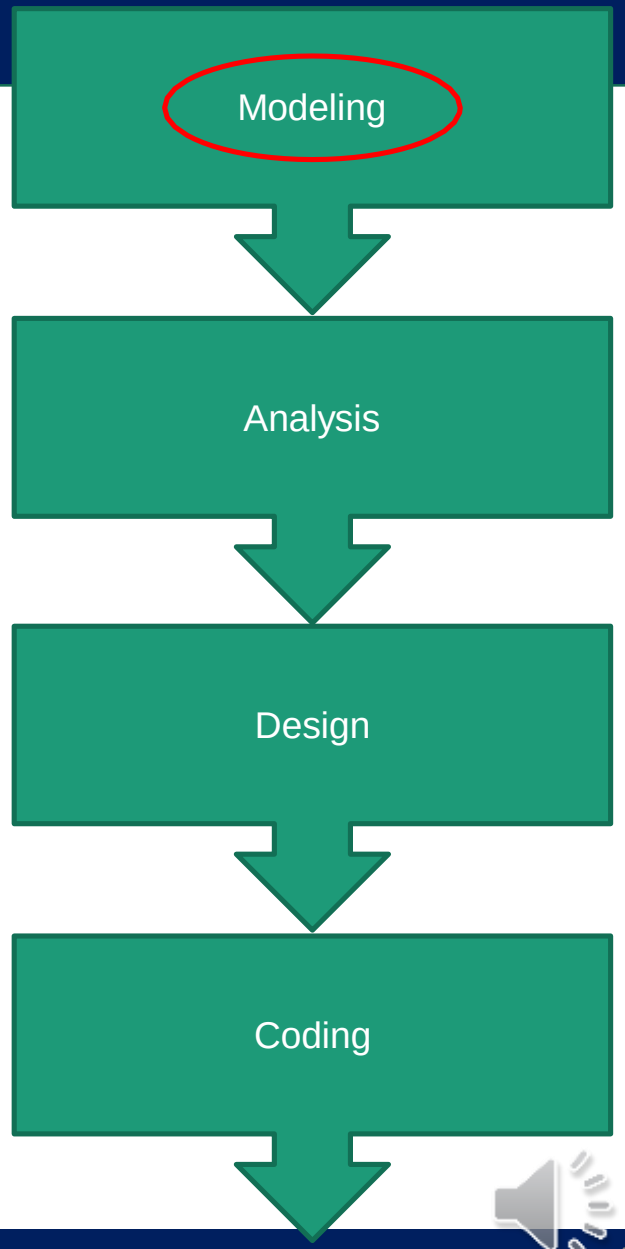
- **Object Oriented Programming Misconceptions**
- **Problems with Procedural Paradigm**

This Lecture

- **Introduction to Object Oriented Modeling**
- **What is a Model?**
- **Object-Orientation - Advantages**

What is Object Orientation

- ***A technique for System Modeling***
- ***Object Oriented Model Consists of several interacting Objects***



What is a Model?

A model is an abstraction of something real or conceptual.

We need models to understand an aspect of reality.

Model Examples

- Highway maps
- Architectural models
- Mechanical models

Model Examples

In the context of programming models are used to understand the problem before starting developing it.

We make Object Oriented models showing several interacting objects to understand a system given to us for implementation.

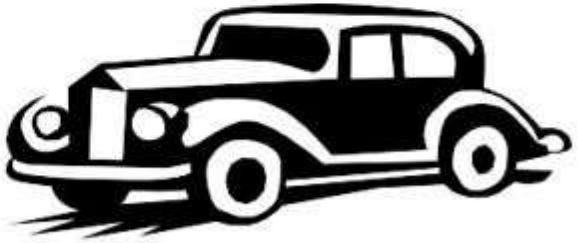
Example 1 (Real World)

- Ali Lives in a house
- Ali Drives a car.

A Person

A House

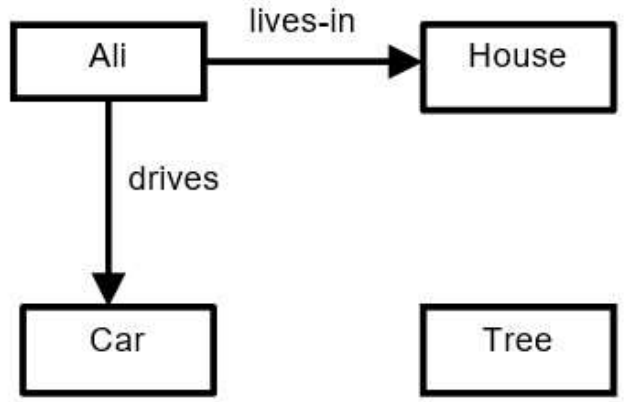
A Tree



A Car

Different Objects

Example 1– Object Oriented Model

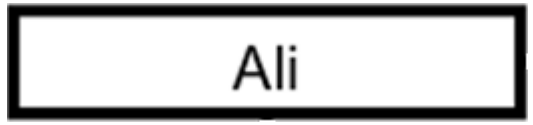


Objects
Ali, Car, House, Tree

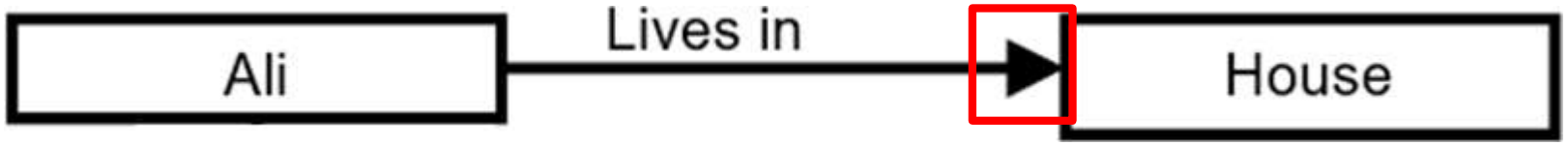
Interactions
Ali lives in the house
Ali drives the car

Object Oriented Model

- Each object is shown with a rectangle/box

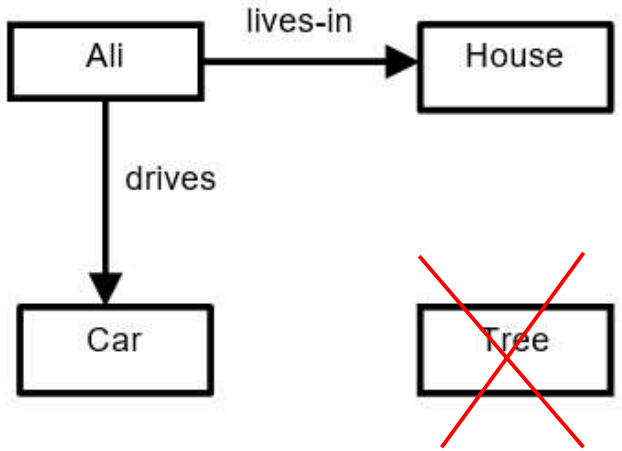


- Interaction between objects is shown with line



- The direction of Line (arrowhead) shows the behavior of interaction

Example 1– Object Oriented Model



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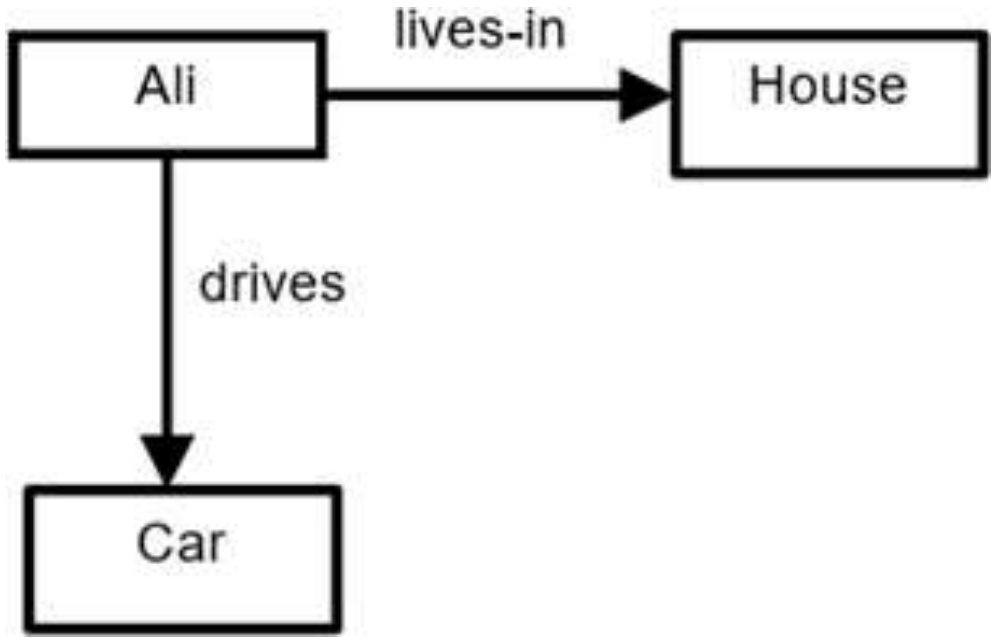
Example 1– Object Oriented Model

- Ali Lives in a house
- Ali Drives a car.



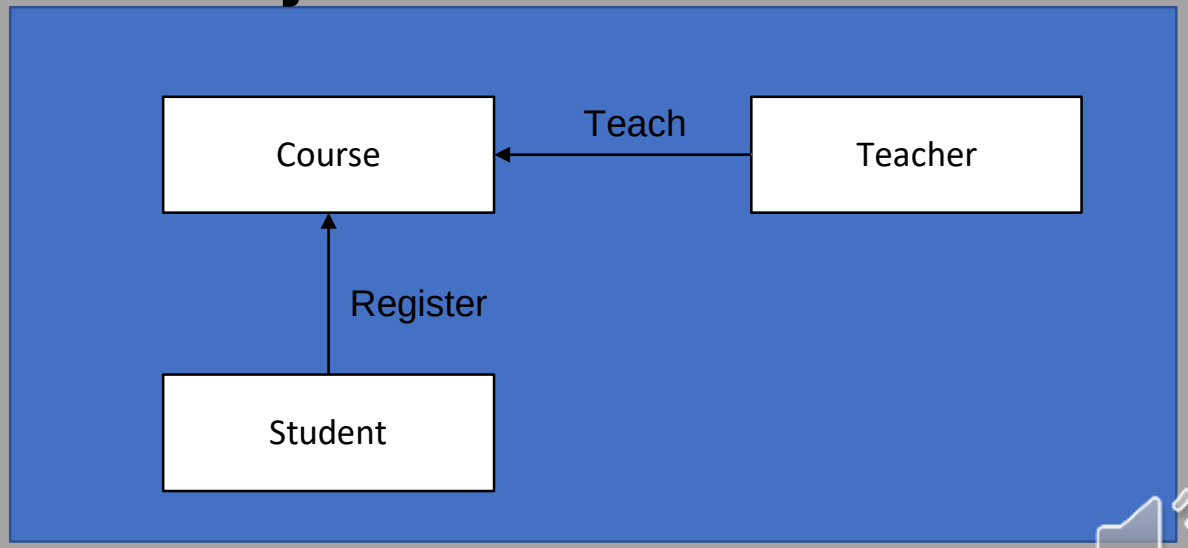
Example 2 (Software Domain)

Problem Statement

- A student can register multiple course
- Teacher can teach more than one course

Objects	Interaction
1. Student 2. Course 3. Teacher	• A student can register multiple courses • Teacher can teach more than one course

Object Oriented Model



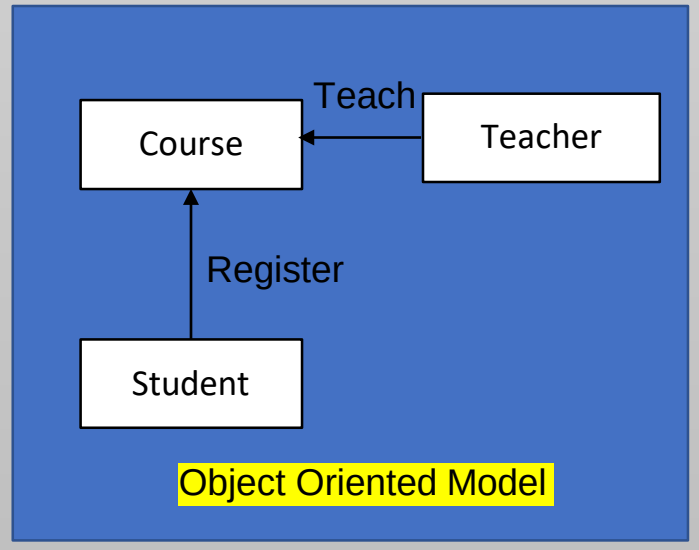
Object-Oriented Programming (OOP) vs. Procedural Programming:

Procedural Paradigm: Code is written in functions and executed sequentially. We call these functions in the main program. (Example: C language)

Object-Oriented Paradigm: Code is organized into **objects and classes**, representing real-world entities. Instead of just writing functions, we create **objects** that interact with each other. (Example:

Object Oriented Paradigm VS Procedural Paradigm

Object Oriented Paradigm




```
Class Course
{
Course Title;
RegisterCourse()
}
Class Teacher
{
Teacher Name;
Teach()
}
Class Student
{
Student Name;
Study();
}
```

Object Oriented Code

Procedural Paradigm

```
Main()
{
…….
……
}

Teach()
{
…
}
Register()
{
…..
}
.
.
.
```

Object-Orientation - Advantages

As Object Oriented Models map directly to reality

We can easily **develop** an object oriented model for a problem.

Everyone can easily **understand** an object oriented model.

We can easily implement an object oriented model for a problem using any object oriented language like **C++\C#** using its features like classes, inheritance, virtual functions and so on…

References

- Object Oriented Programming in C++ Robert Lafore, Chapter 1.
- Object Oriented Programing , Virtual University , Lecture 1, Online Available at: https://ocw.vu.edu.pk/CourseDetails.aspx?cat=Computer+Science%2FInformation+Technology+&course=CS304

THANKS