

# Object-Oriented Programming (OOP)



# Object-Orientation (OO)



# What is Object-Orientation?

- ▶ **A technique for system modeling**
- ▶ **OO model consists of several interacting objects**



# What is a Model?

- ▶ **A model is an abstraction of something**
- ▶ **Purpose is to understand the product before developing it**



# Examples – Model

- ▶ **Highway maps**
- ▶ **Architectural models**
- ▶ **Mechanical models**



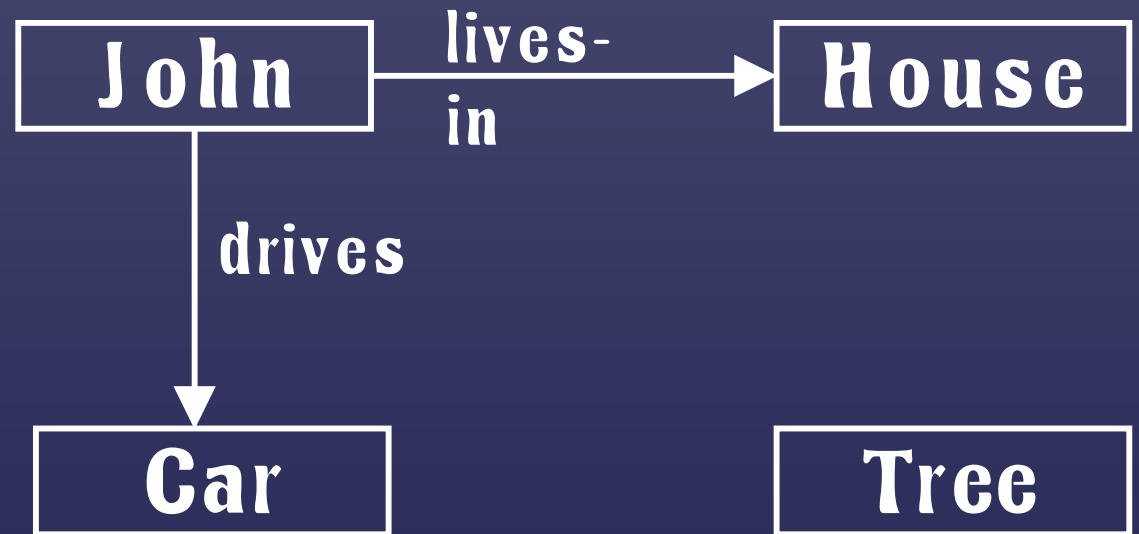
# Example – OO Model



# ...Example – OO Model

## ► Objects

- John
- House
- Car
- Tree



## ► Interactions

- Ali lives in the house
- Ali drives the car

# Object-Orientation - Advantages

- ▶ **People think in terms of objects**
- ▶ **OO models map to reality**
- ▶ **Therefore, OO models are**
  - **easy to develop**
  - **easy to understand**





# What is an Object?

**An object is**

- ▶ **Something tangible (John, Car)**
- ▶ **Something that can be apprehended intellectually (Time, Date)**



# ... What is an Object?

**An object has**

- ▶ **State (attributes)**
- ▶ **Well-defined behaviour (operations)**
- ▶ **Unique identity**



# Example – John is a Tangible Object

- ▶ **State (attributes)**
  - **Name**
  - **Age**
- ▶ **behaviour (operations)**
  - **Walks**
  - **Eats**
- ▶ **Identity**
  - **His name**



# Example – Car is a Tangible Object

- ▶ **State (attributes)**
  - Color
  - Model
- ▶ **behaviour (operations)**
  - Accelerate    - Start Car
  - Change Gear
- ▶ **Identity**
  - Its registration number



# **Example – Time is an Object Apprehended Intellectually**

- ▶ **State (attributes)**
  - **Hours**      - **Seconds**
  - **Minutes**
- ▶ **behaviour (operations)**
  - **Set Hours**   - **Set Seconds**
  - **Set Minutes**
- ▶ **Identity**
  - **Would have a unique ID in the model**



# Example – Date is an Object Apprehended Intellectually

- ▶ **State (attributes)**
  - Year      - Day
  - Month
- ▶ **behaviour (operations)**
  - Set Year   - Set Day
  - Set Month
- ▶ **Identity**
  - Would have a unique ID in the model

