

CSE 452: Programming Languages

Data Abstraction and Object-Orientation



Previous Lecture

- ◆ Abstraction

Abstraction is the elimination of the irrelevant and the amplification of the essential – Robert C Martin

- ◆ Example: Car

- To the driver, the car is a steering wheel, gas pedal, brake, and either an automatic or manual transmission.
- Everything else is largely irrelevant to the driver of a car

- ◆ Abstraction in Programming Languages

- Process Abstraction => Subprograms
- Data Abstraction => Abstract Data Types



From ADTs to OOP

- ◆ Encapsulation
 - Grouping of data and operations of logically related types
 - E.g., Stack data structure
 - ◆ Data: list of elements, index to the top element of the list
 - ◆ Operations: create, push, pop, top, isEmpty
- ◆ Abstract Data Types (ADTs)
 - Encapsulation + Information Hiding (using access control)
- ◆ Object-Oriented Programming (OOP)
 - Motivation
 - Inheritance
 - Dynamic Binding of Method Calls (Polymorphism)