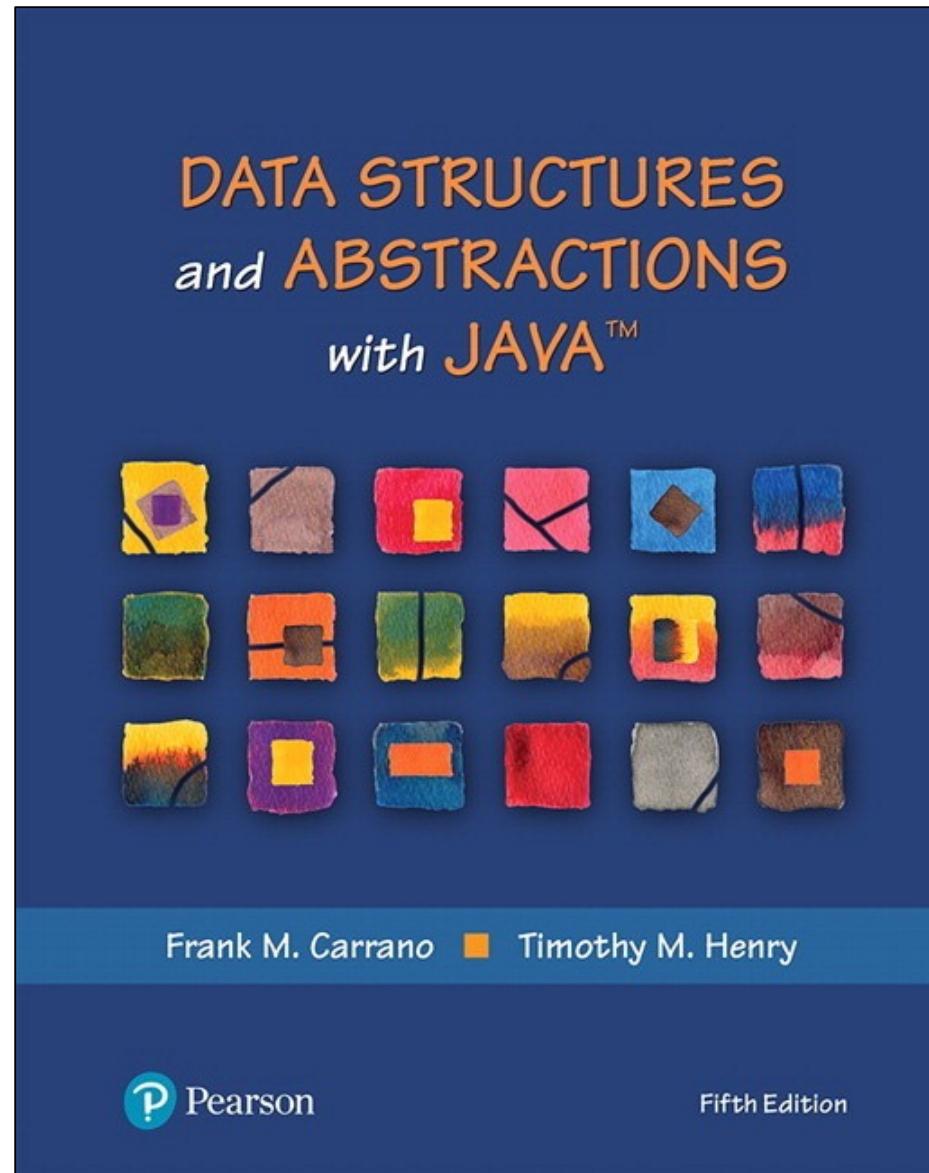
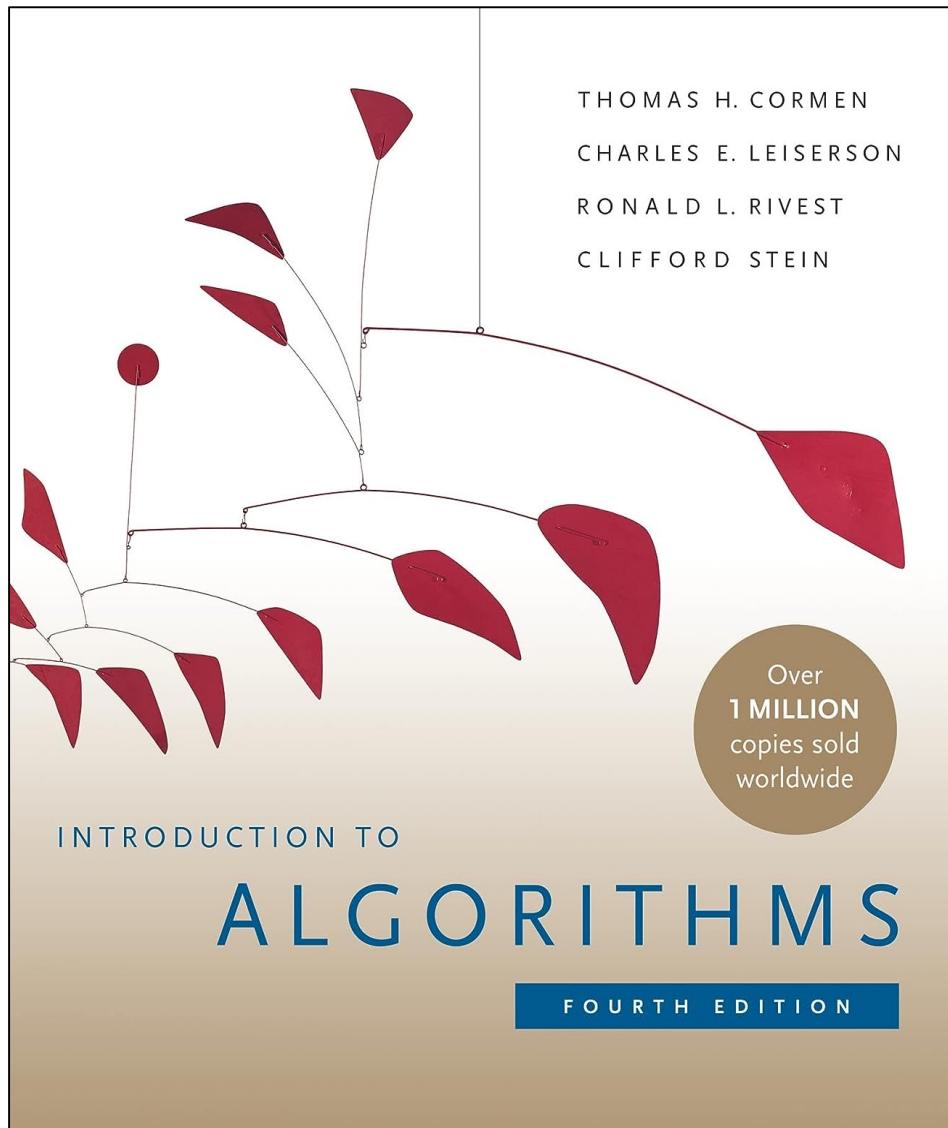


# Textbook



# Supplementary Materials





Northeastern  
University

# Lecture 1: Introduction and Java Review - 1

Prof. Chen-Hsiang (Jones) Yu, Ph.D.  
College of Engineering

Materials are edited by Prof. Jones Yu from

Data Structures and Abstractions with Java, 5<sup>th</sup> edition. By Frank M. Carrano and Timothy M. Henry.  
ISBN-13 978-0-13-483169-5 © 2019 Pearson Education, Inc.

# Outline

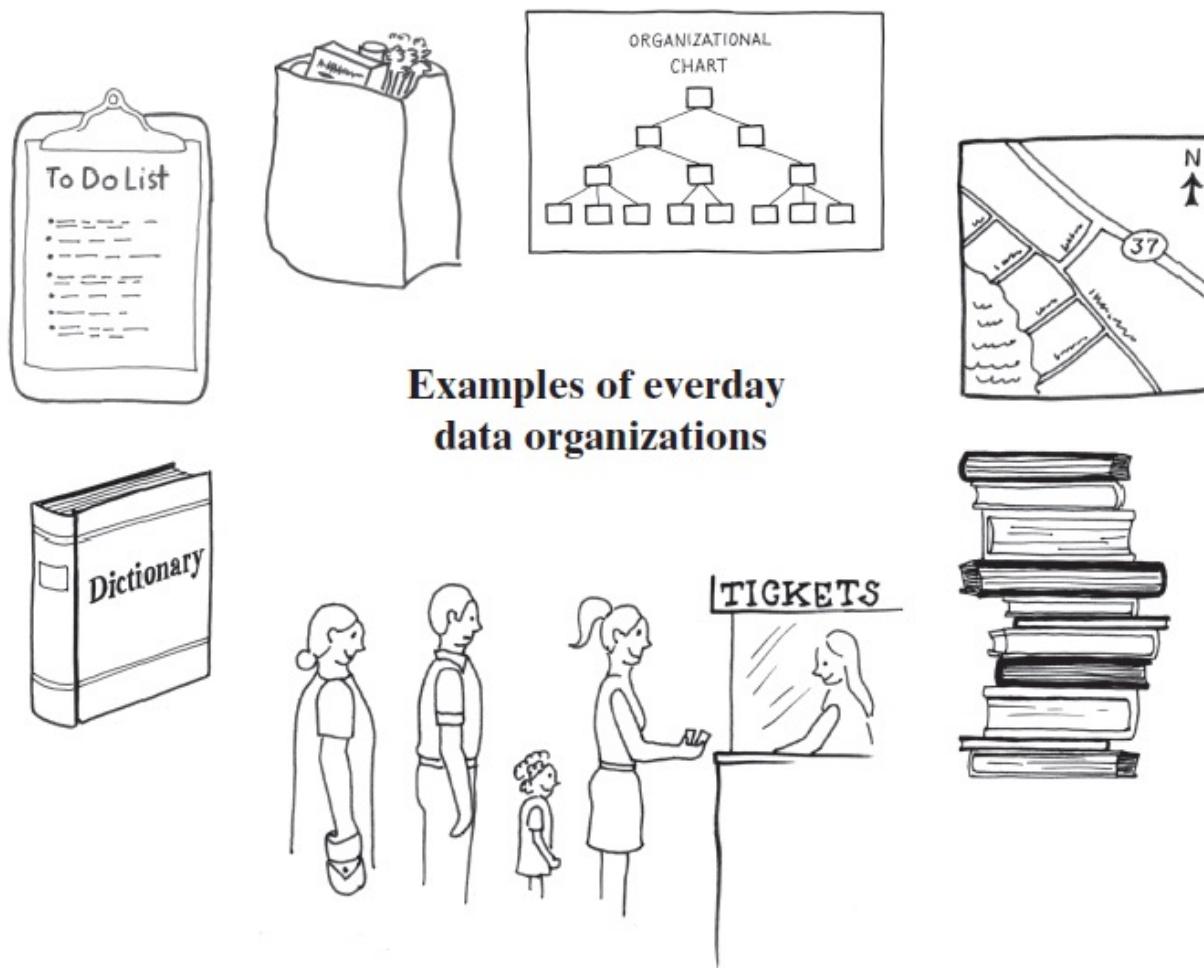
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- Introduction
- Java Review - 1

# Introduction

# Data Organization

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# Data Organization in Life

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- Standing in a line
- Stack of books
- To-Do list
- Dictionary
- Folders, directories on your computer
- Road map

# Computer Data Organization

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- Abstract Data Type (ADT)
  - » A specification that describes a data set and the operations on that data
  - » Does not indicate how to store the data or how to implement the operations
  - » Independent of any programming language
- Data Structure
  - » An implementation of an ADT within a programming language

# Computer Data Organization (cont.)

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- Collection

- » A general term for an ADT that contains a group of objects
- » Some allow duplicate items, some do not
- » Some arrange contents in a certain order, some do not

- Examples of collections

- Bag
- List
- Stack
- Queue
- Dictionary
- Tree
- Graph

# Java Review - 1

# Object Oriented Programming

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- Encapsulation
- Inheritance
- Polymorphism

# Encapsulation

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- Information hiding
- Enclose **data** and **methods** within a class
- Hide **implementation details**
- Programmer receives only enough information to be able to use the class

# Encapsulation

---

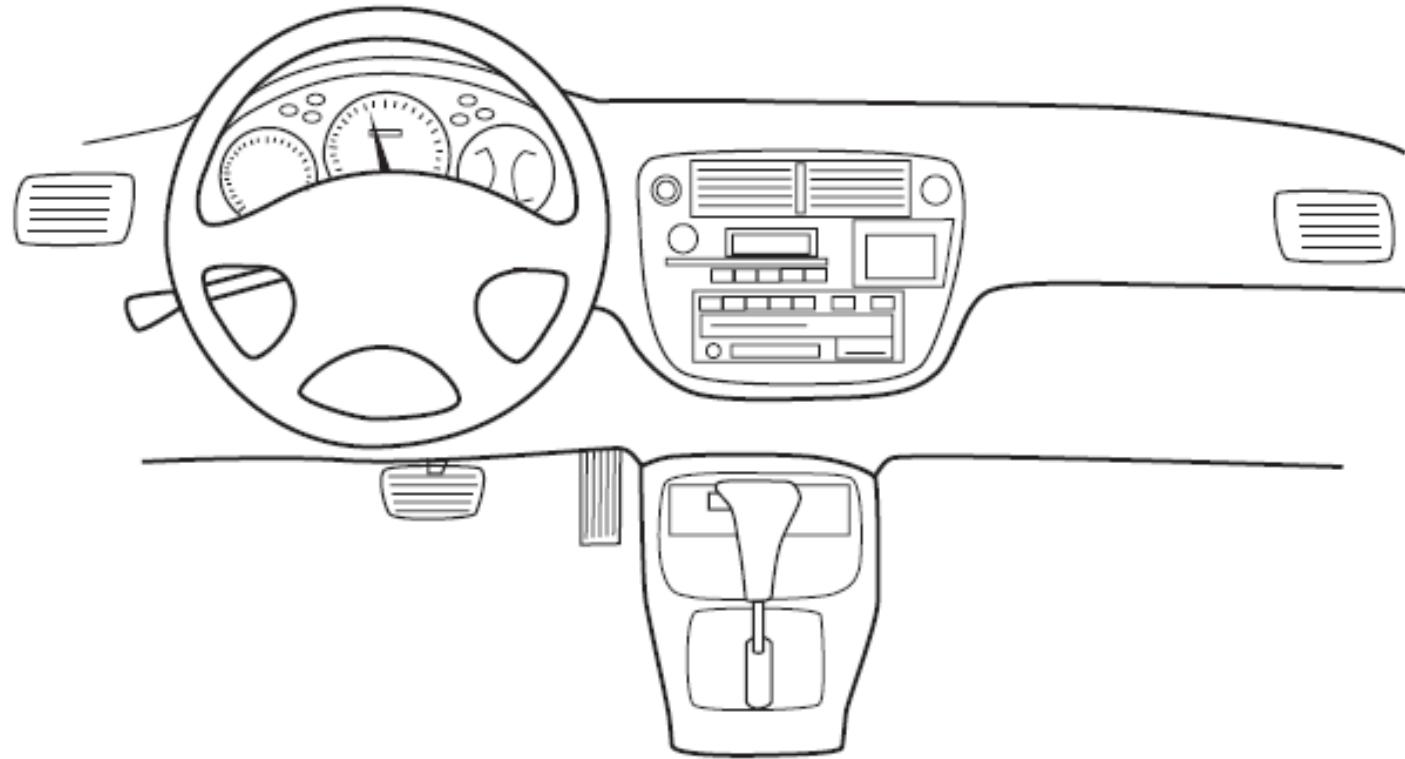


Figure P-1: An automobile's **controls** are visible to the driver, but its **inner workings** are hidden