

### INTRO TO PROGRAMMING

- 1. Elements of Programming
- 2. Functions
- 3. OOP
- 4. Data Structures

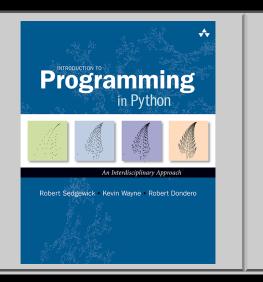
#### COMPUTER SCIENCE

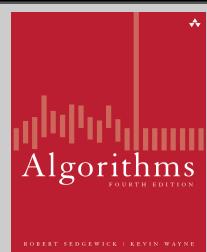
- 5. Theory of Computing
- 6. A Computing Machine
- 7. Building a Computer

#### **B**EYOND

- 8. Systems
- 9. Scientific Computation

#### RELATED BOOKSITES





# WEB RESOURCES FAQ

Data

Code

Errata

Appendices

Lectures

**Online Course** 

Java Cheatsheet

Programming Assignments

ENHANCED BY Google

## 3. OBJECT-ORIENTED PROGRAMMING

**Overview.** In object-oriented programming, we write Java code to create new data types, specifying the values and operations to manipulate those values. The idea originates from modeling (in software) real-world entities such as electrons, people, buildings, or solar systems and extends readily to modeling abstract entities such as bits, numbers, programs or operating systems.

- 3.1 Using Data Types describes how to use existing reference data types, for text processing image processing.
- 3.2 Creating Data Types describes how to create user-defined data types using Java's class mechanism.
- 3.3 Designing Data Types considers important techniques for designing data types, emphasizing APIs, encapsulation, immutability, and design-by-contract.
- 3.4 Case Study: N-Body Simulation presents a case study that simulates the motion of n particles, subject to Newton's laws of gravity.

Java programs in this chapter. Below is a list of Java programs in this chapter. Click on the program name to access the Java code; click on the reference number for a brief description; read the textbook for a full discussion.

REF	PROGRAM	DESCRIPTION
3.1.1	PotentialGene.java 👙	identifying a potential gene
3.1.2	AlbersSquares.java 👙	Albers squares
3.1.3	Luminance.java 👙	luminance library
3.1.4	Grayscale.java 👙	converting color to grayscale
3.1.5	Scale.java 👙	image scaling
3.1.6	Fade.java 👙	fade effect
3.1.7	Cat.java 👙	concatenating files
3.1.8	StockQuote.java 🔮	screen scraping for stock quotes
3.1.9	Split.java 👙	splitting a file
3.2.1	Charge.java 👙	charged-particle data type
3.2.2	Stopwatch.java 🔮	stopwatch data type
3.2.3	Histogram.java 👙	histogram data type
3.2.4	Turtle.java 🔮	turtle graphics data type
3.2.5	Spiral.java 🔮	spira mirabilis
3.2.6	Complex.java 🔮	complex number data type
3.2.7	Mandelbrot.java 🔮	Mandelbrot set
3.2.8	StockAccount.java 🔮	stock account data type
3.3.1	Complex.java 🔮	complex number data type (revisited)
3.3.2	Counter.java 🔮	counter data type
3.3.3	Vector.java 🔮	spatial vector data type
3.3.4	Sketch.java 🔮	document sketch data type
3.3.5	CompareDocuments.java 🔮	similarity detection
3.4.1	Body.java 👙	gravitational body data type
3.4.2	Universe.java 🔮	n-body simulation

Last modified on July 19, 2016.