

INTRO TO PROGRAMMING

1. Elements of Programming

2. Functions

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COMPUTER SCIENCE

5. Theory of Computing

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7. Building a Computer

BEYOND

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1. ELEMENTS OF PROGRAMMING

Overview. Our goal in this chapter is to convince you that writing a computer program is easier than writing a piece of text such as a paragraph or an essay. In this chapter, we take you through these building blocks, get you started on programming in Java, and study a variety of interesting programs.

- [1.1 *Elements of Programming*](#) instructs you on how to create, compile, and execute a Java program on your system.
- [1.2 *Built-in Types of Data*](#) describes Java's built-in data types for manipulating strings, integers, real numbers, and booleans.
- [1.3 *Conditionals and Loops*](#) introduces Java structures for control flow, including `if-else` statements, `while` loops, and `for` loops.
- [1.4 *Arrays*](#) considers a data structure known as the array for organizing large quantities of data.
- [1.5 *Input and Output*](#) extends the set of input and output abstractions (command-line arguments and standard output) to include standard input, standard drawing, and standard audio.
- [1.6 *Random Web Surfer*](#) presents a case study that models the behavior of a web surfer using a Markov chain.

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
1.1.1	HelloWorld.java 	Hello, World
1.1.2	UseArgument.java 	using a command-line argument
1.2.1	Ruler.java 	string concatenation example
1.2.2	IntOps.java 	integer multiplication and division
1.2.3	Quadratic.java 	quadratic formula
1.2.4	LeapYear.java 	leap year
1.2.5	RandomInt.java 	casting to get a random integer
1.3.1	Flip.java 	flipping a fair coin
1.3.2	TenHellos.java 	your first while loop
1.3.3	PowersOfTwo.java 	computing powers of 2
1.3.4	DivisorPattern.java 	your first nested loops
1.3.5	HarmonicNumber.java 	harmonic numbers
1.3.6	Sqrt.java 	Newton's method
1.3.7	Binary.java 	converting to binary
1.3.8	Gambler.java 	gambler's ruin simulation
1.3.9	Factors.java 	factoring integers
1.4.1	Sample.java 	sampling without replacement
1.4.2	CouponCollector.java 	coupon collector simulation
1.4.3	PrimeSieve.java 	sieve of Eratosthenes
1.4.4	SelfAvoidingWalk.java 	self-avoiding random walks
1.5.1	RandomSeq.java 	generating a random sequence
1.5.2	TwentyQuestions.java 	interactive user input
1.5.3	Average.java 	averaging a stream of numbers
1.5.4	RangeFilter.java 	a simple filter
1.5.5	PlotFilter.java 	standard input-to-drawing filter
1.5.6	BouncingBall.java 	bouncing ball
1.5.7	PlayThatTune.java 	digital signal processing
1.6.1	Transition.java 	computing the transition matrix
1.6.2	RandomSurfer.java 	simulating a random surfer
1.6.3	Markov.java 	mixing a Markov chain