

18 Recursion

Objectives

In this chapter you'll:

- Learn the concept of recursion.
- Write and use recursive methods.
- Determine the base case and recursion step in a recursive algorithm.
- Learn how recursive method calls are handled by the system.
- Learn the differences between recursion and iteration, and when to use each.
- Learn what fractals are and how to draw them using recursion and JavaFX's `Canvas` and `GraphicsContext` classes.
- Learn what recursive backtracking is and why it's an effective problem-solving technique.

Outline

1. [18.1 Introduction](#)
2. [18.2 Recursion Concepts](#)
3. [18.3 Example Using Recursion: Factorials](#)
4. [18.4 Reimplementing Class FactorialCalculator Using BigInteger](#)

5. [18.5 Example Using Recursion: Fibonacci Series](#)
6. [18.6 Recursion and the Method-Call Stack](#)
7. [18.7 Recursion vs. Iteration](#)
8. [18.8 Towers of Hanoi](#)
9. [18.9 Fractals](#)
 1. [18.9.1 Koch Curve Fractal](#)
 2. [18.9.2 \(Optional\) Case Study: Lo Feather Fractal](#)
 3. [18.9.3 \(Optional\) Fractal App GUI](#)
 4. [18.9.4 \(Optional\) FractalController Class](#)
10. [18.10 Recursive Backtracking](#)
11. [18.11 Wrap-Up](#)
 1. [Summary](#)
 2. [Self-Review Exercises](#)
 3. [Answers to Self-Review Exercises](#)
 4. [Exercises](#)