

# 18.1 Introduction

The programs we’ve discussed so far are generally structured as methods that call one another in a hierarchical manner. For some problems, it’s useful to have a method *call itself*—this is known as a **recursive method**. Such a method can call itself either *directly* or *indirectly through another method*. Recursion is an important topic discussed at length in upper-level computer-science courses. Here, we consider recursion conceptually, then present several examples of recursive methods. [Figure 18.1](#) summarizes the book’s recursion examples and exercises.

Chapter	Recursion examples and exercises in this book
18	Factorial Method ( <a href="#">Figs. 18.3</a> and <a href="#">18.4</a> )
	Fibonacci Method ( <a href="#">Fig. 18.5</a> )
	Towers of Hanoi ( <a href="#">Fig. 18.11</a> )
	Fractals ( <a href="#">Fig. 18.20</a> )
	What Does This Code Do? ( <a href="#">Exercise 18.7</a> , <a href="#">Exercise 18.12</a> and <a href="#">Exercise 18.13</a> )
	Find the Error in the Following Code ( <a href="#">Exercise 18.8</a> )
	Raising an Integer to an Integer Power ( <a href="#">Exercise 18.9</a> )
	Visualizing Recursion ( <a href="#">Exercise 18.10</a> )
	Greatest Common Divisor ( <a href="#">Exercise 18.11</a> )

	Determine Whether a String Is a Palindrome ( <a href="#">Exercise 18.14</a> )
	Eight Queens ( <a href="#">Exercise 18.15</a> )
	Print an Array ( <a href="#">Exercise 18.16</a> )
	Print an Array Backward ( <a href="#">Exercise 18.17</a> )
	Minimum Value in an Array ( <a href="#">Exercise 18.18</a> )
	Star Fractal ( <a href="#">Exercise 18.19</a> )
	Maze Traversal Using Recursive Backtracking ( <a href="#">Exercise 18.20</a> )
	Generating Mazes Randomly ( <a href="#">Exercise 18.21</a> )
	Mazes of Any Size ( <a href="#">Exercise 18.22</a> )
	Time to Calculate a Fibonacci Number ( <a href="#">Exercise 18.23</a> )
	Koch Curve ( <a href="#">Exercise 18.24</a> )
	Koch Snowflake ( <a href="#">Exercise 18.25</a> )
	Recursive File and Directory Manipulation ( <a href="#">Exercise 18.26</a> )
19	Merge Sort ( <a href="#">Fig. 19.6</a> ) Linear Search ( <a href="#">Exercise 19.8</a> ) Binary Search ( <a href="#">Exercise 19.9</a> ) Quicksort ( <a href="#">Exercise 19.10</a> )
21	Binary-Tree Insert ( <a href="#">Fig. 21.15</a> ) Preorder Traversal of a Binary Tree ( <a href="#">Fig. 21.15</a> ) Inorder Traversal of a Binary Tree ( <a href="#">Fig. 21.15</a> ) Postorder Traversal of a Binary Tree ( <a href="#">Fig. 21.15</a> ) Print a Linked List Backward ( <a href="#">Exercise 21.20</a> ) Search a Linked List ( <a href="#">Exercise 21.21</a> )

Fig. 18.1

Summary of the recursion examples and exercises in this text.