Contents

Preface . . . . . **vii**

1. **Escape! Code Your Way Out of a Paper Bag** **1**
   - Let's Begin 3
   - Your Mission: Find a Way Out 4
   - How to Help the Turtle Escape 6
   - Let's Save the Turtle 7
   - Did It Work? 11
   - Over to You 13

2. **Decide! Find the Paper Bag** **15**
   - Your Mission: Learn from Data 16
   - How to Grow a Decision Tree 18
   - Let's Find That Paper Bag 23
   - Did It Work? 27
   - Over to You 31

3. **Boom! Create a Genetic Algorithm** **33**
   - Your Mission: Fire Cannonballs 35
   - How to Breed Solutions 37
   - Let's Fire Some Cannons 40
   - Did It Work? 48
   - Over to You 53

4. **Swarm! Build a Nature-Inspired Swarm** **57**
   - Your Mission: Crowd Control 58
   - How to Form a Swarm 66
   - Let's Make a Swarm 69
   - Did It Work? 76
   - Over to You 78

5. **Colonize! Discover Pathways** **79**
   - Your Mission: Lay Pheromones 80
   - How to Create Pathways 83
   - Let's March Some Ants 85

Did It Work? 93
Over to You 97

6. Diffuse! Employ a Stochastic Model 99
Your Mission: Make Small Random Steps 100
How to Cause Diffusion 109
Let's Diffuse Some Particles 111
Did It Work? 119
Over to You 125

7. Buzz! Converge on One Solution 127
Your Mission: Beekeeping 128
How to Feed the Bees 131
Let's Make Some Bees Swarm 133
Did It Work? 143
Over to You 145

8. Alive! Create Artificial Life 147
Your Mission: Make Cells Come Alive 149
How to Create Artificial Life 152
Let's Make Cellular Automata 154
Did It Work? 160
Over to You 161

9. Dream! Explore CA with GA 163
Your Mission: Find the Best 164
How to Explore a CA 167
Let's Find the Best Starting Row 169
Did It Work? 181
Over to You 185

10. Optimize! Find the Best 187
Your Mission: Move Turtles 188
How to Get a Turtle into a Paper Bag 189
Let's Find the Bottom of the Bag 193
Did It Work? 198
Extension to More Dimensions 203
Over to You 205

Bibliography 207
Index 209