

Learn to Code, Learn to Think

12 Lessons in Computational Thinking, Problem Solving and Creativity

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This month-long email course starts you off with simple concepts and activities and guides you toward more advanced coding concepts—all using *free resources*. Its goal is not to turn you into a computer scientist, but to introduce you to how programmers think and get computers to do their bidding. Each lesson introduces a concept with several activities, then links to a web page with more information, extra challenges, and solutions. Here are the concepts and activities you will explore along the way.

Lesson 1 ~ What is Coding all About?

- What is Coding?
- An Offline Game to Play
- Start Coding with Bee-Bot
- Activities Using the Alphabet Mat
- A Bee-Bot Race Track and Other Online Activities

Lesson 2 ~ Stop Repeating Yourself — Use Loops!

- Finding Patterns
- Creating Loops with Blue-Bot
- Coding Using Logo Blocks
- Make More Shapes
- The Total Turtle Trip Theorem
- How to Nest Repeats

Lesson 3 ~ Add Surprise with Random Numbers

- All About Random Numbers
- How to Flip a Coin or Roll Dice
- What Else Can You Make Random?
turtle size, pen width, built-in shapes, coordinates

Lesson 4 ~ Procedures: Create Your Own Commands

- How to Write a Procedure
- How to Use an Input to a Procedure
- Lots of Squares!
- Trying Other Shapes and Letters

Lesson 5 ~ What If? Use Conditionals to Make Decisions

- Heads or Tails?
- Take a Penny Hike
- A Silly Game that Uses Conditionals
- Adding a Logical Operator
- Using Absolute Value
- Exploring Conditionals with Pro-Bot Sensors

Lesson 6 ~ Recursion: Procedures That Call Themselves

- What is Recursion?
- Countdown! With Recursion
- Creating a Spiral Using Recursion
- Drawing Lots of Squares
- How Non-tail Recursion Works
- Fractals: An Advanced Use of Recursion

Lesson 7 ~ Store Information with Variables

- What is a Variable?
- Creating Your First Variable
- Creating Shapes with a Given Perimeter
- Exploring the Perimeter Challenge
- Around the World in 60 Days

Lesson 8 ~ Inputs: Interact with Your Users

- Ask the User a Yes or No Question
- Ask the User All Types of Questions
- Coding a Number Guessing Game
- Making a Fancier Number Guessing Game
- Creating a Random Dinner Menu

Lesson 9 ~ Functions: Procedures That Return Results

- Creating a Simple Function Machine
- Converting Units
- Math Magic Trick
- What's the Temp?

Lesson 10 ~ Data Handling: Coding with Words and Lists

- How Computers Store Information
- Picking Items at Random
- Making and Taking Apart Words and Lists
- Swapping Letters in a Word
- Extracting Initials from a Name
- Breaking News! Create Random Headlines
- Making a Word Plural

Lesson 11 ~ Keyboard and Mouse Events

- What is an Event?
- Capturing Mouse Events: Let's Draw!
- Managing Keyboard Events
- Let's Play Tic-Tac-Toe
- Coding a "Connect the Dots" Game
- Coding a Word Grid Activity

Lesson 12 ~ Design and Code Your Own Project

- How to Choose a Project
- Tips for Coding
- How to Test Your Code
- What to Do with Your Project

