

< CODER > ACADEMY

WITH
STICKERS,
POSTER
& PRESS-OUT
MODELS



ARE YOU READY FOR THE CHALLENGE?

SEAN McMANUS
ILLUSTRATED BY ROSAN MAGAR

First published in the UK in 2017 by

Ivy Kids

An imprint of The Quarto Group

The Old Brewery

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www.QuartoKnows.com



Text © 2017 Sean McManus

Design and layout © 2017 Quarto Publishing plc

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British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

ISBN: 978-1-78240-503-0

This book was conceived, designed & produced by

Ivy Kids

58 West Street, Brighton BN1 2RA, United Kingdom

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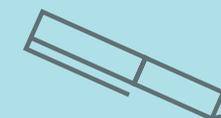
Scratch is developed by the Lifelong Kindergarten Group at the MIT Media Lab. See <http://scratch.mit.edu>

Printed in China

1 3 5 7 9 10 8 6 4 2

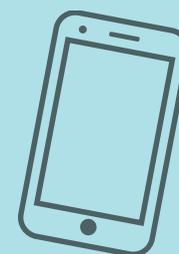


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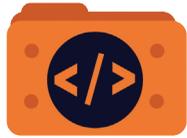


IVY KIDS



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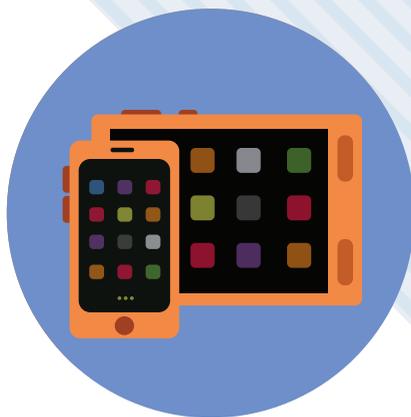


CODERS'S KIT

Robot Programming Challenge Instructions 64
Stickers
Coding Pairs Cards
Coding Careers Poster
Robot Programming Challenge Game



WELCOME TO CODER ACADEMY!



Congratulations! You have now joined Coder Academy, where you will learn all about what it takes to become a coder.

Imagine an alien came to visit. If you wanted to tell it what to do, you'd have to learn its language first. It's similar with computers. To give them instructions or information, you need to write them in a way they can understand. Coding is all about writing instructions and information in a computer language.

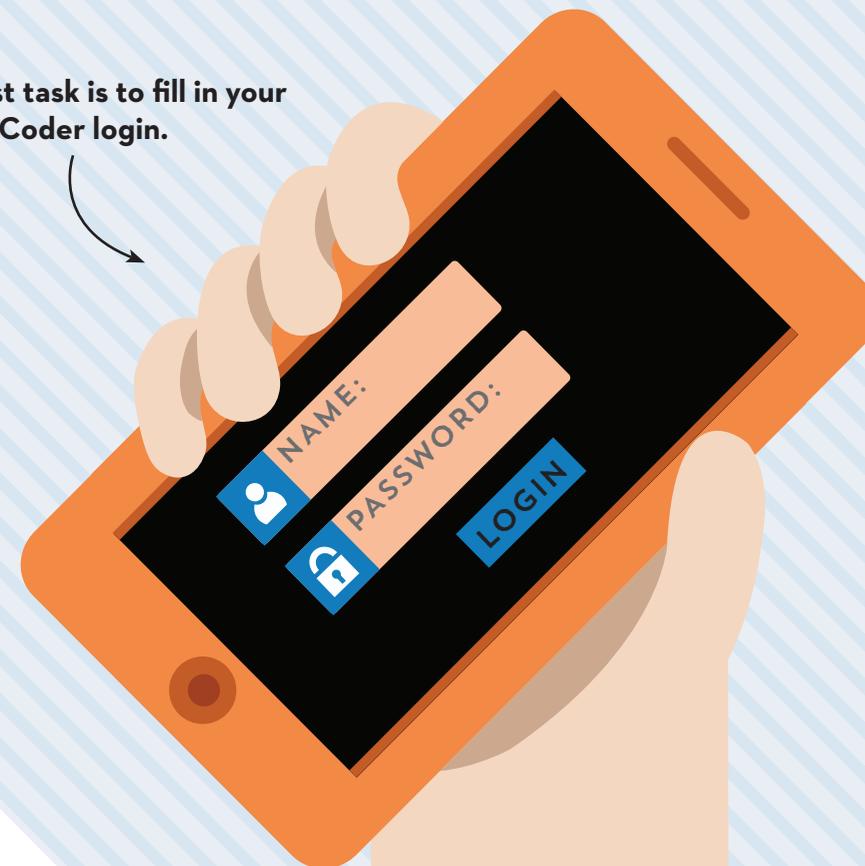
Almost anywhere you go, you're surrounded by computer code running on tiny chips. For example, code is used in phones, video games, in-car navigation units, trains, heating systems and factories.

As you work your way through the book, you'll learn about what a coder needs to be able to do. This includes:

- Understanding different computer languages, such as Scratch.
- Writing simple commands for a computer to follow.
- Designing computer art for games and programs.
- Building web pages and websites using HTML.



Your first task is to fill in your Trainee Coder login.



If you can't get a program working, carefully check it against the book for any differences. With computer code, quite small changes can stop things working. If you still can't get it working, you can download a working example from the author's website at www.sean.co.uk/books/coder.



WHAT IS CODING?

It is the coder's job to tell the computer what to do. The information the computer needs to carry out a task has to be given in a way the computer can understand – in computer language, or code.

When the coder is writing the instructions for a program, even the simplest tasks have to be clearly set out. For example, in an art program the computer needs to know how to move the cursor around on the screen and to recognize the tools and colours being used, as well as more complex tasks. So the art program must contain the computer code on how to do all of these things.

Even computers that respond to spoken instructions need to use code to understand what a voice is telling them to do.



I-SPY CODING

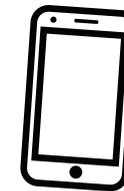
All kinds of devices use computer code to carry out tasks. Match the four devices with the code tasks below. Some devices can do more than one task.

1. Send and receive a message



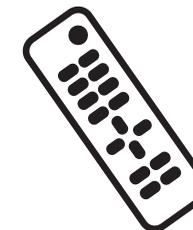
Sat nav system

2. Turn something on or off



Smart phone

3. Do sums



Remote control

4. Work out where to go next



Calculator

Answers:
1 = Smart phone
2 = Remote control
3 = Calculator and smart phone
4 = Sat nav system and smart phone

Once you have completed the challenge, check your answers below and place your sticker here.



TASK COMPLETE





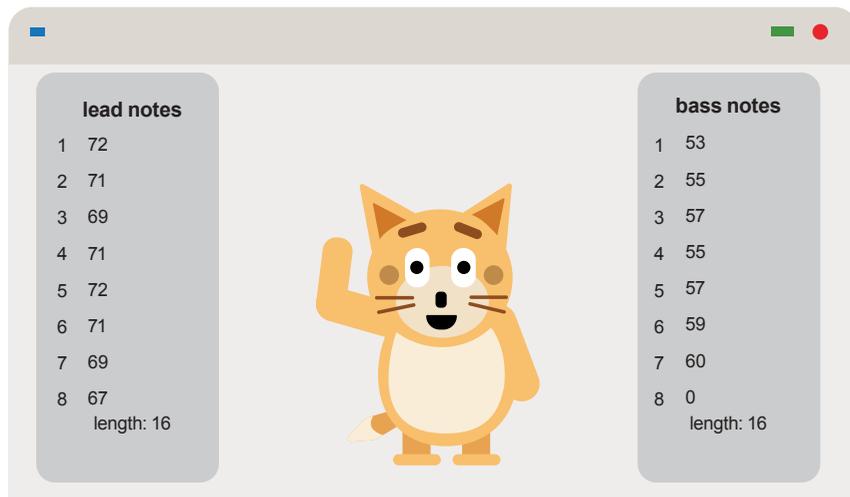
— CODE — A TUNE



You are going to use your note patterns on page 45 to code a tune. On the left side of the grids on page 45, a set of numbers accompanies each note. You will put these numbers into two lists in Scratch, and make a short program to play each note in turn.

ENTER YOUR TUNE IN SCRATCH

1. Start a new project. Click the **Data** button. Click the **Make a List** button and make a list for all sprites called 'lead notes'.
2. Find the 'lead notes' list on the Stage. Click the **+** button at the bottom of it. This will create a text box inside the list.
3. Go to the first column of the top grid on page 45. Look at the first square you filled in. Move your finger left to find the number on that row.
4. Type this number into the box in 'lead notes' on the Stage and press Enter. If you left the column empty, type in 0.
5. Go to the second column of the top grid on page 45. Find the second square filled in and add the row number to the second box in the 'lead notes' list. Keep going in this way until you've entered all the numbers from the top grid into the 'lead notes' list.
6. Click the **Make a List** button and make another list for all sprites called 'bass notes'.
7. Click the 'bass notes' list on the Stage, hold down the mouse button and move the list so it matches the picture below.
8. Repeat steps 2 to 5, but this time use notes from the bottom grid on page 45 and put the data into the 'bass notes' list.



CODE YOUR TUNE IN SCRATCH

Now that you have entered your tune data into Scratch, you need to add a program to play it. Follow these steps:

1. Click the **Data** button and use **Make a Variable** to create three variables: 'beat', 'note 1' and 'note 2'.
2. Add the scripts below to the cat sprite. The scripts don't need to click into each other — add them as they appear here:

Click the **Data** button to find the dark orange blocks.

Add the item 1 of [list name] block. Then drop the beat block on top of the 1.

Use the if ... else block, not the if block. Add the = block, then the note 1 block on top of it.

3. Click the green flag to hear your tune.
4. If there's a note you don't like, you can click on it in the list on the Stage to change it.
5. Play around with different numbers to create brand new tunes! Delete the numbers in the lists by pressing the D key on the keyboard.

Once you have completed the challenge, place your sticker here.



TASK COMPLETE



— DESIGN AN — INSTRUMENT

You can use Scratch to invent your own instrument. Electronic music often uses sounds from real life, as well as singing and sounds like hand-claps. Think of all the different sounds you can record for your instrument to play. Keep a list here:

SOUND LIST



INVENT YOUR OWN INSTRUMENT

You are going to invent a brand new instrument. It could have strings like a guitar, or be more like a keyboard. Perhaps it will be a mixture — or like nothing ever seen before! Give your instrument five buttons or levers to press that each make a different sound. Draw it in the space below. Then, follow the instructions at the bottom of the page to design your instrument in Scratch.



DRAW YOUR INSTRUMENT IN SCRATCH

1. Start a new Scratch project.
2. Click the Paintbrush to the left of the Sprite List to draw a new background.
3. Draw the main body of your instrument, but leave out the buttons.
4. Click the Paintbrush above the Sprite List to draw a new sprite. Draw one of your buttons. It might look like a string, or anything else, but we'll call it a button. Drag it to the right position on the Stage.
5. Draw new sprites for the four other buttons. Turn to page 50 to record the noises for each button.

Once you have completed the challenge, place your sticker here.



TASK COMPLETE



MUSIC



CODE AN INSTRUMENT

A sound designer codes sounds for apps and websites. You are going to record and code a sound for the instrument that you designed on page 49.

RECORD YOUR SOUND

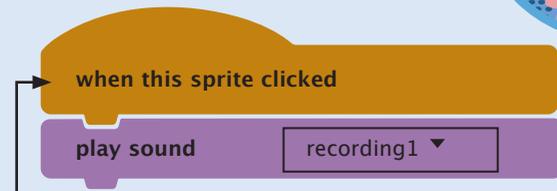
1. Click one of the buttons you designed in the Sprite List on page 49. Click the **Sounds** tab above the Blocks Palette.



2. Click the **Record new sound** button. Get ready to make your sound!



3. Click the **circle** button to start recording. Make your sound straight away. Press the **square** button to stop recording. Click the **triangle** button to play your sound. If you don't like it, go back to the beginning of step 2 and start again.



4. Add this code to your sprite. The **play sound** block should contain your last recording, but you can change the recording name if you need to.

5. Try clicking the button you've set up to test that it works. Now add sounds for the remaining four buttons.



You can also use the sounds that come with Scratch. To add one to a sprite, click the small speaker icon.

Once you have completed the challenge, place your sticker here.



TASK COMPLETE

CONGRATULATIONS! You are now a ...

QUALIFIED COMPUTER MUSICIAN

CODER NAME:

The above-named coder is qualified to be a **COMPUTER MUSICIAN**

and to invent programs using sounds and compose music for games.

Coder Academy would like to wish you every success in your coding career! **GOOD LUCK.**

QUALIFICATION DATE:



CODER'S KIT



- 2 model robots
(on the flaps of the book)
- Stickers
- Coding Pairs cards
- Coding Careers poster
- Robot Programming
Challenge game

CODING PAIRS

1. Shuffle the cards, then place them face-down on a flat surface.
2. Take turns to flip over two cards of your choice. If they are a matching pair, keep them. If not, turn the cards back over and let the next player take their turn.
3. The player to collect the most pairs is the winner.

ROBOT PROGRAMMING CHALLENGE

Find the game board on the pull-out at the back of the book. Push out the dice, then fold and glue it together. Push out the target. Follow the instructions on the flaps to assemble the robots.

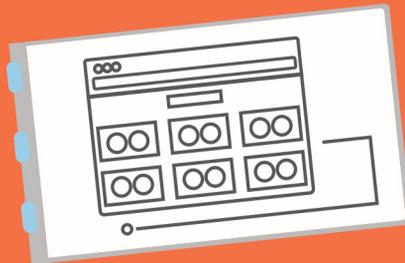
1. Lay the game board flat on a table, maze-side up. Each player chooses a robot and decides who goes first.
2. The first player rolls the dice and places their robot on the matching row number.
3. The player rolls again and moves their robot to the matching column number.
4. Repeating steps 2 and 3, the player places the target into the maze.
5. The player writes a list of instructions to move the robot to the target. The only instructions that can be used are: GO FORWARDS ONE SQUARE, ROTATE LEFT and ROTATE RIGHT.
6. The second player moves the robot to the target using the written instructions. If the instructions are wrong or you hit a wall, the robot must stay where it is.
7. The second player takes their turn, following steps 2 to 6. The player whose robot gets closest to the target is the winner.

< CODER > ACADEMY

Did you know that coders can write programs to control robots, code driverless cars and send rockets into space?

At the Coder Academy, you can take your first steps to becoming a coder. You'll learn how to create music, games, websites and animations. You will learn about how computers think, how to give them instructions, how to use Scratch, write HTML and loads more.

So, turn on your computer and get ready to code!



WARNING
SMALL PARTS NOT SUITABLE FOR CHILDREN
UNDER 3 YEARS OF AGE – CHOKING HAZARD



£9.99

**IVY
KIDS**

ISBN 978-1-78240-503-0



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