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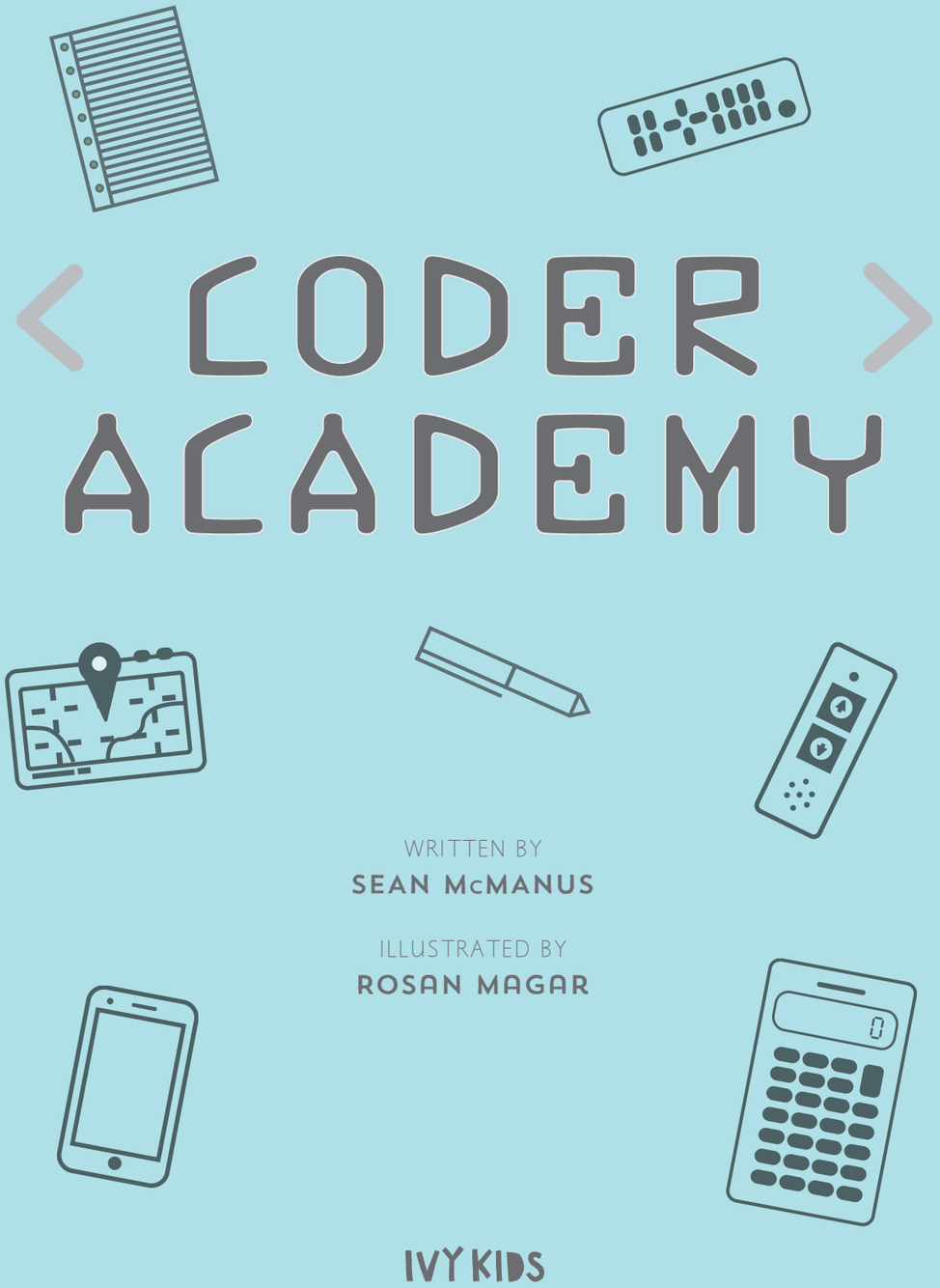

CODER ACADEMY

WRITTEN BY
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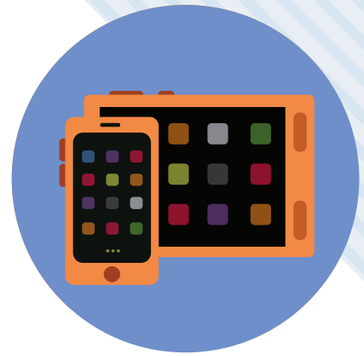
WELCOME TO CODER ACADEMY!



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

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.

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.

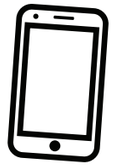
Even computers that respond to spoken instructions need to use code to understand what a voice is telling them to do.

I-SPY CODING

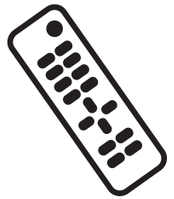
All kinds of devices use computer code to carry out tasks. Match the four devices with the code tasks below. Some devices can do more than one task.

1. Send and receive a message
2. Turn something on or off
3. Do sums
4. Work out where to go next

Sat nav system



Smart phone



Remote control

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.

PLACE STICKER HERE

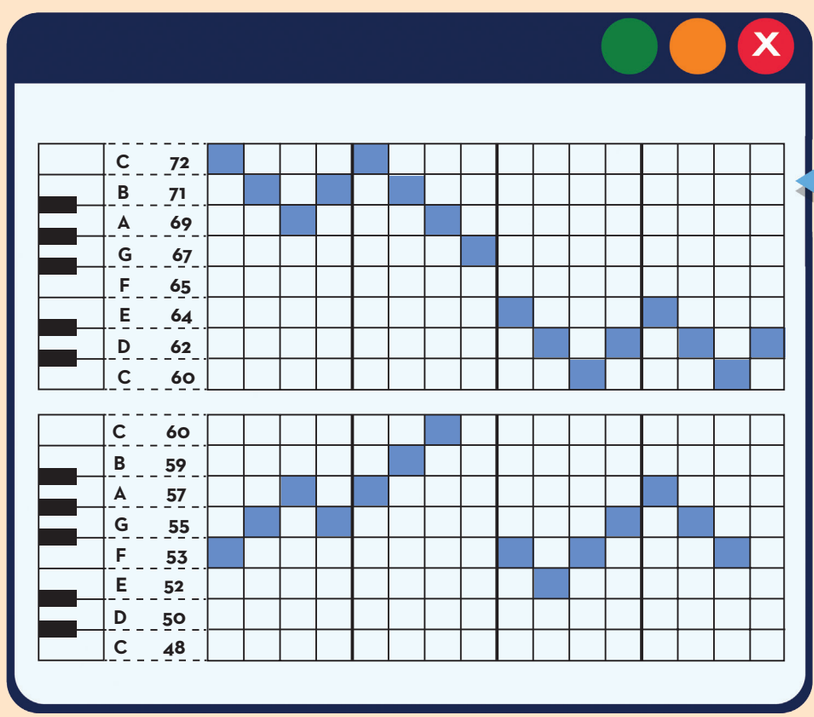
TASK COMPLETE

PLAN A TUNE

Music is all about patterns. There are melodies that rise and fall, notes that repeat, and drum rhythms that hold it all together.

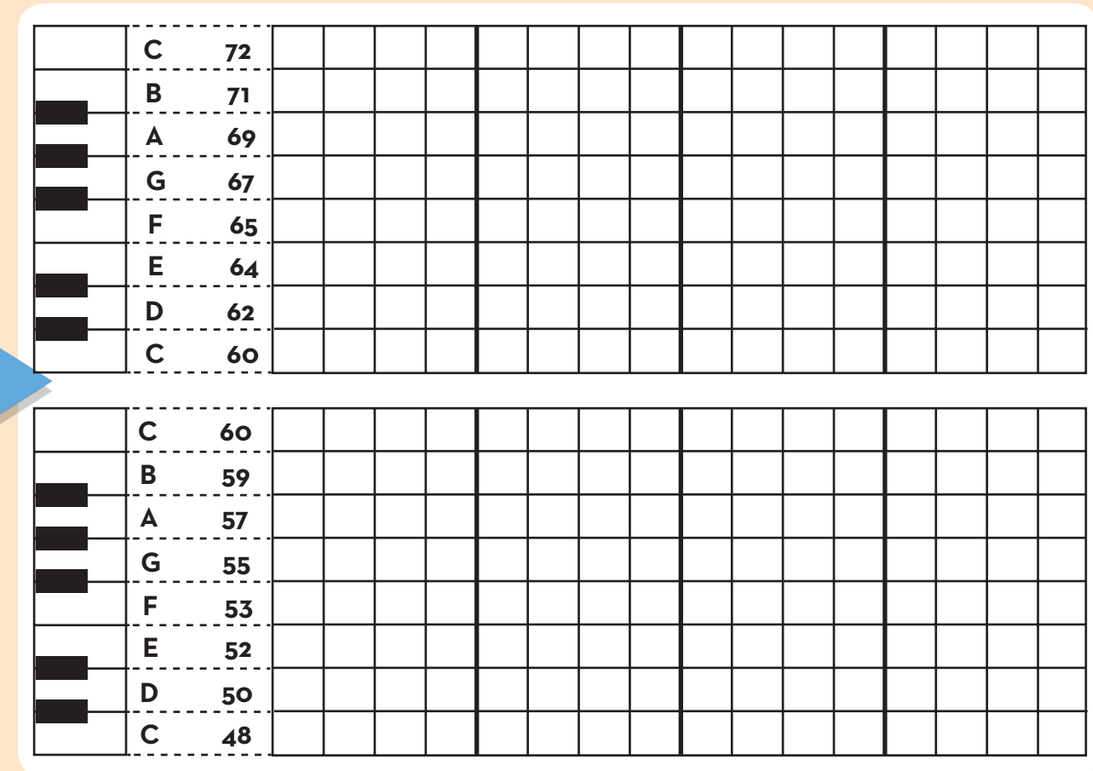
If you can make up a pattern, you can code your own music. To start, draw the pattern of notes you want to use. There are two grids on page 45. The top one is for the lead notes (the high notes), and the bottom one is for the bass notes (the low notes).

Look at this example of a tune below. You will use the numbers on the left of the grid for the Scratch activity on page 46, but you can ignore them for now.



You are going to use the grids below to plan your own tune. Start with the top grid. Work your way from left to right, and fill in one square for each column. The higher up the square is, the higher the note will be. You can leave a column empty if you want to. Then do the same with the grid below.

The note names are on the left of each grid to help you if you play an instrument, but you don't need to know them if not.



On the following page, you'll learn how to put your tune into Scratch.

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

PLACE STICKER HERE

TASK COMPLETE

MUSIC

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.

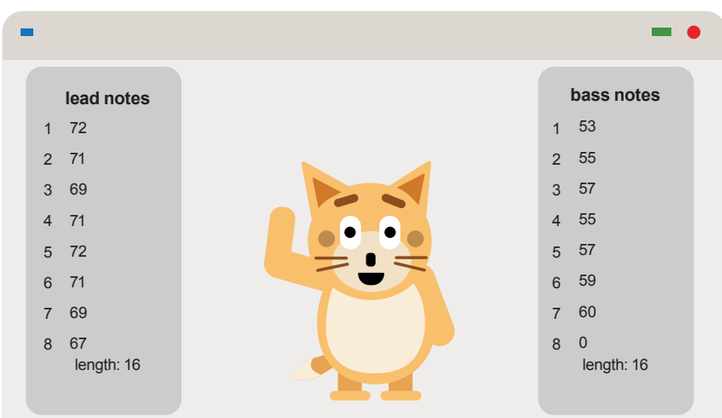
4. Type this number into the box in 'lead notes' on the Stage and press Enter. If you left the column empty, type in 0.

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.

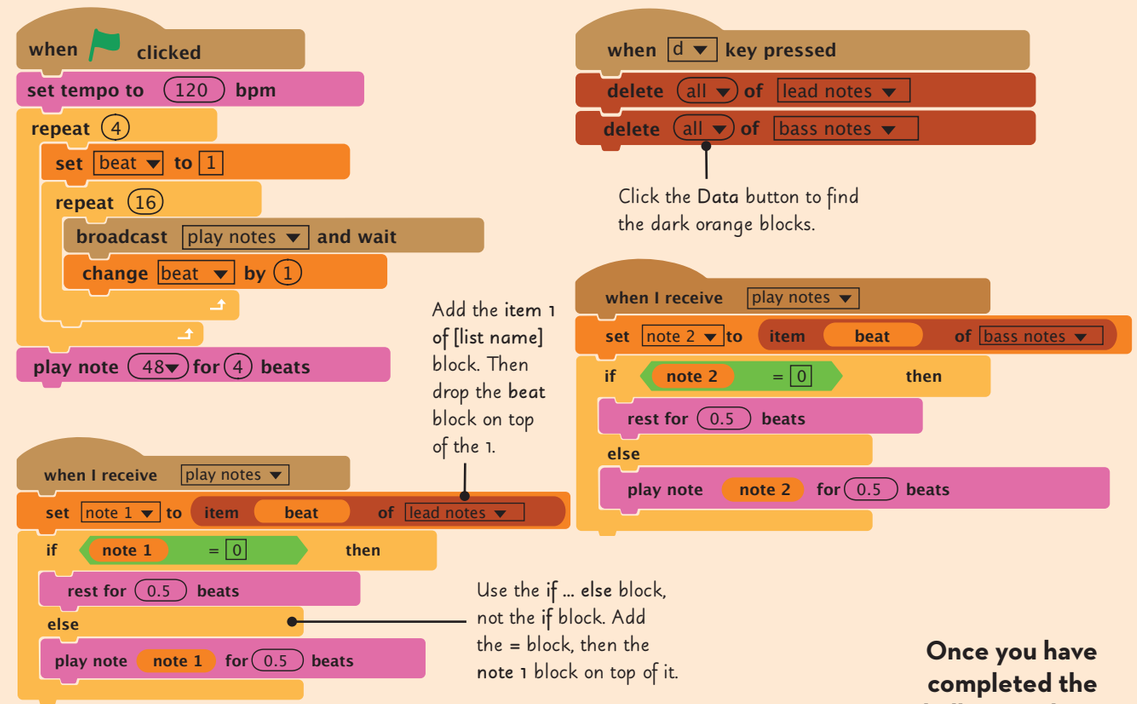


CODE YOUR TUNE IN SCRATCH

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:



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.

PLACE STICKER HERE

TASK COMPLETE

MUSIC

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.

PLACE STICKER HERE

TASK COMPLETE

MUSIC

CODE AN INSTRUMENT

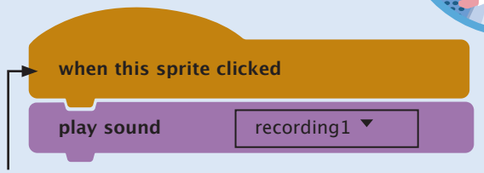
A sound designer codes sounds for apps and websites. You are going to record and code a sound for the instrument that you designed on page 49.

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.

PLACE 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:

_____