THE QUESTKIDS®

in easy steps
BOOKS FOR KIDS

Coding with Scratch

Create Awesome Platform Games

Max Wainewright

Add animations and sound ★ Keep score ★ Create levels

Tiffany Tech Smuffy Dan Devices Chew-Chew

Welcome, budding coders!

Say hi to our heroic adventurers: Dan Devices and Tiffany Tech. Together they are the best of friends, and an amazing team who love to explore and help each other whenever they can.

Dan adores devices, Tiff loves tech, and both are on a constant quest to learn and make learning fun. The friends are joined by their pets, Smuffy and Chew-Chew, who help out in their own special way. Together... they are The QuestKids!

As the newest member of the team, they'll help you to create your own computer games to impress! Don't know where to start? No worries! Tiffany, Dan, Smuffy and Chew-Chew, together, will take you from coding basics to creating real computer games in easy steps.

Now you've met the team, it's time to begin your journey and start creating your own awesome platform games and have fun. Enjoy!

About the author: Max Wainewright is an experienced computing teacher and has taught in the UK and Singapore. He also has significant experience of working in the EdTech industry, including working as an Educational Software consultant for major companies such as Discovery and LEGO. Currently, he teaches coding in a London primary school and runs an innovation group supporting other schools.

To create the games in this book, you will need:

- a computer or laptop with a proper keyboard; an iPad or any other tablet will not work so well.
- an internet connection to connect to the Scratch website.

It is recommended that children should be supervised when using the internet, especially when using a new website. The publishers and the author cannot be held responsible for the content of the websites referred to in this book.

What is Scratch?

Scratch is a computer programming language that is the easiest language for learning coding, and yet it can be used to create impressive computer games and animations. It is ideal for kids to learn coding and is widely used in schools worldwide.

Scratch is a project of the Scratch Foundation, in collaboration with the Lifelong Kindergarten Group at the MIT Media Lab. It is available to download for free at https://scratch.mit.edu

For further help and resources with this book, visit www.maxw.com or thequestkids.com

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Dreamstime, iStock, Shutterstock.com

Contents

Coding with Scratch

In this book you will learn how to code your own platform games. If you haven't done much coding before, don't worry – we will cover all the coding concepts you need as we work through the book. Let's start by learning a bit more about how Scratch works.

THE SCRATCH SCREEN

Use the **File** menu to save your work.

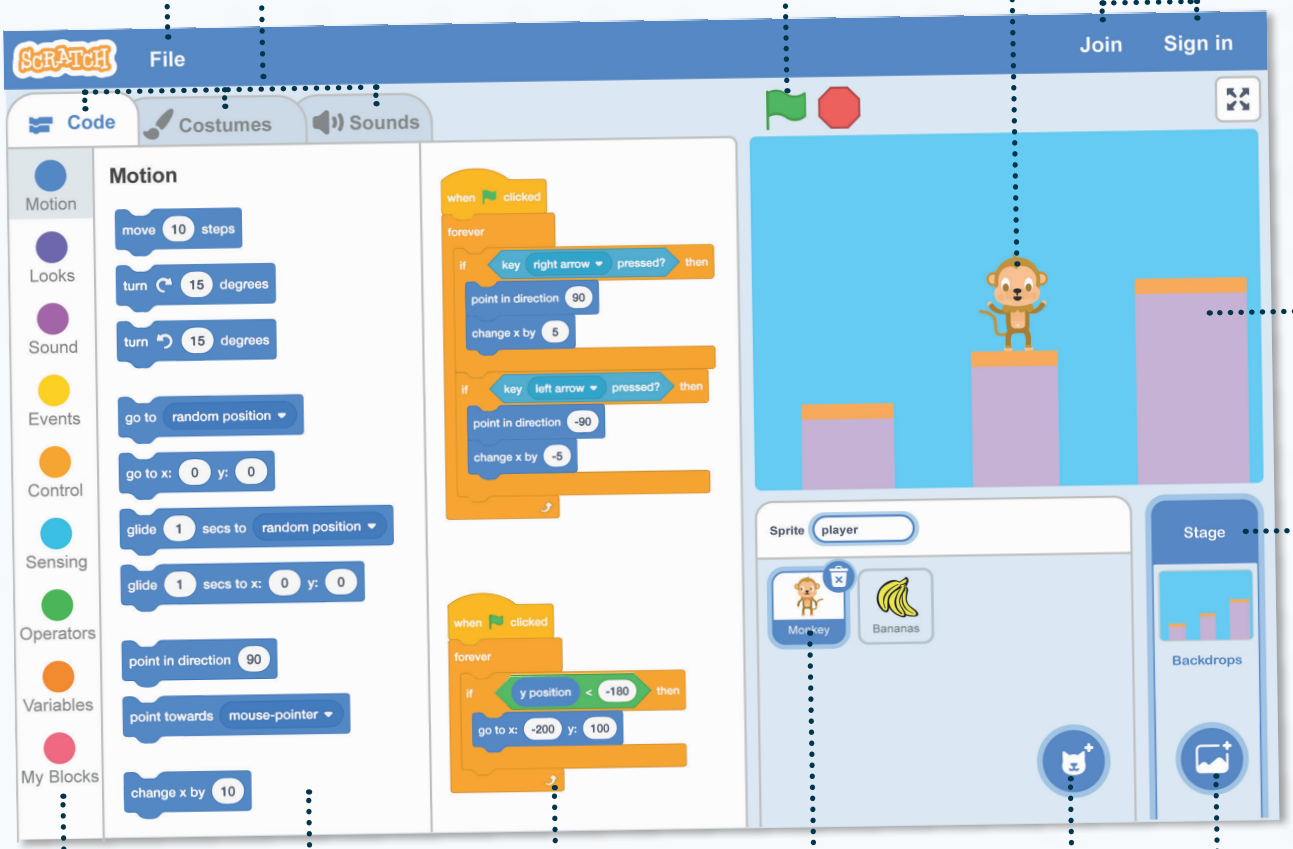
Switch between editing **Costumes** and adding **Code** or **Sounds** to your sprite.

Click the **green flag** to run your code.

Objects that move around in Scratch are called **Sprites**.

Join Scratch for free or log in to your account.

Your game will run in the area called the **stage**.



Choose the group of code blocks you need here.

All the blocks in the group will appear here. You may have to scroll to see them all.

Drag code blocks into the **scripts area** to start coding.

Select which sprite you want to add code to by clicking its icon here.

Add another sprite by clicking this button.

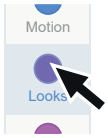
This button adds another backdrop.

Click here to select the stage.

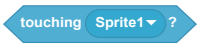
Finding blocks

The colour of the block will tell you which group to look through.

*This block is purple, so you'll find it in the **Looks** group.*

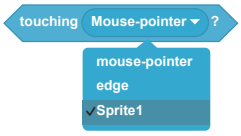


Not all blocks will look exactly the way you need them at first.



*This block isn't in the **Sensing** group...*

...so find the block that starts with the same command...



...and use the drop-down menu.

Joining blocks

Each block in Scratch makes a sprite do something different. To join them together just drag one block so that it snaps onto another.

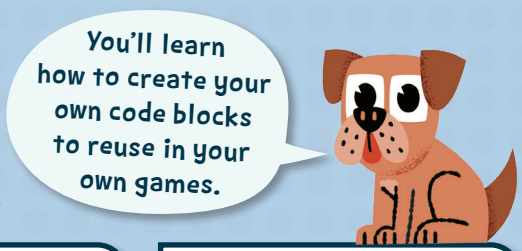
If you want to break blocks apart, you can't pull the top block up.

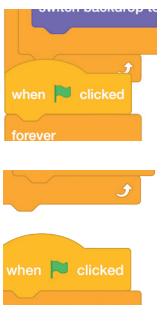
You need to drag a block away from the bottom of the stack.

Arranging your code

Most of the games in this block use quite a lot of code. To make the code clearer it is divided up into different sections or **scripts**.

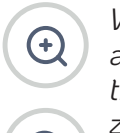
Ouch!





*Don't try to join the top of curved **event** blocks to other blocks.*

The curved event block is the start of a separate script.

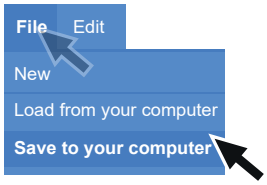


When you have a lot of code, use these controls to zoom in or zoom out of your code.

This button puts your code back to normal size.

Saving your work

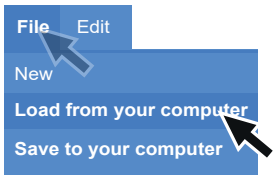
You can save your game by downloading a copy of it to your computer.



*Click **File** > **Save to your computer**.*

Saved work is usually found in your Downloads folder.

Click **Load from your computer**, then browse to your file to get it back.

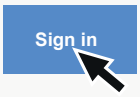


*Click **File** > **Load from your computer**.*

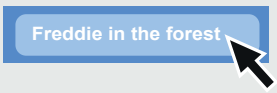
SAVING ONLINE

It is a little easier to save your work if you have a Scratch account. Your work then gets saved online. This means you can carry on with your work on a different computer. It also allows you to share your completed game. Other people will be allowed to comment on your games too. **Check with an adult before signing up to get a Scratch account.**

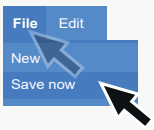
*Click **Join Scratch** and follow the instructions to create an account.*



*To log in to your account, click **Sign in**. You'll need your username and password.*

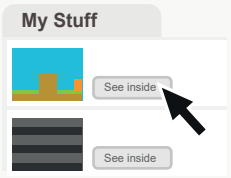


Type a name for your game in the box at the top.



*Click **File** > **Save now** to save your work online.*

*Click the folder icon to see all the files that you have saved (called **My Stuff**).*



*To load a game to play it or carry on coding, click **See inside**.*

It's a good idea to save your work after every step.

Testing your code

After each coding step in this book you will usually see a green flag.

This is reminding you to run your code and check it works. If it doesn't work, check back through the code you have just added. Make sure:

- *You used the correct blocks (some look very similar!).*
- *You have typed in the correct numbers.*
- *You have used minus and plus numbers correctly.*
- *Loops and if then blocks are in the correct place.*

Sometimes it's a good idea to delete some of your code and start over again.

Later on in this book you'll learn how to add background music to a game.

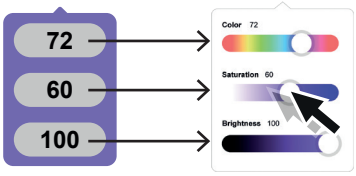
And how to use variables to keep score and track how fast things move!

Setting colours

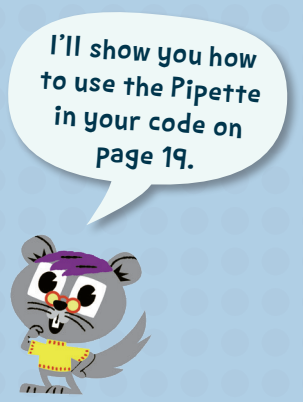
The colour slider lets you pick just over a million different shades.

To help you find the right shade you will find colour helpers like this one.

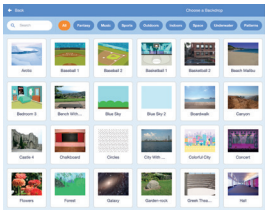
Set each of the sliders to the numbers shown here.



Once you have used a colour, the Pipette tool can be used to "pick up" the exact shade.



Drawing backgrounds

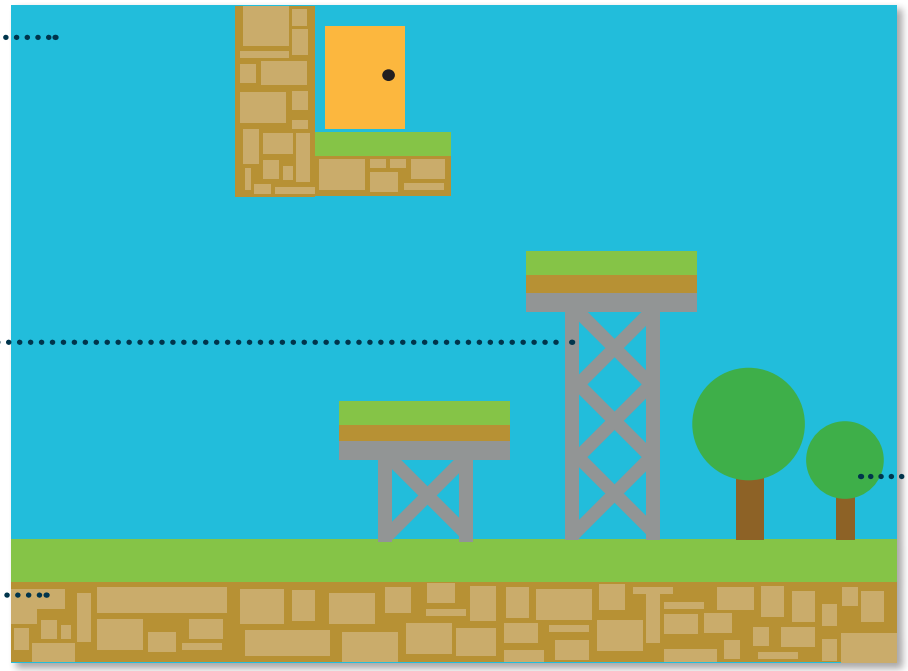


Scratch has lots of great ready-made background pictures, called backdrops. But for most of the games in this book you'll be creating your own backdrops. That way, you'll be able to design all sorts of different levels for your platform games. Here are some of the tools you will be using:

*The **Fill tool** is used to fill in large areas of the screen, such as the sky.*

*The **Line tool** can be used to add extra details.*

*The **Rectangle tool** is used to draw platforms and sections of the ground.*



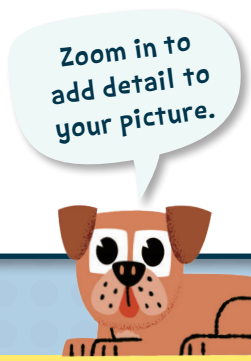
*The **Colour tool** is very important. Different colours will tell the sprites whether they are in mid-air or standing on the ground!*

*The **Circle tool** can be used to draw ovals or circles.*

Undo ***Redo***

Normal size

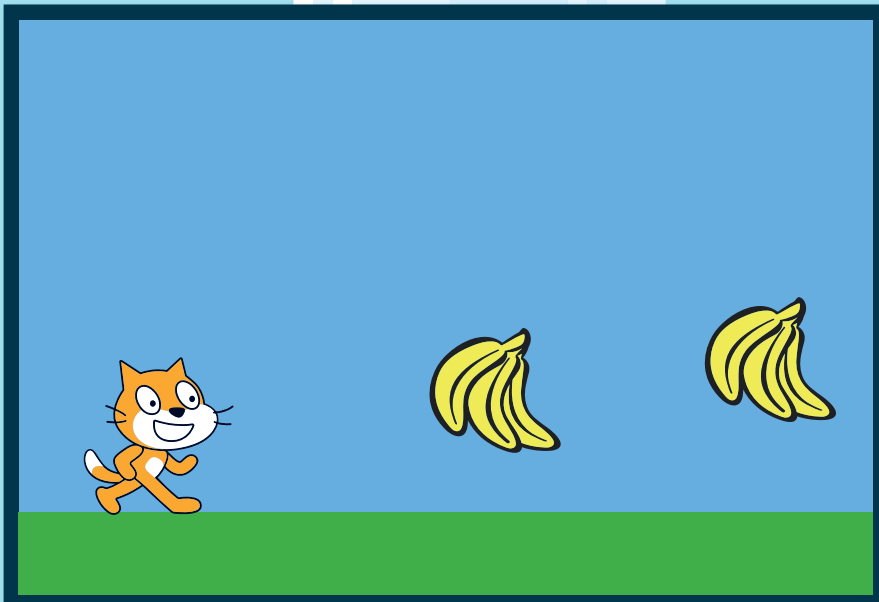
Zoom out ***Zoom in***



BACKDROPS FROM THIS BOOK

If you get really stuck you can download some backdrops to get you started at www.thequestkids.com or www.maxw.com

Banana Bonanza



In this simple game you will learn the basics of how to move a character sprite around the screen. Pressing the left and right arrow keys will make the cat move. Simple animation will make it look as though it is walking. More code will make the bananas the cat eats disappear.

1 Start Scratch

Go to the Scratch website.

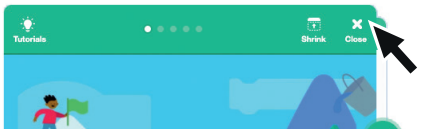
scratch.mit.edu

2 Start creating

At the top of the page click **Create**.

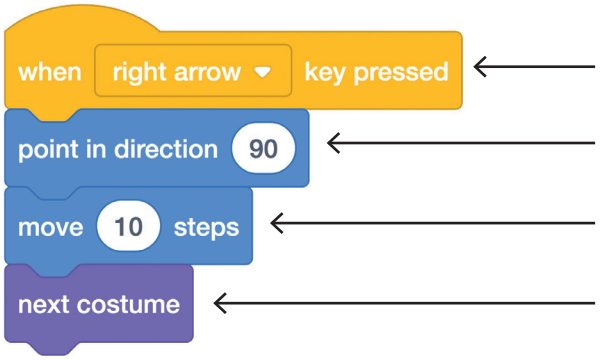
3 Make space

There may be a green help video box. **Close** it to make more space.



4 Move right

We need the cat to move around when the arrow keys are pressed. Drag in the following code blocks:



*When the **right arrow key** is pressed run this code:*

*Point the cat to the **right**.*

Move the cat 10 steps forward.

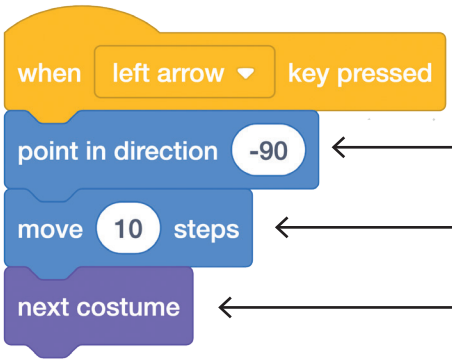
Change the costume to make it look as though the cat is walking.

Press the **right arrow key** on the keyboard to test your code. The cat should slowly walk to the right!

Turn back to pages 4–5 for help finding the code blocks you need.

5 Move left

Drag in these blocks to make the cat move left when the left arrow is pressed:



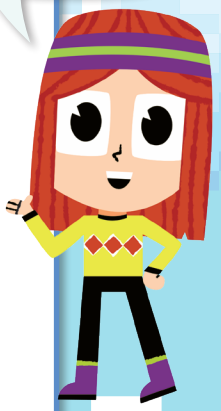
*When the **left arrow key** is pressed run this code:*

*Point the cat to the **left**.*

Move the cat 10 steps forward.

Show the next costume so that it looks like the cat is walking.

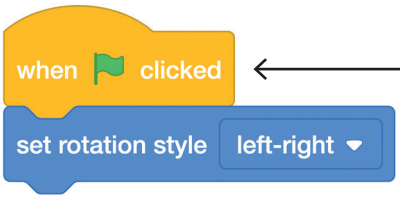
Distances in Scratch are measured in Steps. A Step is the same size as a Pixel. Pixels are the tiny dots on the screen that make up a picture.



Now, experiment by pressing the **left** and **right arrow keys** on the keyboard to test your code. The cat should slowly walk left and right at your command!

6 Rotation style

To keep the sprite the correct way up we will set its rotation style.

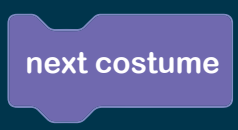


*When the **green flag** is clicked, run this code:*

Stop the cat rotating – just make it face left or right.

Click the **green flag** to test your code. Try using the arrow keys to move left and right. The cat will still walk each way, but now it should stay the right way up.

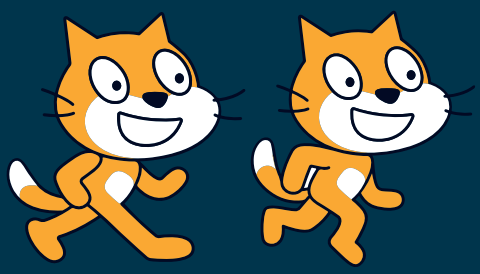
HOW DOES ANIMATION WORK IN SCRATCH?



Just as we can wear more than one set of clothes, sprites in Scratch can have more than one **costume**.

By switching from one costume to another we get a simple animation effect. Each costume must be drawn carefully for this to work.

We'll learn more about costumes later.



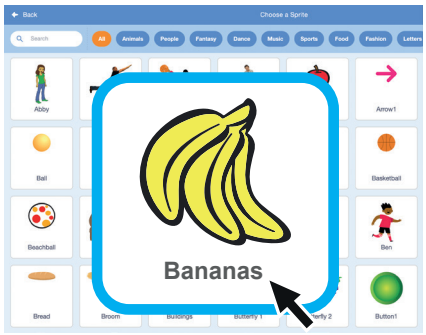
Costume1 *Costume2*

7 Cat food

We need to give the cat something to eat.

Click the **Choose a Sprite** button (in the bottom-right corner of the screen).

8 Take your pick



Choose something for the cat to eat and click it.

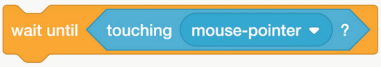
9 Position the banana

Drag the banana downwards so that it is lined up with the cat.

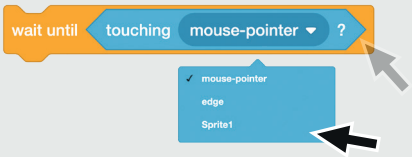
USING SENSING BLOCKS

It can be tricky fitting the light blue sensing blocks into orange control blocks.

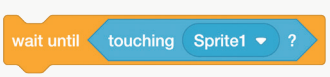
*Start with a **wait until** block from the **Control** group.*



*Drag a **touching mouse-pointer** block inside the **wait until** block.*



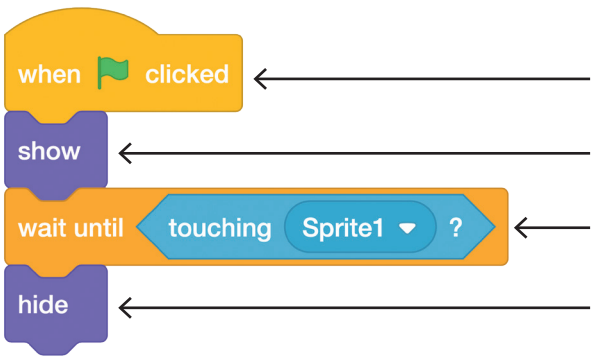
*Click the **mouse-pointer** drop-down and then select **Sprite1**.*



Now, your blocks are ready.

10 Code the banana

So the cat can eat the bananas, we need to add some code.



*When the **green flag** is clicked, run the code below:*

Make sure the banana is visible.

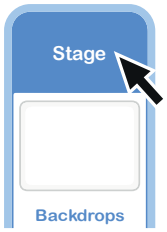
Wait until Sprite1 (the cat) is close enough to touch the banana.

Hide the banana.

Click the **green flag** to test your code. Use the arrow keys to move the cat towards the banana. It should disappear when the cat touches it.

11 Add a background

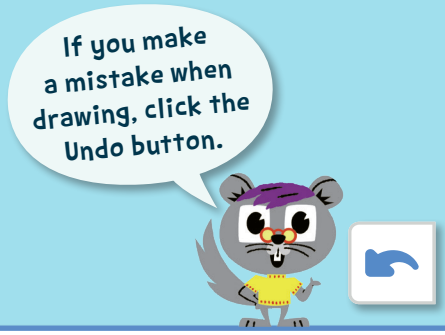
Finally, we need to add a background picture for our game.



Click the **Stage** icon (on the right-hand side of the screen).

Click the **Backdrops** tab (at the top left of the screen).

Click on **Convert to Bitmap**. This will give us simpler tools to use.

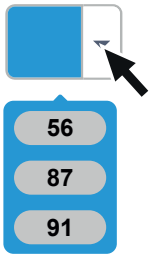


12 Start drawing

Now, draw the sky and some grass – in later games we'll have multiple levels, but keep this one simple.

Click the **Fill** tool.

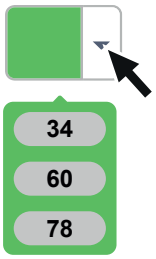
Mix a blue colour.



Fill the sky in blue.

Pick the **Rectangle** tool.

Make a green colour.



Drag out a rectangle to be the grass.

Position the cat on the grass. Try out your game by clicking the **green flag**. Use the arrow keys to move the cat left or right and eat the banana.

Challenges

- Add some different sorts of food for the cat to eat. (Follow steps 5–8 if you are stuck.)
- Create extra food by duplicating the banana. (Click the right mouse button on the banana sprite icon and choose one of the options.)
- Try remaking the game with a different animal instead of the cat.

The QuestKids® series is designed to make learning fun! Let the two best friends along with their pets inspire you to make learning fun.

Using the proven approach of learning in easy steps, this guide is:
• Easy to follow • Fully illustrated • Packed with tips

This book will take you from Scratch basics through to creating your own awesome platform games in easy steps. Each game comes with challenges to take you to the next level of coding. Even includes mods to make your games more exciting. Impress your friends and family!

You'll learn how to:

- Make a series of games where sprites leap from platform to platform
- Design different levels, draw graphics, and make simple animations
- Use variables to keep score and to simulate gravity in games
- Add sound to bring games to life
- Make code blocks and functions

Supported by a designated website www.thequestkids.com

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