





Contents

About Scratch	4
Getting Started	5
The Interface	6




Part 1: Scratch Basics

1.1 	Sprites	16
1.2 	Backdrops	20
1.3 	Sounds	22
1.4 	Blocks	24



Complete this book to become a coder!

Part 2: Tutorials

2.1 	Motion Blocks	32
2.2 	Looks Blocks	46
2.3 	Sound Blocks	58

Part 3: Projects

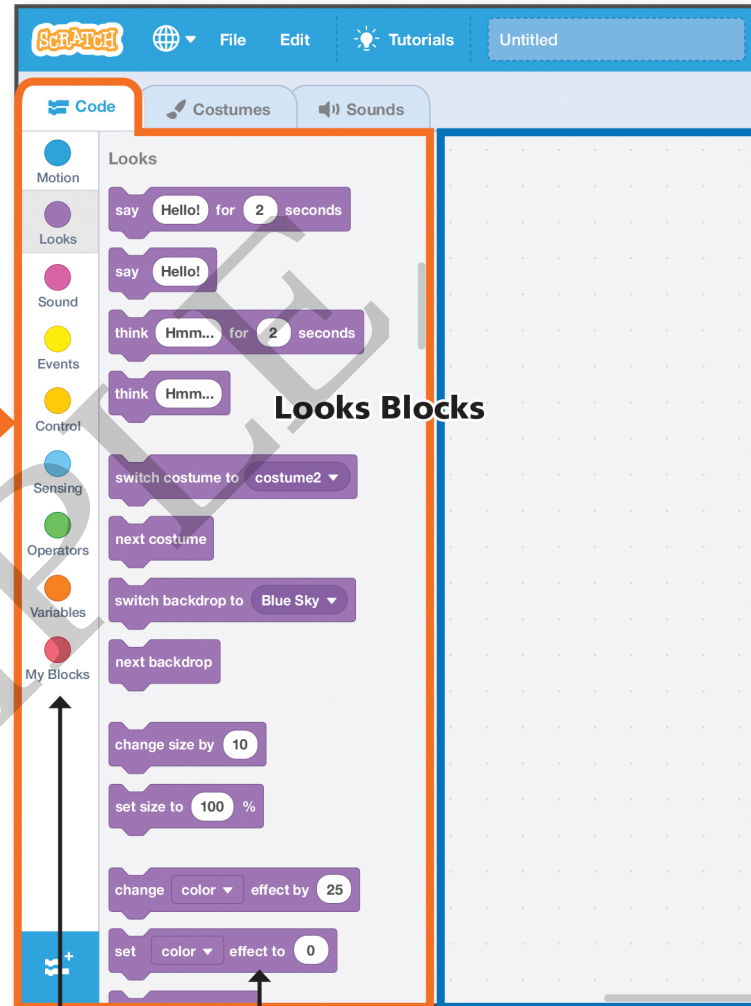
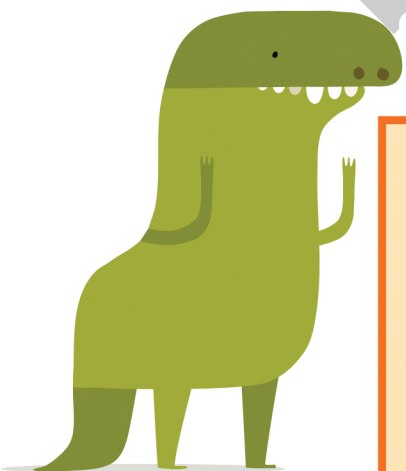
3.1 	A Birthday Card	68
3.2 	A Fun Storybook	90
3.3 	Collect the Apples!	112
3.4 	Catch the Crystals!	134
	Answers	157

The Interface of Scratch

In Scratch's interface, there are five main components: Block Palette, Code Area, Stage, Sprite Pane, and Backdrop Pane.

Sprites are objects that you control in a project. In order to control a sprite, you have to give it a script – a list of instructions – by putting code blocks together. Each block contains one piece of code. Once the blocks are put together, a script is formed and Scratch is able to run through it from top to bottom to allow the sprite to carry out the actions or functions you want it to perform.

I am controlled by blocks.



Looks Blocks

nine main block categories

one piece of code per block

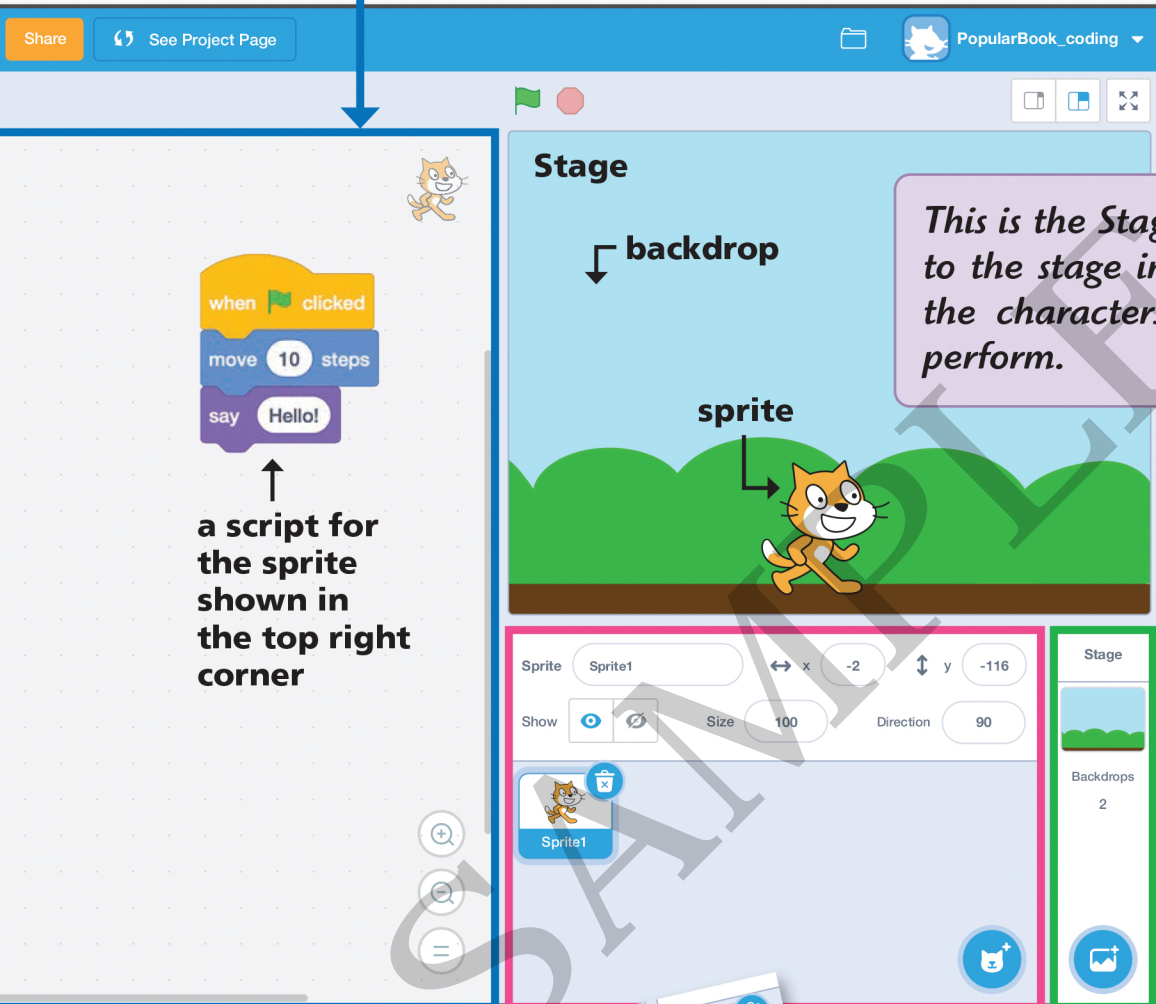
Block Palette

The Block Palette contains blocks that are categorized based on their functionality. The blocks within the same category share the same color and similar functions. There are nine main block categories in Scratch 3.0. This book mainly covers the most commonly used ones such as Motion, Looks, and Sound.



Code Area

The Code Area is where scripts are housed. Scripts are created by colored blocks to tell sprites what to do and set the Stage.



This is the Stage. It is similar to the stage in a play where the characters (also sprites) perform.



a script for the sprite shown in the top right corner

Sprite Pane

Sprites are the “actors” of your project. They can be animals, letters, or objects and they are controlled by scripts. The Sprite Pane shows all the sprites that are included in your project. You can also add, remove, and reorder sprites in the Sprite Pane.

Backdrop Pane

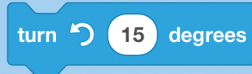
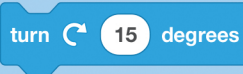
The Backdrop Pane is where you can add backdrops to your project. Backdrops are basically the backgrounds of the Stage and there can be multiple backdrops for the Stage.

2.1d

Simple Movements

Turning a Sprite Right (Clockwise) or Left (Counterclockwise)

In this tutorial, you will use the sprite Dinosaur3 and the following blocks:



Try These!

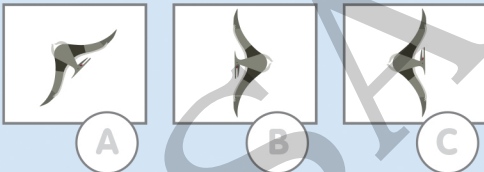
1. Drag  to the Code Area.

- Click the block once. Check what happens.

- A Dinosaur3 turns right.
 B Dinosaur3 turns left.

2. Keep clicking  until Dinosaur3 looks down.


- Check what Dinosaur3 looks like.



3. Drag  to the Code Area.

- Click the block once. Check what Dinosaur3 does.

- A It moves 15 steps. B It turns.

4. Keep clicking . Can Dinosaur3 return to its original position?

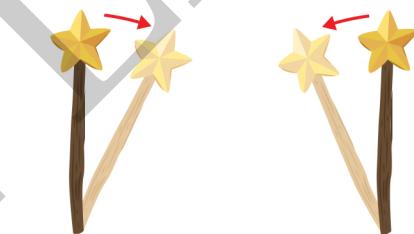
- Check "Yes" or "No".

- A Yes B No



Note

turn right (clockwise) turn left (counterclockwise)



Note

The arrows tell you the direction of the turns.

turn right (clockwise)



turn left (counterclockwise)



TRYOUTS!

Motion

Setup

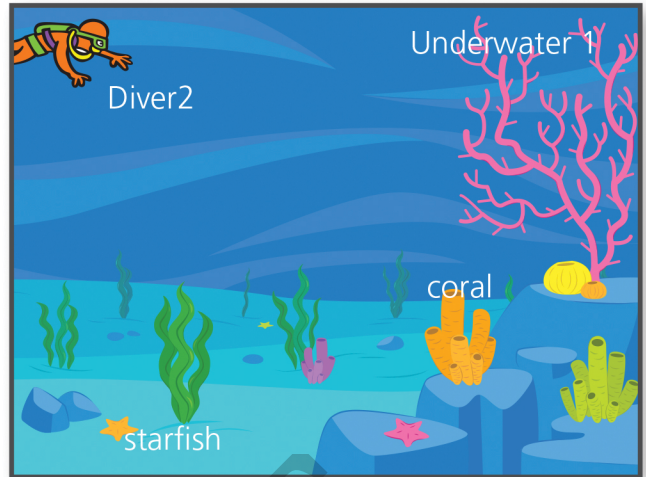
Add Underwater 1 as the backdrop and Diver2 as the sprite.

Blocks

Motion, Events, and Control

Mission

Diver2 starts at the top left corner and swims to look at the orange coral. Then Diver2 turns around and swims to the orange starfish.



Use each description to help find the correct block. Click  to run the script to test whether I'm moving on the Stage the way I'm supposed to.

Draw lines to bring the correct blocks to the script.

set rotation style left-right

point in direction -90

go to x: -221 y: 147

glide 5 secs to x: 45 y: -23

glide 3 secs to x: -100 y: -129

when clicked

point in direction 90

wait 1 seconds

Annotations:

- Set the initial direction.
- Set the initial position to the top left corner.
- Diver2 glides to the coral.
- Pause for 1 second.
- Make Diver2 face either left or right.
- Turn Diver2 around.
- Diver2 glides to the starfish.

A Birthday Card

In Action!



When D is clicked, it will do a full rotation.

Steps:

- 1 Go to the Sprite Pane to add D under the category "Letters".
- 2 Set the position of D at (x: 82,y:16).
- 3 Add the blocks below to the Code Area.

Run the script when D is clicked.

Set D to point to the right.

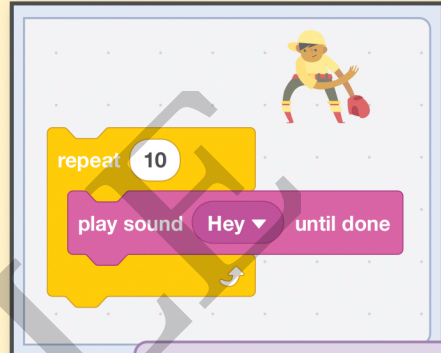
Repeat the blocks inside four times.

Rotate D 90° clockwise and pause for one second (for four times).

- 4 Click D.



Any blocks inside a repeat block will repeat itself a given number of times.



Click this script and you will hear me say "Hey!" ten times.



Question Time

Check ✓ the script that works the same as the one above.



Snapshots

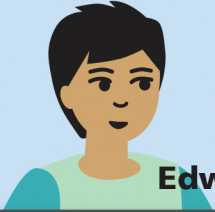
A

B



In programming, a bug is a coding error in a computer program. The coders find that there are bugs in their programs. Help them spot the bugs in their scripts and answer the questions.

Case 1



Edwin

I want Cake's candles to be lit and the music to be played when Cake is clicked, but it is not doing that.

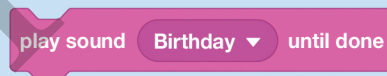
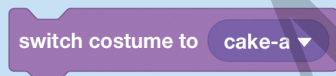


Circle or check ✓ the correct answers.

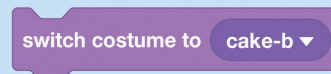
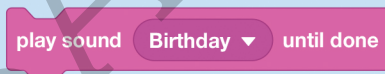
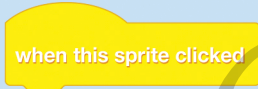
1. With Edwin's script, what happens when Cake is clicked?

- A The candles are lit and music is played; there is no issue with the script.
- B Nothing happens to Cake; there is no animation or music.

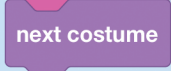
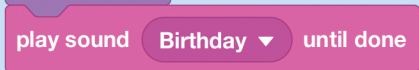
2. Circle the block in the script that causes the problem.



3. Replacing the block you circled in Question 2 with which block below can fix the problem? Circle it.



4. Edwin's friend, Amy, thinks that her script below allows the candles to be lit and unlit correctly. However, it is not always true. Under what circumstance does the script fail?



- A when a user clicks Cake and lets the script finish running before clicking Cake again
- B when a user clicks Cake repeatedly while the script is still running
- C when a user clicks Rooster before clicking Cake