The Official ROBLOX Guide

Coding with Roblox Lua in 24 Hours

Pearson

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About the Author

Genevieve Johnson is the senior instructional designer for Roblox, the world's largest user-generated social platform for play. In her role, she oversees creation of educational content and advises educators worldwide on how to use Roblox in STEAM-based learning programs. Her work empowers students to pursue careers as entrepreneurs, engineers, and designers. Prior to Roblox, Johnson was educational content manager for iD Tech, a nationwide tech education program that reaches more than 50,000 students yearly, ages 6-18. While at iD Tech, she helped launch a successful all-girls STEAM program, and her team developed educational content for more than 60 technology-related courses, teaching a variety of subjects from coding to robotics and game design.

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HOUR 1
Coding Your First Project

What You'll Learn in This Hour:

- ▶ Why Roblox and Lua are a perfect combination
- ▶ What Roblox Studio's main windows are
- ▶ How to say "Hello" to the world with your first code
- ▶ How to make a part explode
- ▶ How to check for errors
- ▶ How to leave a comment

Roblox is the world's most popular game development platform. All types of people come together to create amazing virtual experiences: artists, musicians, and—you guessed it—coders. Coding is what allows players to interact with the world that they see.

In Roblox, the coding language used is Lua. Lua is one of the easiest coding languages to learn, and when used with Roblox Studio, you can see the results of your code fast. For example, want to create an enormous explosion with a massive blast radius? You can do that with just a couple of lines of Lua.

Roblox Studio is the tool in which all Roblox games are created, and when paired with Lua, it offers seamless access to multiplayer servers, physics and lighting systems, world-building tools, monetization systems, and more. And even though Roblox provides the environment in which your program runs, you control the vision. You are the creator and artist. Roblox gives you the canvas and paints, and Lua the brushes and actions. But *you*, with some well-placed dabs of code, get to create your masterpiece. This first hour covers how to set up Roblox Studio, make your first script, and test your code.

Installing Roblox Studio

Before you get started, make sure you have Roblox Studio installed. It runs on Windows and MacOS, and you can grab a copy at https://roblox.com/create. Click Start Creating to begin. You'll need to create a Roblox account if you don't yet have one (see Figure 1.1).

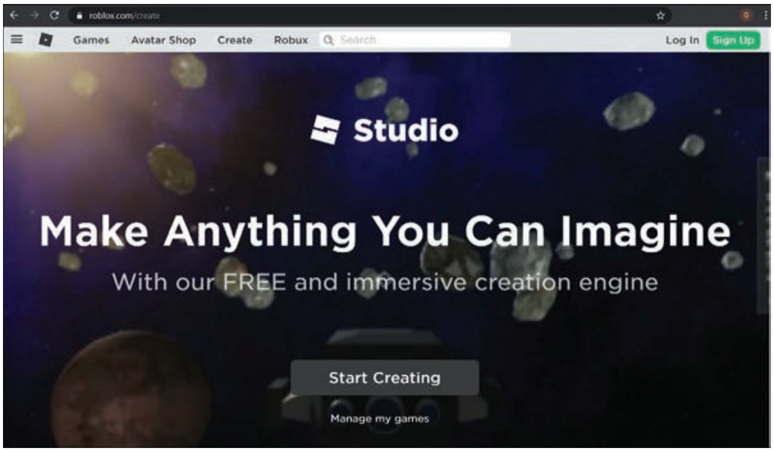


FIGURE 1.1
You need an account to use Roblox Studio. It's free and just a quick sign-up away.

Let's Take a Tour

Roblox Studio provides everything you need to create games. It includes assets such as character models, items to put in the world, graphics for the sky, soundtracks, and more.

Go ahead and launch Roblox Studio to see the window shown in Figure 1.2. Enter the login information for the account you created when you signed up on the Roblox website and click Log In.

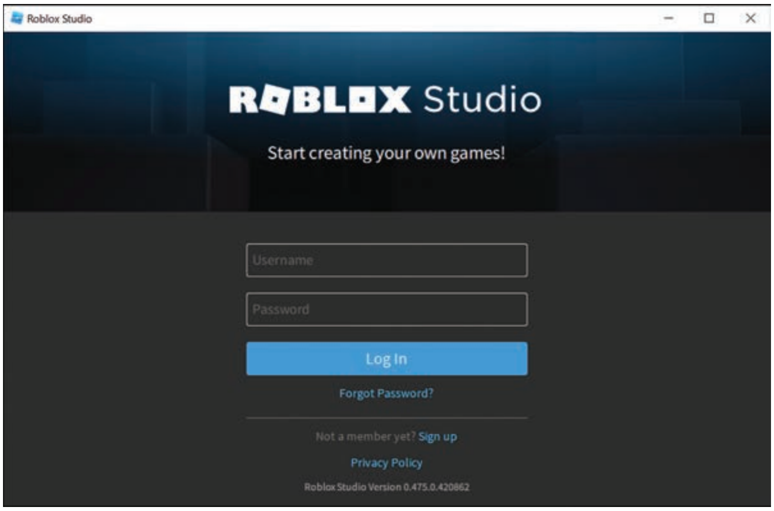

Roblox Studio
ROBLOX Studio
Start creating your own games!
Username
Password
Log In
Forgot Password?
Not a member yet? Sign up
Privacy Policy
Roblox Studio Version 0.475.0.420862

FIGURE 1.2
Enter your normal Roblox account information.

When you first open up Studio, you see templates. These are starting places you can use for your experiences. The simplest starting point for any project is the *Baseplate* template. Click on the Baseplate template, as shown in Figure 1.3.

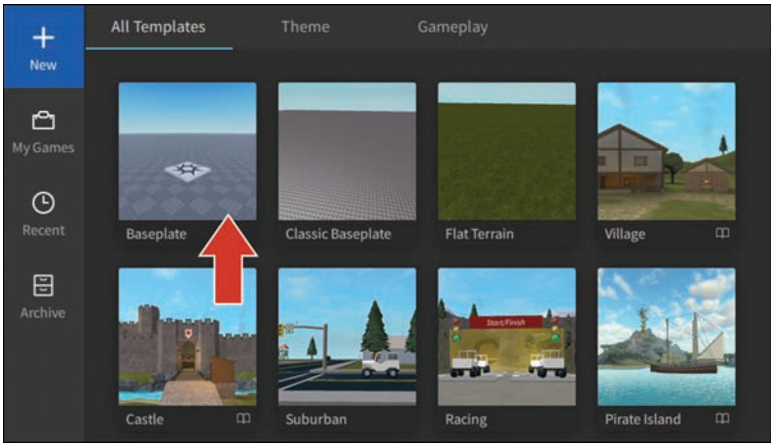


FIGURE 1.3
Studio offers template places you can use as starting points.

Let's start with a quick overview of the main parts of the screen in Figure 1.4, and then move straight into your first line of code:

1. The offerings in the Toolbar ribbon change according to the menu tab you've selected.
2. The Toolbox contains existing assets to add to your game. You can also create your own assets through a 3D modeling program such as Blender3D, and Studio includes a set of mesh-editing tools to customize the 3D models already available.
3. The 3D Editor provides a view of the world. Hold your right mouse button to turn the view, and use the WASD keys to reposition the camera. Table 1.1 describes the different controls to move the camera.
4. The Explorer window provides convenient access to every key asset or system in the game. You use this to insert objects into your experience.
5. Use the Properties window to make changes to objects in the game, such as color, scale, value, and attributes. Select an object in the Explorer to see available properties.

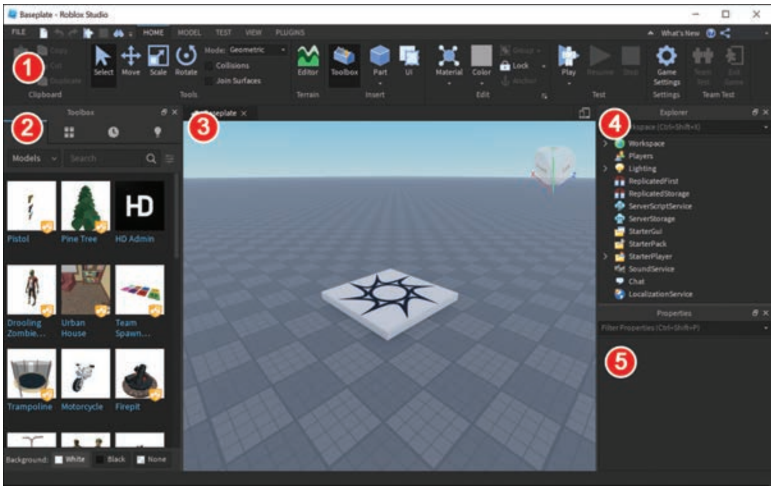


FIGURE 1.4
There are a number of panels, buttons, and lists in the Studio, and you'll quickly become familiar with them.

TABLE 1.1 Camera Controls

Key	Movement
W A S D	Move the camera up, left, down, or right
E	Move the camera
Q	Lower the camera down
Shift	Move the camera slower
Right mouse button (hold and drag mouse)	Turn the camera
Middle mouse button	Drag the camera
Mouse scroll wheel	Zoom the camera in or out
F	Focus on selected object

There are numerous ways to configure this main screen, including hiding different sections, rearranging their positioning to be more convenient, and changing their size.

Roblox Studio is a very complete game development environment that goes well beyond Lua. It's a big topic on its own, so you may want to check out our other book, *Roblox Game Development in 24 Hours*, for help.

Opening the Output Window

The Output window in Studio isn't open by default, but you need this before you continue so that you can see errors and messages that are related to your code.

Use the following steps to display the Output window:

1. Click the View tab (see Figure 1.5). If you ever close a window and need to reopen it, you can find it here.

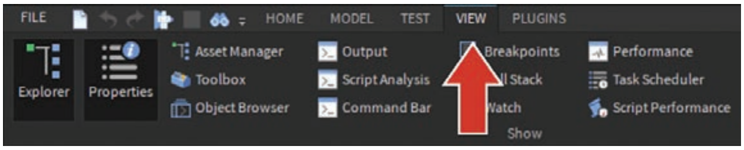


FIGURE 1.5
Use the View tab to control which windows are open.

2. Click Output (see Figure 1.6) to display the Output window at the bottom of your screen, as shown in Figure 1.7.

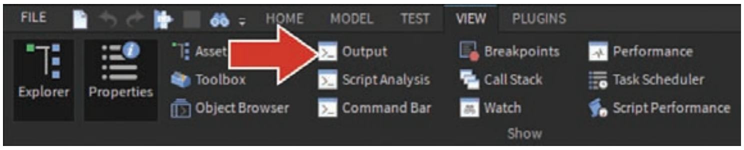
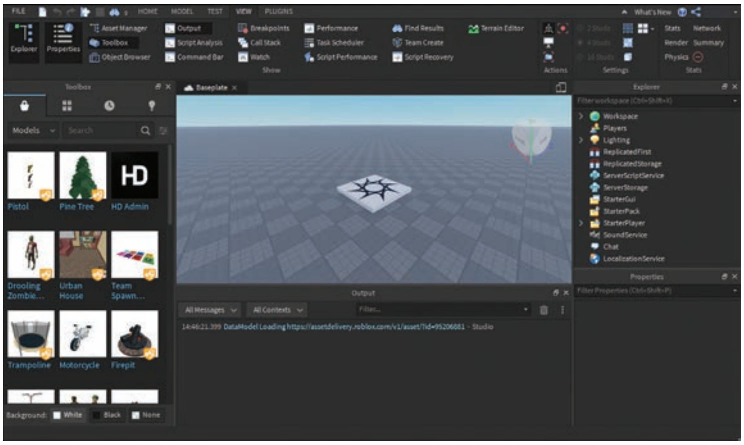


FIGURE 1.6
Click the Output option to open the Output window.



```
14:46:21.399 DataModel Loading https://assetdelivery.roblox.com/v1/asset/?id=95206881 - Studio
```

FIGURE 1.7
The Output window opens beneath the 3D Editor.

Writing Your First Script

On to coding! You need something to hold your code, and that's a script. You can insert scripts directly into objects within the world. In this case, you're inserting a script into a part.

Insert a Script into a Part

A part is the basic building block of Roblox. Parts can range in size from very tiny to extremely large. They can be different shapes such as a sphere or wedge, or they can be combined into more complex shapes.

1. Return to the Home tab and click Part (see Figure 1.8). The part appears in the 3D Editor at the center of your camera view.

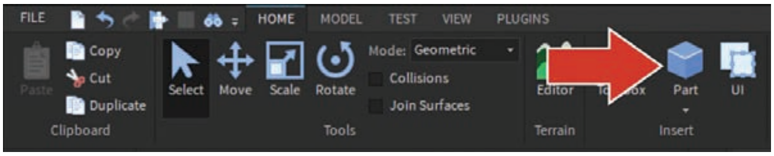


FIGURE 1.8
Click Part on the Home tab to insert a part.

2. To add a script, in Explorer, hover over the part and click the + symbol, and then select Script from the drop-down menu (see Figure 1.9).

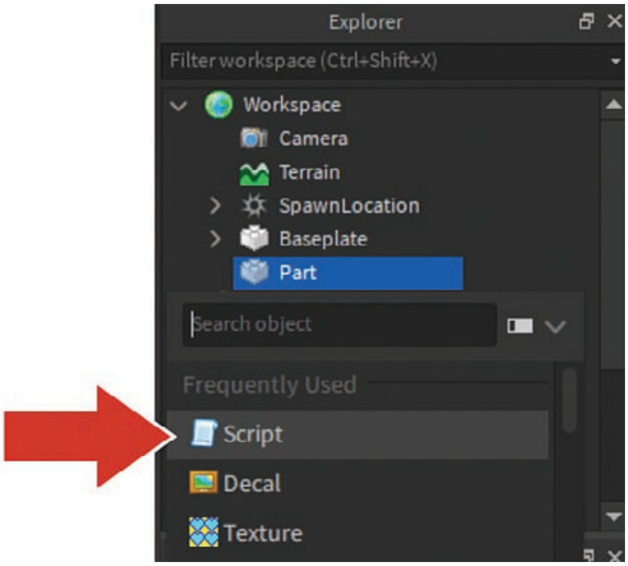


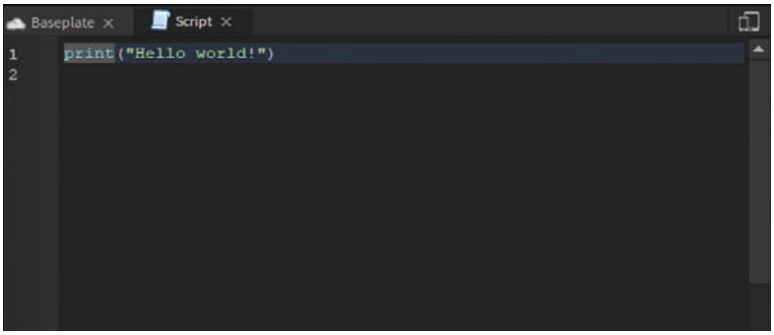
FIGURE 1.9
You use Explorer to insert a script into the part.

TIP

Finding Items Quickly

Typing the first letter (*S*, in this case) or two of the items you are adding filters the list so you can locate that item quickly.

The script automatically opens. At the top, you see words familiar to any coder: `"Hello world!"` (see Figure 1.10).



```
print("Hello world!")
```

FIGURE 1.10
The window shows the default script and code.

Writing Some Code

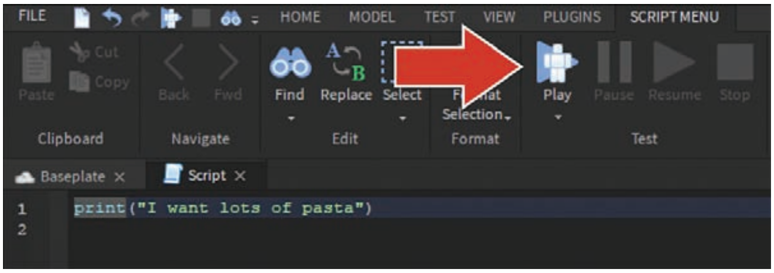
Since the 1970s, `"Hello World!"` has been one of the first pieces of code people have learned. Here it's being used in the print function. Functions are chunks of code that serve a specific purpose. As you learn to code, you'll use prebuilt functions like `print()`, which displays messages in the Output window. You will, of course, also learn how to create functions of your own.

`print()` displays a string, which is a type of data usually used with letters and numbers that need to stay together. In this case, you're printing `"Hello world!"`:

1. Make this code your own by changing the message inside of the quotation marks to what you want for dinner tonight. Here's an example:

   ```
   print("I want lots of pasta")
   ```

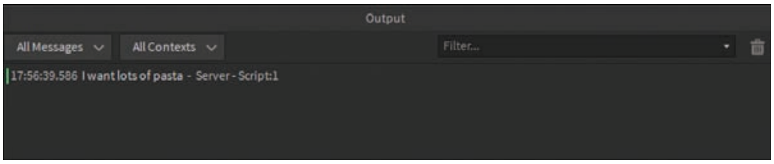
2. To test the code, in the Home tab, click Play (see Figure 1.11).



```
print("I want lots of pasta")
```

FIGURE 1.11
Click Play to test your script.

Your avatar will fall into the world, and you can see your dinner dreams displayed in the Output window, along with a note about which script that message came from (see Figure 1.12).



```
17:56:39.586 I want lots of pasta - Server - Script:1
```

FIGURE 1.12
The string is displayed in Output.

3. To stop the playtest, click the Stop button (see Figure 1.13).

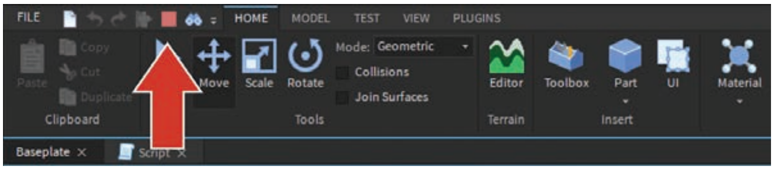
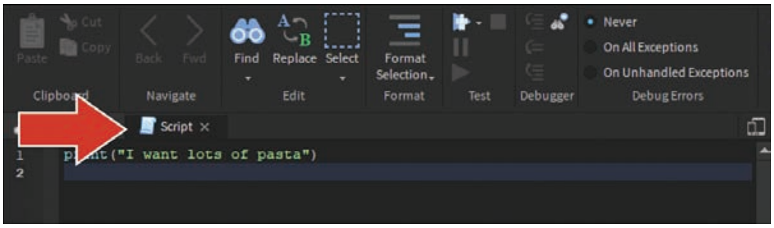


FIGURE 1.13
Click Stop to quit the playtest.

4. Return to your script by clicking on the tab above the 3D Editor, as shown in Figure 1.14.



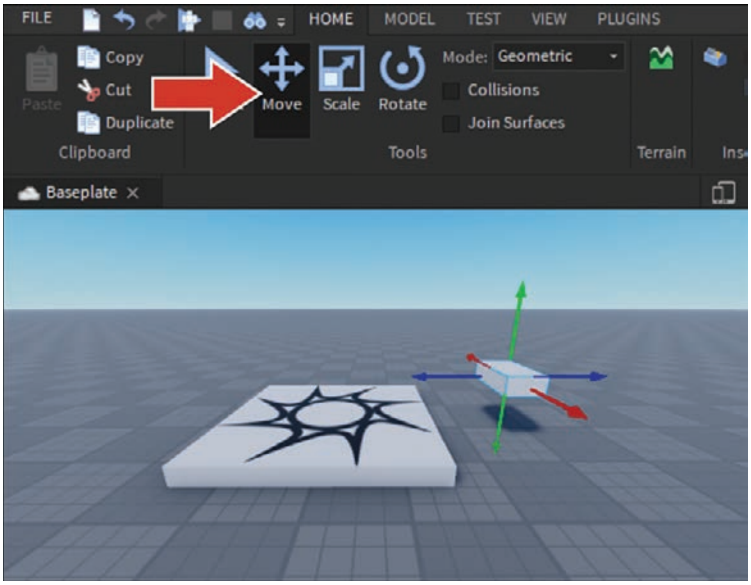
```
print("I want lots of pasta")
```

FIGURE 1.14
Click Script to return to the window where your script is visible.

Code an Explosion

Code of course can do more than just display messages to the output window. It can completely change how players interact with the world and make it come alive. Let's take a slightly longer piece of code and make the block in the Baseplate template destroy anything it touches:

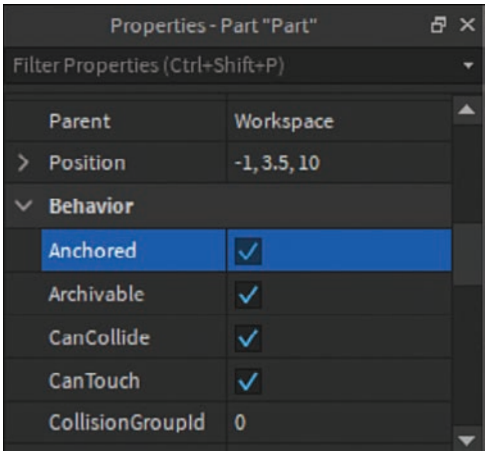
1. Use the Move tool (see Figure 1.15) to move the block off the ground and away from the spawn point. The code you're going to write will destroy anything it touches, and you don't want it to go off prematurely.



Mode: Geometric

FIGURE 1.15
Move the part up and away from the spawn.

2. In the Properties window, scroll to Behavior and make sure Anchored (see Figure 1.16) is selected so the block doesn't fall when you click Play.



Properties - Part "Part"

Filter Properties (Ctrl+Shift+P)

Parent	Workspace
Position	-1, 3.5, 10
Behavior	
Anchored	✓
Archivable	✓
CanCollide	✓
CanTouch	✓
CollisionGroupId	0

FIGURE 1.16
Check Anchored to keep the blocks from falling.

3. In the script, below the `print` function, add the following code:

```
print("I want lots of pasta!")

-- Destroys whatever touches the part
local trap = script.Parent
local function onTouch(partTouched)
    partTouched:Destroy()
end
trap.Touched:Connect(onTouch)
```

NOTE

Code Boxes

Code boxes for this book will be presented in light mode, unless specifically calling attention to Studio UX.

4. Click Play and run up and touch the part.

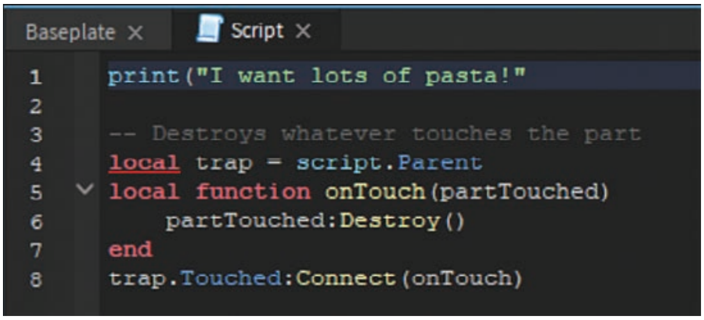
The result should be that your character breaks or parts of your avatar are destroyed. You may notice that this code only destroys what touches it directly, such as your feet. Try jumping on top of the block or brushing against it with just a hand. You'll see only that part of your avatar is destroyed.

The reason is that code only does what you tell it, and you told the part to destroy only what it touches and nothing more. You have to tell it how to destroy the rest of the player. Throughout this book, you'll learn how to write additional instructions so that the code can handle more scenarios like this one. In Hour 4, "Parameters and Arguments," you'll learn how to make sure it destroys the entire player character.

Error Messages

What if the code didn't work? The truth is, all engineers make mistakes in their code. It's no big deal, and the editor and the output window can help you spot mistakes and fix them. Try making a couple of mistakes to learn how to better spot them later:

1. Delete the second parenthesis from the `print` function. A red line appears under `local`. (See Figure 1.17.) In the editor, red lines indicate a problem.

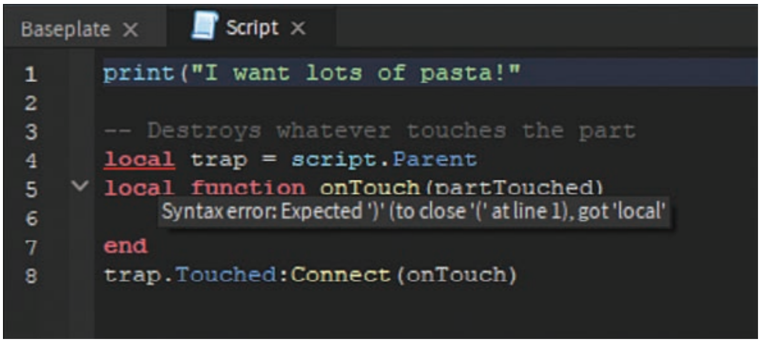


```
print("I want lots of pasta!"

-- Destroys whatever touches the part
local trap = script.Parent
local function onTouch(partTouched)
    partTouched:Destroy()
end
trap.Touched:Connect(onTouch)
```

FIGURE 1.17
A red line indicates Studio has spotted an error.

2. Hover over the red line, and the editor gives you a clue about what's gone wrong, as shown in Figure 1.18. But don't fix the mistake quite yet.

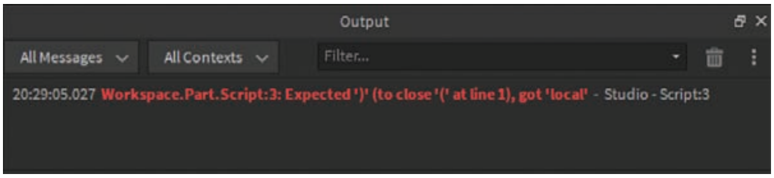


```
print("I want lots of pasta!"

-- Destroys whatever touches the part
local trap = script.Parent
local function onTouch(partTouched)
    Syntax error: Expected ')' (to close '(' at line 1), got 'local'
end
trap.Touched:Connect(onTouch)
```

FIGURE 1.18
An error message displays when you hover over the red line.

3. Click Play, which causes an error message to display in the Output window, as shown in Figure 1.19. Click the red error, and Studio takes you to where it thinks the problem is.



```
20:29:05.027 Workspace.Part.Script:3: Expected ')' (to close '(' at line 1), got 'local' - Studio - Script:3
```

FIGURE 1.19
The error shows up as a clickable red message in the Output window.

Stop the playtest and fix the issue.

TIP

Changes Made While Playtesting Aren't Permanent

Be careful about making changes while in a playtest because the work you've done is not automatically saved. If you do make changes, be sure to click Preserve Changes when you stop the playtest.

Leaving Yourself Comments

In the previous code, you may notice the sentence `-- Destroys whatever touches the part`. This is a comment. Comments begin with two dashes. Anything on the same line as the dashes doesn't affect the script.

Coders use comments to leave notes to themselves and others about what the code does. Trust us: When you haven't looked at a piece of code in months, it's very easy to forget what it does.

The following code shows what it might look like to add a comment at the top of the script you wrote earlier in this hour:

```
-- What do I want for dinner?
print("I want lots of pasta!")
```

Summary

In just one hour, you've come a long way, particularly if this happened to be your first time coding or using Roblox Studio. This hour covered creating an account and opening Roblox for the first time. By using the + button, you were able to insert a script into a part, and then you added code that turned the part into a trap for anyone who happened to touch it.

In addition, you learned how to test code using the Play button and use the built-in error detection within the script editor and Output window to help you troubleshoot when something goes wrong.

Finally, you learned about comments, which are only readable in the script editor and can be used to leave notes about the purpose of the code.

Q&A

Q. Can you use Studio on a Chromebook?

A. To create, Studio must be run on a MacOS or Windows machine. Once a game has been published, it's available to be played on Android, Apple, Mac, PC, Chrome, and potentially even XBox Live.

Q. How do I reopen a script if I close it?

A. If you close out of the script editor, you can reopen it by double-clicking the script object in Explorer.

Q. How do I save my work?

A. Go to File, Publish to Roblox to save to the cloud, which makes your game accessible from any computer.

Q. Where do I go if I want additional information about how Roblox Studio works?

A. You can visit developer.roblox.com to find documentation on all of Studio's features and API.

Workshop

Now that you have finished, let's review what you've learned. Take a moment to answer the following questions.

Quiz

1. Roblox uses the _________ coding language.
2. Aspects of an object such as color, rotation, and anchored can be found in the ______ window.
3. Game objects are found in the _________ window.
4. To enable the Output window, which displays code messages and errors, enable it in the ________ tab.
5. True or false: Comments change the code to enable new functionality.
6. To force parts to stay in place, they need to be _______.

Answers

1. Lua
2. Properties
3. Explorer
4. View
5. False. Comments do not affect the code and are used to leave notes to yourself and other coders as to the purpose of the script.

5. Anchored

Exercise

Before moving on, take a moment to experiment with the creation tools by creating a mini obstacle course. It could be individual parts the player has to avoid, or it could be a lava floor like the one shown in Figure 1.20.

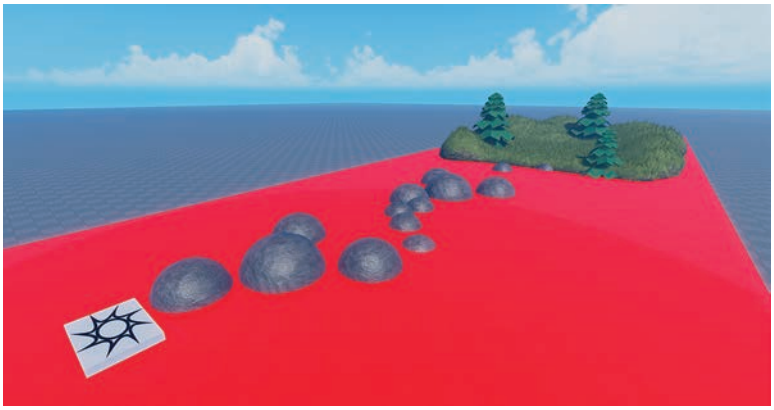


FIGURE 1.20
Use what you've learned so far to create a lava obstacle course.

Tips

- ▶ Create more parts and manipulate them with the Move, Translate, and Scale tools found on the Home tab (see Figure 1.21). You can also change the parts' appearance with Material and Color.

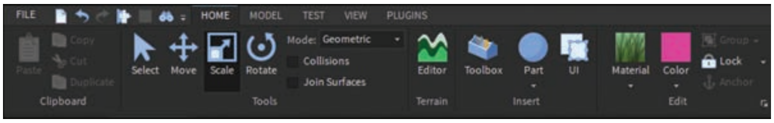


FIGURE 1.21
The Home tab has the tools you need to create and manipulate parts.

- ▶ Use a single large part and insert a script as you did earlier to turn it into lava.
- ▶ Additional models can be found in the Toolbox; just be aware that some models may already have scripts in them.
- ▶ Don't forget to anchor all parts and models.
- ▶ If you know how to use the terrain tools, you can work that into your obstacle course as well.

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