

Roblox coding with Lua



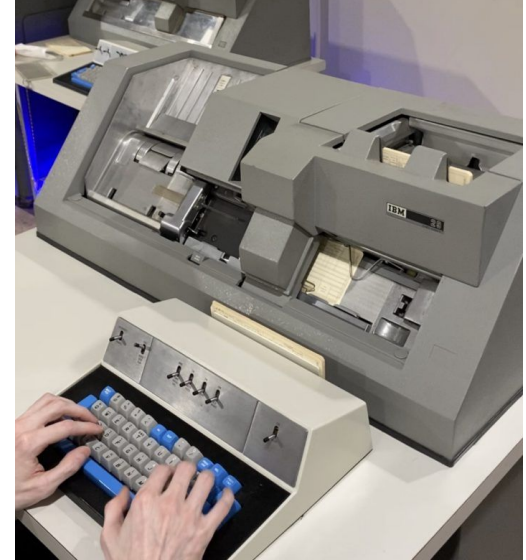
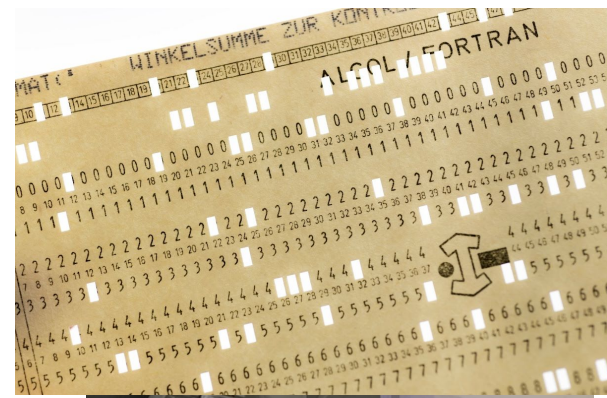
Lecture 1



A hacker's guide to them codez by [@murrekatt](#).

What is Programming?

1. *Programming, coding, software engineering*
2. **Writing text (instructions) to do something**
 - a. software instructs hardware
 - b. software instructs other software
3. “Text” to be translated into machine code
4. Many different programming languages - why?
5. **Great for problem solving-thinking training!**



How a computer runs code

1. Software is compiled code
 - a. Various intermediate steps
2. Compiled code is what the CPU understands
 - a. Hardware architecture matters!
3. Zeros and Ones — binary — on or off elec
in small circuits (chips)
4. Computer loads compiled code into memory
to run it

```
return (function ()  
  
    local function tdump(t)  
        local search = pairs;  
        local sf = string.format;  
        local sr = string.rep;  
        local perf_type = type;  
        local ts = tostring;  
        local function dmp(t, l, k)  
            if perf_type(t) == "table" then  
                local msg = sf("%s%s:", sr(" ", l*2), ts(k));  
                print(msg);  
                for k, v in search(t) do  
                    dmp(v, l+1, k);  
                end  
            else  
                local msg = sf("%s%s:%s", sr(" ", l*2), ts(k), ts(t));  
                print(msg);  
            end  
        end  
        dmp(t, 1, "root");  
    end  
  
    return {  
        tdump = tdump;  
    };  
end)(...)
```

.text:00008768	e51b2038	ldr r2, [fp, #-56]
.text:0000876c	e51b301c	ldr r3, [fp, #-28]
.text:00008770	e300378f	mov r3, #1935
.text:00008774	e50b303c	str r3, [fp, #-60]
.text:00008778	e51b3020	ldr r3, [fp, #-32]
.text:0000877c	e2832001	add r2, r3, #1



What is Lua?



1. **Simple and minimalistic language to be embedded**
2. Used by many platforms and other software
 - a. Roblox, World of Warcraft, Angry Birds
 - b. nginx, plugins, extension, ...
3. Not compiled to machine code, but **interpreted at runtime**
 - a. Lua VM (virtual machine) used by Roblox
4. **A great language to get started with programming**

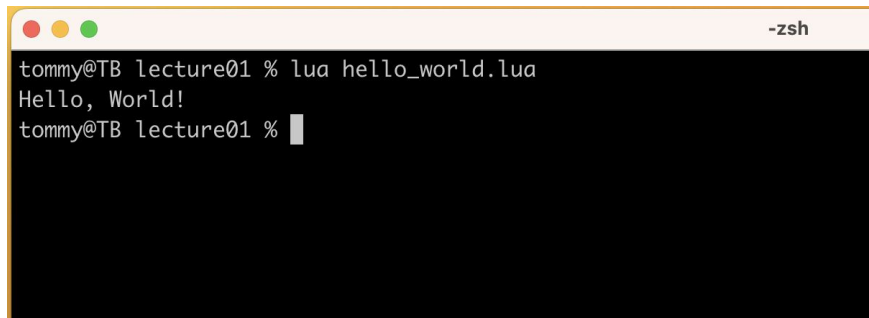
Lua in action

```
$ brew install lua
```

```
$ code hello_world.lua
```

```
$ lua hello_world.lua
```

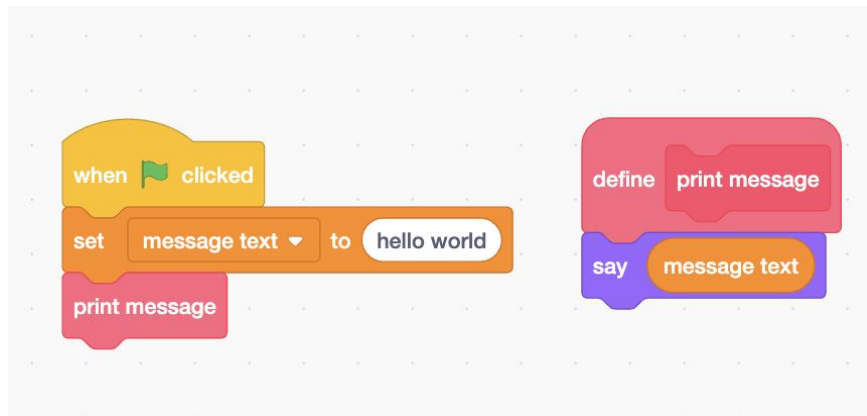
```
local message_text = "Hello, World!"  
local function print_message()  
    print(message_text)  
end  
print_message()
```

A terminal window with a black background and white text. The window has a title bar with three colored circles (red, yellow, green) on the left and the text "-zsh" on the right. The terminal content shows the command "lua hello_world.lua" being executed, which outputs "Hello, World!". The prompt "tommy@TB lecture01 %" is visible at the end of each line.

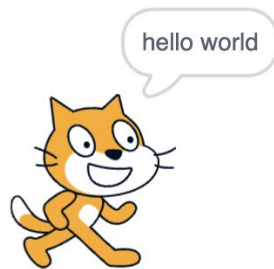
```
tommy@TB lecture01 % lua hello_world.lua  
Hello, World!  
tommy@TB lecture01 %
```

Lua vs Scratch

```
local message_text = "Hello, World!"  
local function print_message()  
    print(message_text)  
end  
print_message()
```



```
tommy@TB lecture01 % lua hello_world.lua  
Hello, World!  
tommy@TB lecture01 %
```



Actors vs Sequential

1. Actors run own code and interact with other actors

- a. Objects (Roblox)
- b. Sprites (Scratch)

2. ...this is a decentralized and concurrent model

- a. *“Things happen at the same time”*

3. Sequential

- a. *“Things happen one after the other in a fixed order”*

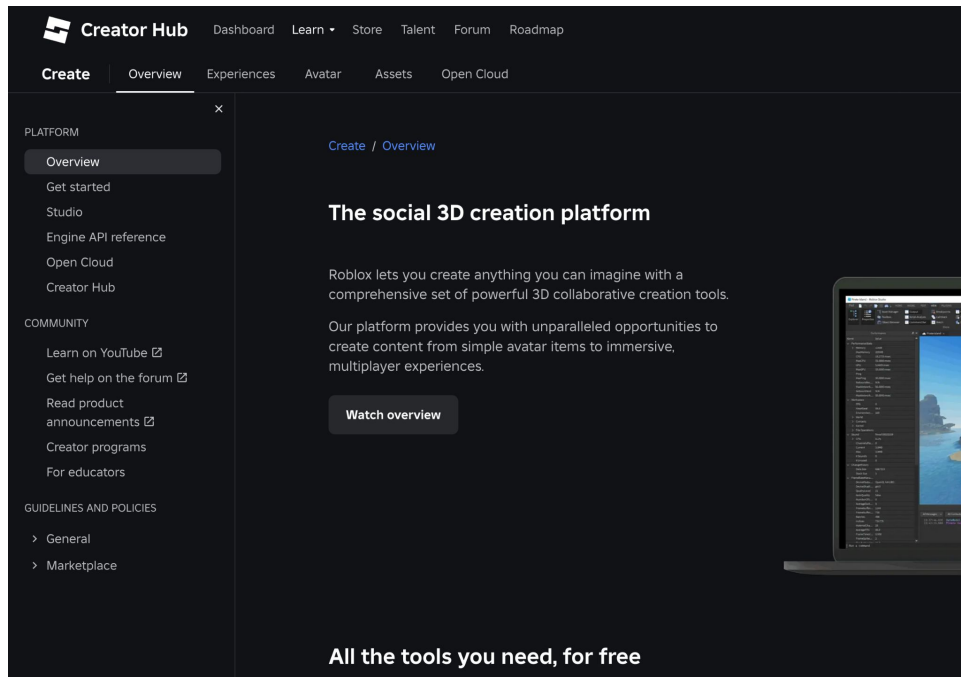
Roblox and Lua



1. Roblox runs Lua inside itself
 - a. Lua VM
 - b. *Luau, a Lua derivative... (more on this later)*
2. Lua scripts attached to objects
 - a. Scratch code attached to sprites
3. Lua is very simple...
4. ...But Roblox provides many things ready to use

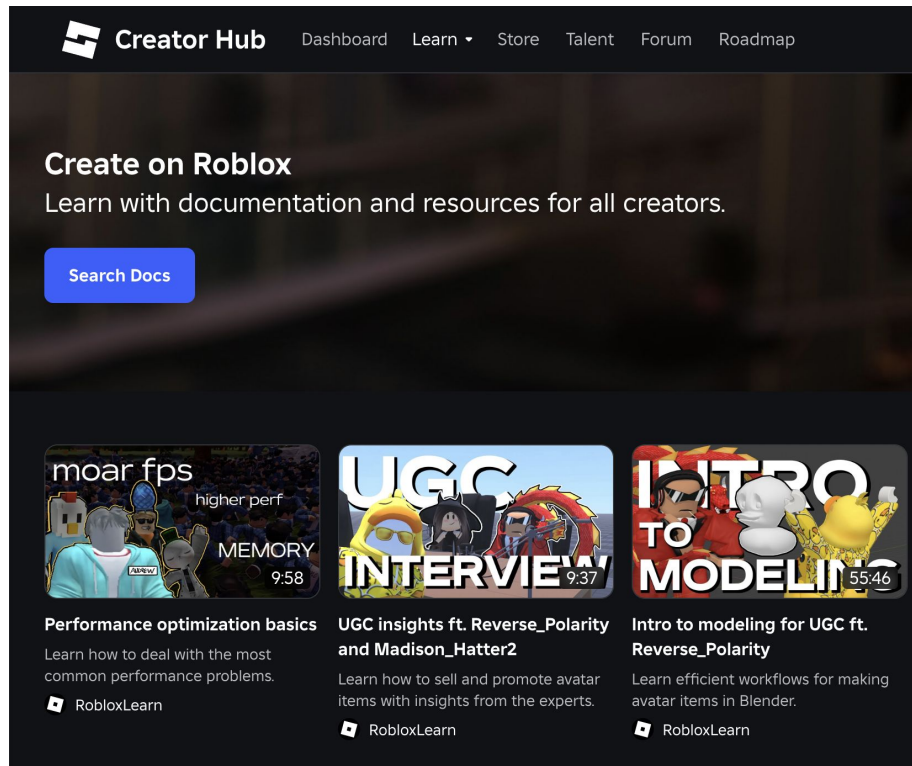
Roblox APIs

1. Roblox apps use Roblox API
2. <https://create.roblox.com/docs/en-us/platform>



Roblox Docs

1. Great tutorials
2. <https://create.roblox.com/docs>




The screenshot shows the Roblox Creator Hub homepage. At the top is a dark navigation bar with the 'Creator Hub' logo and links for 'Dashboard', 'Learn', 'Store', 'Talent', 'Forum', and 'Roadmap'. Below the navigation bar, the main heading 'Create on Roblox' is followed by the text 'Learn with documentation and resources for all creators.' A blue 'Search Docs' button is positioned below this text. The lower section features three video thumbnails. The first thumbnail, titled 'moar fps', shows avatars in a game environment with text overlays for 'higher perf', 'MEMORY', and a duration of '9:58'. The second thumbnail, titled 'UGC INTERVIEW', shows three avatars with a duration of '9:37'. The third thumbnail, titled 'INTRO TO MODELING', shows avatars with a duration of '55:46'. Each video has a title, a brief description, and a 'RobloxLearn' logo at the bottom.

Creator Hub Dashboard Learn Store Talent Forum Roadmap

Create on Roblox


Learn with documentation and resources for all creators.

Search Docs




moar fps
higher perf
MEMORY
9:58

Performance optimization basics
Learn how to deal with the most common performance problems.
RobloxLearn



UGC INTERVIEW
9:37

UGC insights ft. Reverse_Polarity and Madison_Hatter2
Learn how to sell and promote avatar items with insights from the experts.
RobloxLearn



INTRO TO MODELING
55:46

Intro to modeling for UGC ft. Reverse_Polarity
Learn efficient workflows for making avatar items in Blender.
RobloxLearn

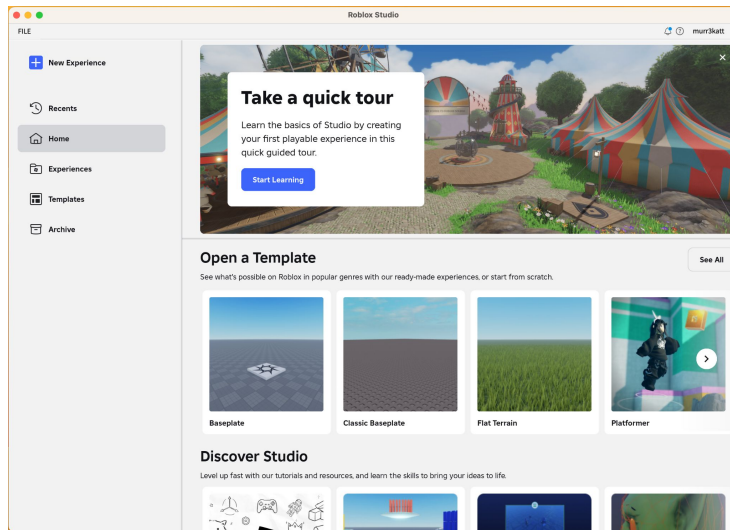
Roblox Studio in action

1. Open Roblox Studio
2. New experience
3. Add part and edit script:

```
local part = script.Parent
```

```
part.BrickColor = BrickColor.Red()
```

```
print("Hello, World!")
```



Why Lua matters

1. Simple and powerful

- a. Tables are Lua's magic data structure

2. Embeddable in other software

3. Flexibility!

Variables

1. Store and manipulate data (“memory”)
2. Dynamically typed

```
local part = script.Parent
local color = "Red"
local size = 5
print("Color:", color, "Size:", size)
part.BrickColor = BrickColor.new(color)
part.Size = Vector3.new(size, size, size)
```

Conditionals (if-then-else)

1. Controls flow...

```
local part = script.Parent
local playerCount = game.Players.NumPlayers
if playerCount > 0 then
    part.BrickColor = BrickColor.new("Green")
    print("Players in game! Sphere is green.")
else
    part.BrickColor = BrickColor.new("Red")
    print("No players. Sphere is red.")
end
```

For-loops

Repeat for all in a list...

```
local part = script.Parent
for i = 1, 5 do
    print("Loop iteration:", i)
    wait(1) -- Wait 1 second
    part.Transparency = i / 5 -- Fade sphere
end
```

While-Loops

Repeats until condition no longer true

```
local part = script.Parent
for i = 1, 5 do
    print("Loop iteration:", i)
    wait(1) -- Wait 1 second
    part.Transparency = i / 5 -- Fade sphere
end
```


Tables

Lua's core data structure (“memory”)

```
local part = script.Parent
local colors = {"Red", "Blue", "Green"} -- Array-like table
local properties = {size = 5, isVisible = true} -- Dictionary-like table
for i, color in ipairs(colors) do
    print("Setting color:", color)
    part.BrickColor = BrickColor.new(color)
    wait(1)
end
part.Size = Vector3.new(properties.size, properties.size, properties.size)
print("Size set to:", properties.size)
```

Funcations

Reusable code blocks

```
local part = script.Parent
local function changeColor(newColor)
    part.BrickColor = BrickColor.new(newColor)
    print("Changed to:", newColor)
end
changeColor("Red")
wait(1)
changeColor("Blue")
```

Events

Handle interactions with other things and what happens

“How everything talks to each other”

```
local part = script.Parent
part.Touched:Connect(function(hit)
    part.BrickColor = BrickColor.new("Yellow")
    print("Sphere touched by:", hit.Parent.Name)
end)
```

Next steps and Q&A

1. Lua coding lesson 2

- a. Lua coding syntax and how it works
- b. Github (clone a repo from me)

2. Roblox platform how it works and how to use it

3. Self-study

- a. [Roblox Docs](#)
- b. [Roblox APIs](#)