New Think Tank

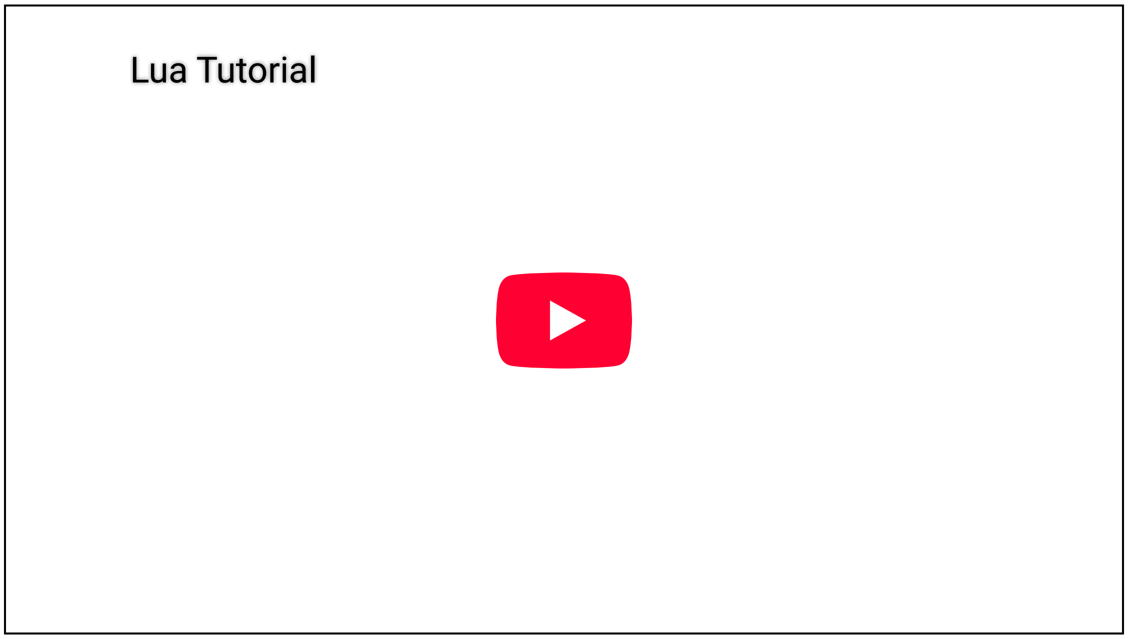
WEB DESIGN

LEARN LUA IN ONE VIDEO

JUNE 28, 2015 | DEREK BANAS | LEAVE A COMMENT

In todays video you will learn Lua in one video. I'll cover Data Types, Math, Conditionals, Strings, Looping, Repeat Until, getting user input, For, For In, Tables, Functions, returning multiple values, Variadic Functions, Closures, Coroutines, File I/O, Modules, Metatables, OOP, Inheritance and a lot more.

All of the code used in the video can be found below after the video. I also have videos like this for HTML5, CSS3, JavaScript, Java, PHP, OOP PHP, MySQL, Ruby, Go, C++, Python, Sass, Susy, Objective C and Swift.



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Cheat Sheet From the Video

```
-- Prints to the screen (Can end with semicolon)
print("Hello World")

--[[
Multiline comment
]]

-- Variable names can't start with a number, but can contain letters, numbers
-- and underscores

-- Lua is dynamically typed based off of the data stored there
-- This is a string and it can be surrounded by ' or "
name = "Derek"

-- Another way to print to the screen
-- Escape Sequences : \n \b \t \\ \" \'
-- Get the string size by proceeding it with a #
io.write("Size of string ", #name, "\n")

-- You can store any data type in a variable even after initialization
name = 4
io.write("My name is ", name, "\n")

-- Lua only has floating point numbers and this is the max number
bigNum = 9223372036854775807 + 1
io.write("Big Number ", bigNum, "\n")

io.write("Big Number ", type(bigNum), "\n")

-- Floats are precise up to 13 digits
floatPrecision = 1.999999999999 + 0.0000000000005
io.write(floatPrecision, "\n")

-- We can create long strings and maintain white space
longString = [[
I am a very very long
string that goes on for
ever]]
io.write(longString, "\n")
```

```
-- Combine Strings with ..
longString = longString .. name
io.write(longString, "\n")

-- Booleans store with true or false
isAbleToDrive = true
io.write(type(isAbleToDrive), "\n")

-- Every variable gets the value of nil by default meaning it has no value
io.write(type(madeUpVar), "\n")

-- ---------- MATH ----------
io.write("5 + 3 = ", 5+3, "\n")
io.write("5 - 3 = ", 5-3, "\n")
io.write("5 * 3 = ", 5*3, "\n")
io.write("5 / 3 = ", 5/3, "\n")
io.write("5.2 % 3 = ", 5%3, "\n")

-- Shorthand like number++ and number += 1 aren't in Lua

-- Math Functions: floor, ceil, max, min, sin, cos, tan,
-- asin, acos, exp, log, log10, pow, sqrt, random, randomseed

io.write("floor(2.345) : ", math.floor(2.345), "\n")
io.write("ceil(2.345) : ", math.ceil(2.345), "\n")
io.write("max(2, 3) : ", math.max(2, 3), "\n")
io.write("min(2, 3) : ", math.min(2, 3), "\n")
io.write("pow(8, 2) : ", math.pow(8, 2), "\n")
io.write("sqrt(64) : ", math.sqrt(64), "\n")

-- Generate random number between 0 and 1
io.write("math.random() : ", math.random(), "\n")

-- Generate random number between 1 and 10
io.write("math.random(10) : ", math.random(10), "\n")

-- Generate random number between 1 and 100
io.write("math.random(1,100) : ", math.random(1,100), "\n")

-- Used to set a seed value for random
```

```
math.randomseed(os.time())

-- Print float to 10 decimals
print(string.format("Pi = %.10f", math.pi))

-- ---------- CONDITIONALS ----------
-- Relational Operators : > < >= <= == ~=
-- Logical Operators : and or not

age = 13

if age < 16 then
    io.write("You can go to school", "\n")
    local localVar = 10
elseif (age >= 16) and (age < 18) then
    io.write("You can drive", "\n")
else
    io.write("You can vote", "\n")
end

-- A variable marked local is local only to this if statement
-- io.write("Local Variable : ", localvar)

if (age < 14) or (age > 67) then io.write("You shouldn't work\n") end

-- Format, convert to string and place boolean value with string.format
print(string.format("not true = %s", tostring(not true)))

-- There is no ternary operator in Lua
-- canVote = age > 18 ? true : false

-- This is similar to the ternary operator
canVote = age > 18 and true or false
io.write("Can I Vote : ", tostring(canVote), "\n")

-- There is no Switch statement in Lua

-- ---------- STRINGS ----------
quote = "I changed my password everywhere to 'incorrect.' That way when I forget
it,it always reminds me, 'Your password is incorrect.'"
```

```
io.write("Quote Length : ", string.len(quote), "\n")

-- Return the string after replacing
io.write("Replace I with me : ", string.gsub(quote, "I", "me"), "\n")

-- Find the index of a matching String
io.write("Index of password : ", string.find(quote, "password"), "\n")

-- Set characters to upper and lowercase
io.write("Quote Upper : ", string.upper(quote), "\n")
io.write("Quote Lower : ", string.lower(quote), "\n")

-- ---------- LOOPING ----------
i = 1
while (i <= 10) do
  io.write(i)
  i = i + 1

  -- break throws you out of a loop
  -- continue doesn't exist with Lua
  if i == 8 then break end
end
print("\n")

-- Repeat will cycle through the loop at least once
repeat
  io.write("Enter your guess : ")

  -- Gets input from the user
  guess = io.read()

  -- Either surround the number with quotes, or convert the string into
  -- a number
until tonumber(guess) == 15

-- Value to start with, value to stop at, increment each loop
for i = 1, 10, 1 do
  io.write(i)
end
```

```
print()

-- Create a table which is a list of items like an array
months = {"January", "February", "March", "April", "May",
"June", "July", "August", "September", "October", "November",
"December"}

-- Cycle through table where k is the key and v the value of each item
for k, v in pairs(months) do
  io.write(v, " ")
end

print()

-- ---------- TABLES ----------
-- Tables take the place of arrays, dictionaries, tuples, etc.

-- Create a Table
aTable = {}

-- Add values to a table
for i = 1, 10 do
  aTable[i] = i
end

-- Access value by index
io.write("First Item : ", aTable[1], "\n")

-- Items in Table
io.write("Number of Items : ", #aTable, "\n")

-- Insert in table, at index, item to insert
table.insert(aTable, 1, 0)

-- Combine a table as a String and seperate with provided seperator
print(table.concat(aTable, ", "))

-- Remove item at index
table.remove(aTable, 1)
```

```
print(table.concat(aTable, ", "))

-- Sort items in reverse
table.sort(aTable, function(a,b) return a>b end)
print(table.concat(aTable, ", "))

-- Create a multidimensional Table
aMultiTable = {}

for i = 0, 9 do
  aMultiTable[i] = {}
  for j = 0, 9 do
    aMultiTable[i][j] = tostring(i) .. tostring(j)
  end
end

-- Access value in cell
io.write("Table[0][0] : ", aMultiTable[1][2], "\n")

-- Cycle through and print a multidimensional Table
for i = 0, 9 do
  for j = 0, 9 do
    io.write(aMultiTable[i][j], " : ")
  end
  print()
end

-- ---------- FUNCTIONS ----------
function getSum(num1, num2)
  return num1 + num2
end

print(string.format("5 + 2 = %d", getSum(5,2)))

function splitStr(theString)

  stringTable = {}
  local i = 1

  -- Cycle through the String and store anything except for spaces
  -- in the table
  for str in string.gmatch(theString, "[^%s]+") do
    stringTable[i] = str
    i = i + 1
  end

  -- Return multiple values
  return stringTable, i
end

-- Receive multiple values
splitStrTable, numOfStr = splitStr("The Turtle")

for j = 1, numOfStr do
  print(string.format("%d : %s", j, splitStrTable[j]))
end

-- Variadic Function recieve unknown number of parameters
function getSumMore(...)
  local sum = 0

  for k, v in pairs{...} do
    sum = sum + v
  end
  return sum
end

io.write("Sum : ", getSumMore(1,2,3,4,5,6), "\n")

-- A function is a variable in that we can store them under many variable
-- names as well as in tables and we can pass and return them though functions

-- Saving an anonymous function to a variable
doubleIt = function(x) return x * 2 end
print(doubleIt(4))

-- A Closure is a function that can access local variables of an enclosing
-- function
function outerFunc()
  local i = 0
  return function()
    i = i + 1
    return i
  end
end

-- When you include an inner function in a function that inner function
-- will remember changes made on variables in the inner function
getI = outerFunc()
print(getI())
print(getI())

-- ---------- COROUTINES ----------
-- Coroutines are like threads except that they can't run in parallel
-- A coroutine has the status of running, susepnded, dead or normal

-- Use create to create one that performs some action
co = coroutine.create(function()
  for i = 1, 10, 1 do
  print(i)
  print(coroutine.status(co))
  if i == 5 then coroutine.yield() end
  end end)

-- They start off with the status suspended
print(coroutine.status(co))

-- Call for it to run with resume during which the status changes to running
coroutine.resume(co)

-- After execution it has the status of dead
print(coroutine.status(co))

co2 = coroutine.create(function()
  for i = 101, 110, 1 do
  print(i)
  end end)

coroutine.resume(co2)
coroutine.resume(co)
```

```
-- ---------- FILE I/O ----------
-- Different ways to work with files
-- r: Read only (default)
-- w: Overwrite or create a new file
-- a: Append or create a new file
-- r+: Read & write existing file
-- w+: Overwrite read or create a file
-- a+: Append read or create file

-- Create new file for reading and writing
file = io.open("test.lua", "w+")

-- Write text to the file
file:write("Random string of text\n")
file:write("Some more text\n")

-- Move back to the beginning of the file
file:seek("set", 0)

-- Read from the file
print(file:read("*a"))

-- Close the file
file:close()

-- Open file for appending and reading
file = io.open("test.lua", "a+")

file:write("Even more text\n")

file:seek("set", 0)

print(file:read("*a"))

file:close()

-- ---------- MODULES ----------
-- A Module is like a library full of functions and variables
-- Use require to gain access to the functions in the module
convertModule = require("convert")

-- Execute the function in the module
print(string.format("%.3f cm", convertModule.ftToCm(12)))

-- ---------- METATABLES ----------
-- Used to define how operations on tables should be carried out in regards
-- to adding, subtracting, multiplying, dividing, concatenating, or
-- comparing tables

-- Create a table and put default values in it
aTable = {}
for x = 1, 10 do
  aTable[x] = x
end

mt = {
  -- Define how table values should be added
  -- You can also define _sub, _mul, _div, _mod, _concat (..)
  __add = function (table1, table2)

    sumTable = {}

    for y = 1, #table1 do
      if (table1[y] ~= nil) and (table2[y] ~= nil) then
        sumTable[y] = table1[y] + table2[y]
      else
        sumTable[y] = 0
      end
    end

    return sumTable
  end,

  -- Define how table values should be checked for equality
  __eq = function (table1, table2)
    return table1.value == table2.value
  end,
  -- For homework figure out how to check if less then
  __lt = function (table1, table2)
    return table1.value < table2.value
  end,

  -- For homework figure out how to check if less then or equal
  __le = function (table1, table2)
    return table1.value <= table2.value
  end,
}

-- Attach the metamethods to this table
setmetatable(aTable, mt)

-- Check if tables are equal
print(aTable == aTable)

addTable = {}

-- Add values in tables
addTable = aTable + aTable

-- print the results of the addition
for z = 1, #addTable do
  print(addTable[z])
end

-- ---------- OBJECT ORIENTED PROGRAMMING ----------
-- Lua is not an OOP language and it doesn't allow you to define classes
-- but you can fake it using tables and metatables

-- Define the defaults for our table
Animal = {height = 0, weight = 0, name = "No Name", sound = "No Sound"}

-- Used to initialize Animal objects
function Animal:new (height, weight, name, sound)

  setmetatable({}, Animal)

  -- Self is a reference to values for this Animal
  self.height = height
  self.weight = weight
  self.name = name
  self.sound = sound

  return self
end

-- Outputs a string that describes the Animal
function Animal:toString()

  animalStr = string.format("%s weighs %.1f lbs, is %.1f in tall and says %s",
self.name, self.weight, self.height, self.sound)

  return animalStr
end

-- Create an Animal
spot = Animal:new(10, 15, "Spot", "Roof")

-- Get variable values
print(spot.weight)

-- Call a function in Animal
print(spot:toString())

-- ---------- INHERITANCE ----------
-- Extends the properties and functions in another object

Cat = Animal:new()

function Cat:new (height, weight, name, sound, favFood)
  setmetatable({}, Cat)

  -- Self is a reference to values for this Animal
  self.height = height
  self.weight = weight
  self.name = name
  self.sound = sound
  self.favFood = favFood
  return self
end

-- Overide an Animal function
function Cat:toString()

  catStr = string.format("%s weighs %.1f lbs, is %.1f in tall, says %s and loves
%s", self.name, self.weight, self.height, self.sound, self.favFood)

  return catStr
end

-- Create a Cat
fluffy = Cat:new(10, 15, "Fluffy", "Meow", "Tuna")

print(fluffy:toString())
```

```
-- The module name and filename are the same
local convert = {}
function convert.ftToCm(feet)
  return feet * 30.48
end
return convert
```