Introduction

This is the documentation for **Synapse X V3**, the new scripting engine made by the creators of Synapse and Synapse X. This website has installation instructions, internal features, design decisions, and an API reference for all the features Synapse X V3 has to offer.

Installing Synapse X V3.

Introduction to developing for Synapse X

Welcome to Synapse X! This development tutorial will give you an introduction to scripting for Synapse X - including the core concepts of the Synapse X enviornment, supervisor based programming, method interception, defensive programming, the Synapse X security model, and ultimately to get you to develop your own scripts for the platform.

Before we dive in, its important to lay some ground rules and assumptions that this guide takes:

- This set of guides assumes you are already proficient in Lua scripting (and programming in general). If this is your first time scripting in Lua, we recommend you look at the Lua 5.1 manual and get a feel for the language beforehand. While many people have learned programming via Synapse X, there is advanced concepts covered in this guide that may not make sense without a background in computer science.
- This guide attempts to avoid easily 'copy-pastable' scripts - instead, we focus on short examples in order to teach concepts. It is **far more important** for you to know the core concepts behind Synapse X scripting instead of simply copy-pasting example code. Trust us - it will save you a lot of time in the future if you choose to continue scripting for Synapse X.
- Many concepts covered here will be advanced, as stated earlier. Whenever we cover such concepts, we will attempt to give background for people without prior knowledge of the concept.

That out of the way, lets jump right in with the Synapse X environment!

Introduction to the Synapse X Environment

Before we can go into the new scripting methodology offered by Synapse X, it is first important to know the *differences* between the Synapse X environment and the game script environment.

Script Identity

Synapse X scripts run at a higher identity than normal game scripts - while the actual identity number(s) are mostly irrelevant to us (if you wish to know, as of writing this documentation, Synapse X scripts run at identity `7` and normal game scripts run at identity `2`), it is more important to know what extra privileges this gives Synapse X scripts over normal game scripts.

Unlike game scripts, Synapse X scripts have *mostly* (see below for exceptions) full access to the full game APIs without limitations. This means you can use certain functions not normally possible to use from either game scripts or even the command bar.

Some examples of extended functionality introduced by higher identity include:

- Ability to use protected services like `VirtualUserService` and `CoreGui`. (abiet there are far better alternatives for both we will introduce later)
- Ability to modify the 'protected' instance tree and properties.
- Ability to use protected functions like the `UserSettings` APIs or `game:GetObjects`, commonly used to load external instances by Synapse X scripts.

While Synapse X tries to provide the most access as possible to scripts executed by it, some functions are deemed off limits and are not allowed to be called by Synapse X scripts. These functions include:

- Functions that allow stealing from the Synapse X user who executed the script, or access to private information of the Synapse X user that should not be accessible from scripts.
- Functions that have known security issues. (Ex: a function that has a known memory corruption vulnerability that could lead to arbitrary code execution on the user executing the script)
- Functions that provide unrestricted authenticated HTTP request access, which allows the 1st point to occur. Synapse X provides facilities to allow unauthenticated web requests.

Synapse X Additions

Along with script identity, Synapse X also introduces many custom functions that allow for enhanced functionality and access by Synapse X scripts. We will introduce many of these functions to you later in this guide, but we will start with a commonly used (and simple) one for Synapse X scripts: `getgenv`. Getgenv allows you to get the 'global environment', a shared top-level environment between Synapse X scripts. You can use this to set globals that will be used by all Synapse X scripts. Do note that `getgenv` is *not* shared to game scripts - you can instead use `getrenv` if you wish to do that.

An example is shown below for `getgenv`:

```
getgenv().test = 123
print(test) --> 123
```

Then, from another Synapse X script:

```
print(test) --> 123
```

As you can see, the value will stay within the globals table between each Synapse X script. You can add as many of these globals as you like.

Miscellaneous Changes

There are also many miscellaneous changes between Synapse X scripts and game scripts. These changes are listed below:

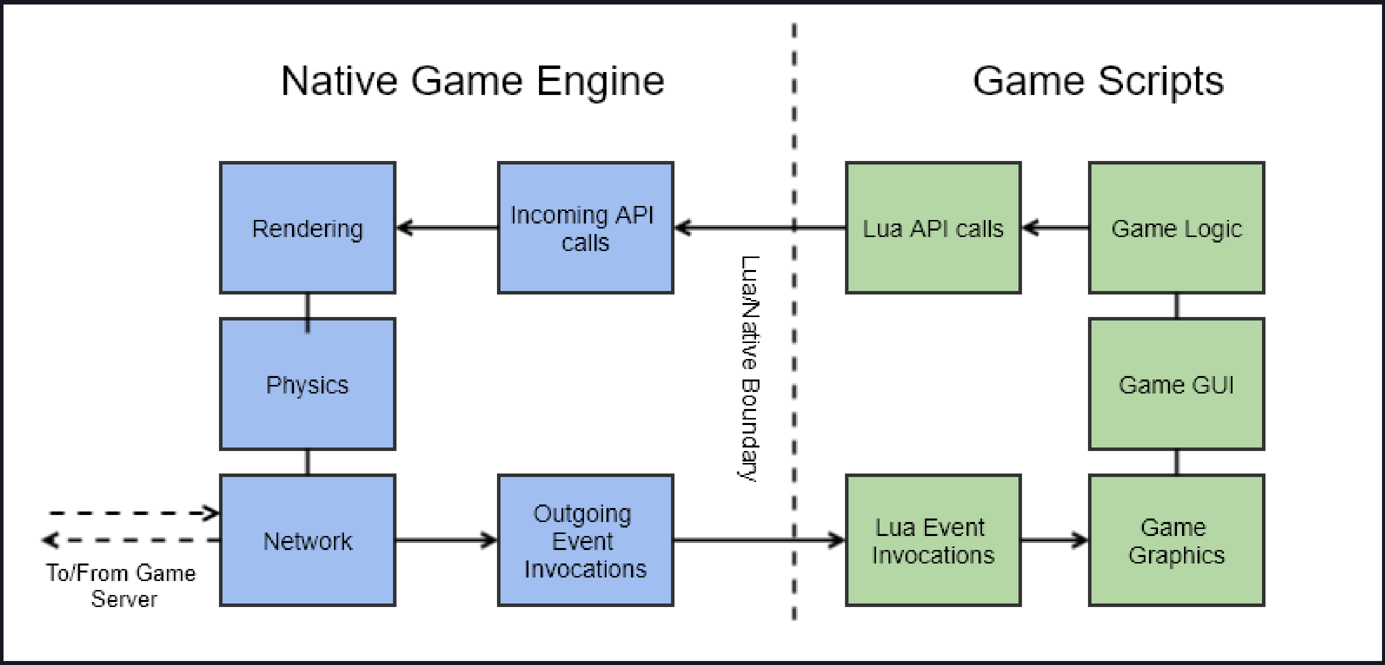
- Synapse X scripts are not attached to a `script` global. While Synapse X still provides a `script` global for each script, it is only provided for compatibility reasons and is deprecated for all future use. Setting the `Disabled` property on the Synapse X `script` global will do nothing due to the Synapse X script not being connected to it. You should never touch this global in scripts you make.
- `shared` and `_G`, two tables commonly used by game scripts are not connected to Synapse X scripts. Instead, Synapse X scripts have their own `shared` and `_G` tables, like `getgenv`. If you wish to access the game script `shared` and `_G` tables, use `getrenv()._G` and vice versa. Please note the considerations in the Synapse X security model if you wish to do this.
- Synapse X provides many internal protections against implicit environment leaks to game scripts. Please see the Synapse X security model for more information.

Now that you have a general idea of the Synapse X Environment, we can now move on to the major programming concept behind Synapse X - supervisor-based programming.

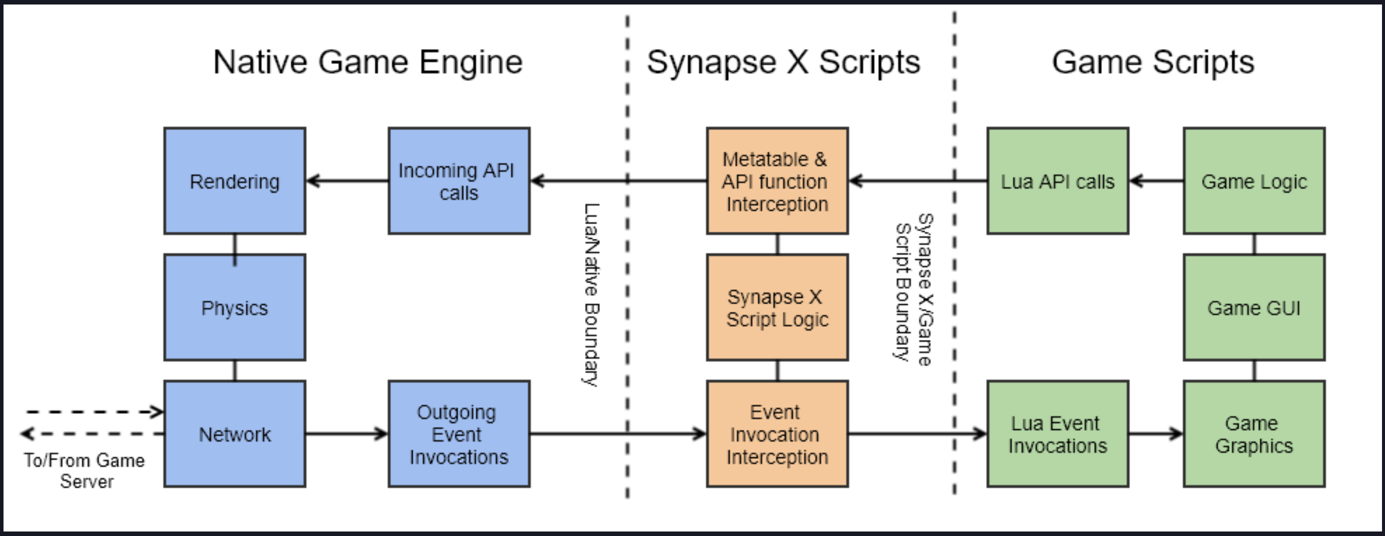
Supervisor Based Programming

For new developers to Synapse X, most will be confused on how to fully utilize the power of the Synapse X environment. For you to understand where Synapse X scripts extracts its abilities from, we must first show where most Synapse X scripts insert themselves.

Shown below is a diagram of a normal game instance:



Now, we will show a diagram after a Synapse X script fully utilizing Synapse X's supervisor programming model:



As you can see, Synapse X extracts its abilities from being able to *intercept* API calls and event invocations from both the native game engine, and game scripts. Once an interception function is called, Synapse X scripts have full control over arguments, return values, and can modify calls as needed by that script. This allows Synapse X scripts to act as *supervisors* of game logic, alas the term 'supervisor-based programming'.

Supervisor based programming allows a powerful programming model much unlike most other forms of systems programming. If the native game engine were the OS kernel and game scripts were user mode programs, Synapse X scripts would act as the 'drivers' for such a system under this analogy.

API Reference

This section contains documentation for every Synapse X 2021 custom function.

Environment APIs

Functions

getgenv

```
table getgenv()
```

Returns Synapse's global environment table.

getrenv

```
table getrenv()
```

Returns the game's global environment table.

getreg

```
table getreg()
```

Returns a read-only copy of the Lua registry.

getgc

```
table getgc(include_tables?: bool)
```

Returns a weak table of all Lua objects currently alive according to the garbage collector. By default, tables are not included. Note that some values may immediately be collected after this is called; as such, there will be *many* gaps in the table.

filtergc

```
nil | any filtergc(type: string, options: table, return_one?: bool)
```

Searches for values currently referenced by Lua that match the given criteria. `type` can either be 'function' or 'table'. Setting `return_one` indicates that this function should return the first result, or nil if there are no matches. The following options can be used:

Table:

Key	Description	Default
Keys	If not empty, only include tables with keys corresponding to all values in this table	nil
Values	If not empty, only include tables with values corresponding to all values in this table	nil
KeyValuePairs	If not empty, only include tables with keys/value pairs corresponding to all values in this table	nil
Metatable	If not empty, only include tables with the metatable passed	nil

Function:

Key	Description	Default
Name	If not nil, only include functions with this name	nil
Constants	If not nil, only include functions with constants that match all values in this table	nil
Upvalues	If not nil, only include functions with upvalues that match all values in this table	nil
IgnoreSyn	If false, do not ignore Synapse functions.	true
Proto	If not nil, only include functions with this function prototype.	nil
Environment	If not nil, only include functions with this environment.	nil
Hash	If not nil, only return functions with this hash.	nil
StartLine	If not nil, only return functions with this starting line.	nil

NOTE; values are compared using **bit-for-bit equality checks**. This means that NaN == NaN and -0 ~= 0. This allows you to specify NaN or -0 as a value you want to search for.

Examples:

```lua
local empty_table = {
    good = false
}

local my_table = {
    good = true,
    one = "two",
    three = "four",
    five = "six",
    v1 = "value one",
}

local my_other_table = {
    good = true,
    one = "not two",
    three = "not four",
    five = "six",
    v1 = "value one",
}

-- intentionally does not match KeyValuePair, so table should not be found
local my_bad_table = {
    good = false,
    one = "not two",
    three = "not four",
    v1 = "value one",
    five = "not six",
}

for _, v in next, filtergc('table', {
    Keys = { "one", "three" },
    Values = { "value one" },
    KeyValuePairs = {
        five = "six"
    }
}) do
    assert(v.good)
    warn(v)
end
```

```
    local uv = "bbbbb"
    local function myfunc()
        return "aaaaa" .. uv
    end

    print(filtergc('function', {
        IgnoreSyn = false,
        Name = "myfunc"
    }, true)

    print(filtergc('function', {
        IgnoreSyn = false,
        Constants = { "aaaaa" }
    }, true)

    print(filtergc('function', {
        IgnoreSyn = false,
        Upvalues = { "bbbbb" }
    }, true)
```

getinstances

```
table getinstances()
```

Returns a list of all instances referenced by the current Lua state. Core script references are not included.

getnilinstances

```
table getnilinstances()
```

Returns a list of all nil-parented instances referenced by the current Lua state. Core script references are not included.

getscripts

```
table getscripts()
```

Returns a list of all loaded scripts in the caller's global state.

getloadedmodules

```
table getloadedmodules()
```

Returns a list of all loaded `ModuleScripts` in the caller's global state.

fireclickdetector

```
void fireclickdetector(target: Instance)
```

Emulates clicking a `ClickDetector`.

fireproximityprompt

```
void fireproximityprompt(target: Instance)
```

Emulates triggering a `ProximityPrompt`. Equivalent to calling replicatesignal on `ProximityPrompt.TriggerActionReplicated` and `ProximityPrompt.TriggerEndedActionReplicated` (non-scriptable events).

firetouchinterest

```
void firetouchinterest(part: Instance, to_touch: Instance, toggle: bool)
```

Emulates a `Touched` event on `to_touch` with `part`.

Filesystem APIs

NOTE: All filesystem APIs are sandboxed to the `workspace` folder in your Synapse installation. Attempting to access files outside of this folder will result in an error.

Functions

readfile

```
string readfile(path: string)
```

Reads a file from the workspace folder.

readfileasync

```
string readfileasync(path: string) [yields]
```

Reads a file from the workspace folder asynchronously.

writefile

```
void writefile(path: string, contents: string)
```

Writes to a file in the workspace folder.

writefileasync

```
void writefileasync(path: string, contents: string) [yields]
```

Writes to a file in the workspace folder asynchronously.

appendfile

```
void appendfile(path: string, contents: string)
```

Appends to a file in the workspace folder.

appendfileasync

```
void appendfileasync(path: string, contents: string) [yields]
```

Appends to a file in the workspace folder asynchronously.

loadfile

```
(function?, string?) loadfile(path: string, contents: string)
```

Equivalent to `loadstring(readfile(path))`.

loadfileasync

```
(function?, string?) loadfileasync(path: string, contents: string) [yields]
```

Equivalent to `loadstring(readfileasync(path))`.

listfiles

```
table listfiles(folder?: string)
```

Returns an array of file names belonging to `folder`.

isfile

```
bool isfile(path: string)
```

Returns true if `path` refers to a file.

isfolder

```
bool isfolder(path: string)
```

Returns true if `path` refers to a folder.

makefolder

```
bool makefolder(path: string)
```

Recursively creates directories. Returns true on success.

delfolder

```
void delfolder(path: string)
```

Deletes a folder.

delfile

```
void delfile(path: string)
```

Deletes a file.

getsynasset

```
string getsynasset(path: string)
```

Returns a `Content` string that can be used with GUI elements, sounds, meshes, and etc. to refer to an asset in the workspace folder.

Note: Certain assets only work with certain file types. For example, `VideoFrame`s only work with .webm encoded videos.

saveinstance

```
bool saveinstance(instance: Instance | table, options?: table) [yields]
```

Saves an instance in binary (.rbxl or .rbxm) format. The following options can be passed:

Option	Description	Default
FileName	Output file	Varies
IgnoreArchivable	Ignores the `Archivable` property	false
SavePlayerCharacters	Includes player characters (.rbxl only)	false
SavePlayers	Includes `Player` objects and their descendants (.rbxl only)	false
DisableCompression	Disables compression in the binary output	false
Decompile	Starts a batch decompiler job for all relevant scripts and includes the results	false
DecompileJobless	Includes already decompiled code in the output. No new scripts are decompiled.	false
SaveNonCreatable	Includes non-serializable instances as `Folder` objects	false
NilInstances	Includes nil instances (.rbxl only)	false
CopyToClipboard	If true, copies the result to clipboard instead of writing to disk	false
IgnoreList	A list of instances (and their descendants) to ignore	{}
DecompileOptions	See documentation for `decompile`	{}

If the `Decompile` option is enabled, `saveinstance` returns true when the job completes successfully or false if cancelled by the user.

saveplace

```
bool saveplace(options?: table) [yields]
```

Equivalent to `saveinstance(game, options)`.

Classes

- DirectoryWatcher

Hooking APIs

Functions

setstackhidden

```
void setstackhidden(closure: function, hidden?: bool = True)
```

Hides or unhides a function from the callstack.

```
void setstackhidden(level: int, hidden?: bool = True)
```

Hides or unhides a function (indicated by `level`) in the callstack.

newcclosure

```
function newcclosure(closure: function, name?: string)
```

Creates a C wrapper around `closure` with function name `name` if provided.

clonefunction

```
function clonefunction(to_clone: function)
```

Clones a function. Note that if the function passed is a C closure, `is_synapse_function` will return `true` on the returned closure.

hookfunction

```
function hookfunction(to_hook: function, hook: function, filter?: Filter =
nil)
```

Hooks a Lua or C function in-place. Returns a copy of the original function. Can optionally specify a filter to use.

hookproto

```
void hookproto(to_hook: ProtoProxy, hook: function)
```

Hooks a Lua function prototype. Prototypes can only be hooked once!

hookmetamethod

```
void hookmetamethod(to_hook: userdata, metamethod: string, hook: function,
arg_guard?: bool = True, filter?: Filter = nil)
```

TODO

restorefunction

```
void restorefunction(to_restore: closure)
```

Un-hooks a function hooked with hookfunction.

isfunctionhooked

```
bool isfunctionhooked(f: function)
```

Returns true if `f` is hooked by `hookfunction`, `hookmetamethod`, or `syn.oth.hook`.

restoreproto

```
void restoreproto(to_restore: ProtoProxy)
```

Removes a Proto hook created via `hookproto`.

hooksignal

```
void hooksignal(signal: ScriptSignal, callback: function)
```

Enables the interception of signal invocations. When `signal` is fired, `callback` is called for every *Lua* connection in `signal` with an info table and the invocation arguments. Returning true from this callback fires the original connection. For now, the callback **should not yield.** `hooksignal` cannot be used to intercept C (engine) connections or Lua connections belonging to CoreScripts.

Example code:

```
local part = Instance.new("Part")
part.Changed:Connect(function(prop)
    print(prop .. " changed?")
end)
hooksignal(part.Changed, function(info, prop)
    print(info.Connection) -- the connection object.
    print(info.Function) -- the original function. Not available for waiting
connections.
    print(info.Index) -- the position of this connection in part.Changed at the
time this callback is executed. Not available for waiting connections.
    print(prop)
    return true, "Hooked"
end)
part.Name = "NewName"
```

Output:

```
Connection
function: <etc>
0
Name
Hooked changed?
```

restoresignal

```
void restoresignal(signal: ScriptSignal)
```

Unhooks a signal hooked with hooksignal.

issignalhooked

```
void issignalhooked(signal: ScriptSignal)
```

Returns true if `signal` is hooked.

syn.oth.hook

```
function syn.oth.hook(target: function, hook: function)
```

A secure version of `hookfunction` for C functions that works by running hook code on separate threads. When a hooked function is called, a new or cached hook thread is resumed with the `hook` and any passed arguments. The returned callback can be used to execute the original function on the original, calling thread.

In the context of a hook thread, the following functions behave as though being called under the original thread:

- getnamecallmethod

- setnamecallmethod
- checkcaller
- checkcallstack
- getcallingscript
- the debug library (debug.*)
- TODO

syn.oth.unhook

```
bool syn.oth.unhook(target: function, hook_or_callback?: function)
```

Un-hooks a function hooked with `syn.oth.hook`. The second parameter is not required if the function has only been hooked once. Returns true upon success.

syn.oth.get_root_callback

```
function syn.oth.get_root_callback()
```

Returns a function that can be used to call the original function in the context of a hook thread. Useful for when a function is hooked multiple times and the callback you receive from `syn.oth.hook` executes the next hook in the chain, not the original function.

syn.oth.is_hook_thread

```
bool syn.oth.is_hook_thread()
```

Returns true if this thread is a hook thread.

syn.oth.get_original_thread

```
thread syn.oth.get_original_thread()
```

Return the original thread this hook comes from, or nil if the current thread is not a hook.

Filter APIs

Functions

getfilter

```
function getfilter(filter: FilterBase, original_function: function,
filter_function: function)
```

Classes

- FilterBase
- NotFilter
- AnyFilter
- AllFilter
- TypeFilter
- NamecallFilter
- InstanceTypeFilter
- InstanceNameFilter
- ArgumentFilter
- UserdataTypeFilter
- ArgCountFilter
- CallerFilter

Input APIs

Functions

iswindowactive

```
bool iswindowactive()
```

Returns true if the game window is in focus.

lockwindow

```
void lockwindow()
```

Focuses and locks the game window. While locked, focus changes and input by the user are not seen by the game. Input can still be sent with the input API.

unlockwindow

```
void unlockwindow()
```

Unlocks the game window.

iswindowlocked

```
bool iswindowlocked()
```

Returns true if the game window is locked.

keypress

```
void keypress(key: KeyCode)
```

Simulates a key press for the specified KeyCode.

```
void keypress(key: number)
```

Simulates a key press for the specified virtual key-code.

keyrelease

```
void keyrelease(key: KeyCode)
```

Simulates a key press for the specified KeyCode.

```
void keyrelease(key: number)
```

Simulates a key release for the specified virtual key-code.

keyclick

```
void keyclick(key: KeyCode)
```

Simulates an instant key press + release for the specified KeyCode.

mouse1press

```
void mouse1press(x: number, y: number)
```

Simulates a left mouse button press at the specified coordinates.

```
void mouse1press()
```

Simulates a left mouse button press at the current mouse position.

mouse1release

```
void mouse1release(x: number, y: number)
```

Simulates a left mouse button release at the specified coordinates.

```
void mouse1release()
```

Simulates a left mouse button release at the current mouse position.

mouse1click

```
void mouse1click()
```

Simulates a left mouse click at the current mouse position.

mouse2press

```
void mouse2press(x: number, y: number)
```

Simulates a right mouse button press at the specified coordinates.

```
void mouse2press()
```

Simulates a right mouse button press at the current mouse position.

mouse2release

```
void mouse2release(x: number, y: number)
```

Simulates a right mouse button release at the specified coordinates.

```
void mouse2release()
```

Simulates a right mouse button release at the current mouse position.

mouse2click

```
void mouse2click()
```

Simulates a right mouse click at the current mouse position.

mousescroll

```
void mousescroll(forward: bool, x: number, y: number)
```

Simulates a scroll forward or backward at the specified coordinates.

```
void mousescroll(forward: bool)
```

Simulates a scroll forward or backward at the current mouse position.

mousemoverel

```
void mousemoverel(x: number, y: number, internal?: bool)
```

Moves the mouse relative to its current position. If provided, `internal` specifies whether a mouse movement event is signalled internally or your physical mouse cursor is moved. If not provided, `internal` is implied to be true if the game window is locked OR not active and false if otherwise. A physical mouse movement cannot occur when the game window is not in focus.

mousemoveabs

```
void mousemoveabs(x: number, y: number, internal?: bool)
```

Moves the mouse to the specified coordinates. If provided, `internal` specifies whether a mouse movement event is signalled internally or your physical mouse cursor is moved. If not provided, `internal` is implied to be true if the game window is locked OR not active and false if otherwise. A physical mouse movement cannot occur when the game window is not in focus.

iskeydown

```
bool iskeydown(key: number)
```

Returns true if the specified virtual-key code is pressed and the game window is in focus and not locked.

iskeytoggled

```
bool iskeytoggled(key: number)
```

Returns true if the specified virtual-key code is toggled (e.g. caps lock) and the game window is in focus and not locked.

getmousestate

```
bool getmousestate()
```

Returns true if the internal UI cursor is enabled.

setmousestate

```
void setmousestate(new_state: bool)
```

Enables or disables the internal UI cursor.

Miscellaneous APIs

Functions

setclipboard

```
bool setclipboard(data: string | number | Instance | table)
```

Copies a string or Instance or table of Instances to the clipboard. Returns true on success.

setfflag

```
bool setfflag(fflag: string, value: string)
```

Sets FFlag `fflag` to `value`. Returns false if the flag doesn't exist or couldn't be set.

identifyexecutor

```
(string, string) identifyexecutor()
```

Returns "Synapse X" and version string.

unlockmodulescript

```
void unlockmodulescript(module: ModuleScript)
```

"Unlocks" `module` such that code running at different contexts (e.g. level 2 vs level 7) return the same values when required.

require

```
any require(module: ModuleScript)
```

This function replaces the game's `require` to allow for requiring game modules from higher contexts of script execution, like the one in which Synapse scripts run.

messagebox

```
int messagebox(text: string, caption?: string, type?: int) [yields]
```

A wrapper around Microsoft's MessageBoxA.

setwindowtitle

```
void setwindowtitle(text: string)
```

Sets the title of the game window. A wrapper around Microsoft's SetWindowTextA.

setwindowicon

```
void setwindowicon(data: string?)
```

Sets the icon of the game window.

gethui

```
Instance gethui()
```

Returns a protected container where GUIs can be hidden from detection by the game.

createuitab

```
void createuitab(title: string, contents: string, icon?: string)
```

Creates a tab in the external UI

newtable

```
table newtable(narray: number, nhash: number)
```

Creates a table with the specified array and hash sizes, then fills with random data. Random data for hash part has random vector keys with X, Y, and Z values between 0 and 1 and `false` as a value. Random data for array part has `false` as a value. This function is useful for creating tables with memory hidden to scripts. If you would like this feature, make sure `narray` is >= 33 and `nhash` is >= 17. NOTE: To prevent table reallocation from exposing this memory, make sure you don't have fewer array/hash values!

cloneref

```
Instance cloneref(instance: Instance)
```

Clones a reference to an Instance. The Lua expression `clone == instance` will be false, but both values will point to the same Instance.

syn.queue_on_teleport

```
void syn.queue_on_teleport(script: string)
```

Queues `script` to be executed after the next teleport.

syn.clear_teleport_queue

```
void syn.clear_teleport_queue()
```

Removes all queued scripts from the teleport queue.

syn.get_thread_identity

```
int syn.get_thread_identity()
```

Returns the current thread's context level.

syn.set_thread_identity

```
void syn.set_thread_identity(identity: int)
```

Sets the current thread's context level.

syn.protect_gui

```
void syn.protect_gui(target: Instance)
```

`protect_gui` is deprecated. For backwards compatability, this function will cause `target` to be parented the return value of `gethui()` the next time it is parented.

syn.unprotect_gui

```
void syn.unprotect_gui(target: Instance)
```

`unprotect_gui` is deprecated. For backwards compatability, this function will disable the parent-redirection done by `protect_gui`.

syn.trampoline_call

```
(bool, ...any|string) syn.trampoline_call(target: function, call_stack: table,
thread_options: table, ...any)
```

Proxy a call to a Lua function with the given call stack and thread options. `call_stack` is an array of tables, with each sub-table having fields described below.

The `thread` parameter allows you to preset the `script`, `identity`, and `env` fields with the values from that thread. This field is optional, and those fields can be overridden after the fact.

Note: These values do *not* need to correlate with actual information returned by debug.getinfo; they are fully customizable.

Note: The `func` parameter will override all other data you pass here aside from `currentline`!

Call Stack Entry	Description
currentline	The currently executing line of code.
env	The function's environment.
source	The 'source' field returned by `debug.getinfo`.
name	The function's name.
numparams	The number of parameters in the function.
is_vararg	Whether this function takes variadic arguments.
func	A function to copy all information from.

Thread Option Entry	Description
script	The script attached to the thread.
identity	The identity of the new state.
env	The global environment of the new thread.
thread	A thread used as the parent.

syn.toast_notification

```
void syn.toast_notification(options: table)
```

Displays a toast notification in the internal UI. The options table follows the following format:

Option	Description	Default
Type	ToastType enum	Required
Duration	How long the notification should last, in seconds	5
Title	The notification's title	Required
Content	The notification's content	Required
IconColor	Overrides the icon color	Varies by `Type`

syn.ipc_send

```
void syn.ipc_send(data: any)
```

Sends data to the UI.

Classes

- Value

Enums

- ToastType

Network APIs

Functions

isnetworkowner

```
bool isnetworkowner(part: BasePart)
```

Returns true if your client is a network owner of `part`.

Reflection APIs

Functions

setscriptable

```
bool setscriptable(instance: Instance, property_name: string, scriptable: bool)
```

Sets a property's `scriptable` flag. Non-scriptable properties cannot be accessed from Lua. Returns the flag's original state. NOTE: Take care using this function as changes done also affect game scripts, introducing the possibility of creating detection vectors or breaking existing code.

gethiddenproperty

```
any gethiddenproperty(instance: Instance, property_name: string)
```

Safely reads a non-scriptable property value, including those of type `BinaryString` and `SharedString`.

sethiddenproperty

```
void sethiddenproperty(instance: Instance, property_name: string, value: any)
```

Safely sets a non-scriptable property value.

getproperties

```
table getproperties(instance: Instance)
```

Returns a dictionary of all property values, including any non-scriptable, for `instance`.

gethiddenproperties

```
table gethiddenproperties(instance: Instance)
```

Returns a dictionary of all non-scriptable property values for `instance`.

getpcdprop

```
(string, string) getpcdprop(instance: TriangleMeshPart)
```

Returns a `TriangleMeshPart`'s `PhysicalConfigData` property.

getcallbackmember

```
any getcallbackmember(instance: Instance, property: string, return_raw?: bool
= False)
```

Returns the value of a callback property, such as `RemoteFunction.OnClientInvoke`. **NOTE**; Arbitrary values can be passed here. See the documentation for `getconnectionfunction` for more information about this and what `return_raw` does.

geteventmember

```
ScriptSignal geteventmember(instance: Instance, event_name: string)
```

Creates an unrestricted signal object for any event in `instance`. Useful for connecting to conventionally non-scriptable signals.

getrendersteppedlist

```
table getrendersteppedlist()
```

Returns all callbacks bound with `RunService:BindToRenderStep`.

Script APIs

Functions

loadstring

```
function loadstring(source: string, chunk_name?: string)
```

Equivalent to Lua 5.1's loadstring. This function may access the thread's global environment (`getfenv(0)`) to resolve/cache imports and builtins.

checkcaller

```
bool checkcaller()
```

Returns true if the current thread is owned by Synapse.

checkcallstack

```
bool checkcallstack(type: string, level?: int = 2)
```

Returns true if the current thread is owned by Synapse AND *all* functions at or above `level` in the call stack are Synapse functions. A level of `1` represents the function calling checkcallstack, `2` represents the function calling the function calling checkcallstack, and so forth.

issynapsefunction

```
bool issynapsefunction(f: function)
```

Returns true if `f` is a Synapse function.

islclosure

```
bool islclosure(f: function)
```

Returns true if `f` is a Lua function (as opposed to a C function).

decompile

```
string decompile(target: variant<function, LuaSourceContainer>, options?:
table) [yields]
```

Decompiles `target` asynchronously. `target` cannot be a Synapse function. The following options can be used:

Option	Description	Default
VerboseFunctions	Adds a comment to functions with their name and optionally other info	true
FunctionLine	Adds the line that a function is defined	true
FunctionUpvalues	Lists the upvalues of functions	true
FunctionConstants	Lists the constants that functions use	false
RenameLoopVariables	Gives for loop variables more specific names if possible	true
VariableRenaming	Gives some variables contextual names	true
ExtraRenaming	Renames extra variables	true
NullableNaming	Allows variable renaming to ignore nil assignments	true
PrimitiveRenaming	Renames variables with trivial primitive types	true
Semicolons	Adds semicolons to the end of each statement	true
TableNewlines	Adds a newline after each table entry	true
UseIfElseExpression	Allows the use of if-else expression	false
CallLineInfo	Adds a comment next to function calls of their line	false
LazyFlattening	Try to less aggressively condense expressions	true
FormatNamecallChains	Adds extra newlines in between chained namecalls	false
FlattenGuardStatements	Turns guard statements into single lines	true
MaxCustomNameLength	Max length for variable names	32
MaxTabs	Max number of tabs	20
MaxRationalDenominator	Max denominator for rationalization	1000
DeduplicationThreshold	Threshold for string deduplication	10000

getscriptthread

```
thread getscriptthread(script: Instance)
```

Returns the main Lua thread associated with `script`. Note that this may not be the only thread used!

getsenv

```
table getsenv(script: Instance)
```

Returns the Lua environment (such as that returned by `getfenv`) associated with the main function of `script`. Essentially equivalent to getfenv(getscriptfunction(script)).

WARNING: Scripts may add a metatable to this value and check who's accessing it! If you want to get around this, check for whether the environment has a metatable and use `syn.trampoline_call` accordingly.

getscriptfunction

```
function getscriptfunction(script: Instance)
```

Returns the main function associated with `script`.

getscripthash

```
string getscripthash(script: LuaSourceContainer)
```

Returns a script's bytecode hash.

getfunctionhash

```
string getfunctionhash(script: function)
```

Returns a Lua function's bytecode hash.

getscriptname

```
string getscriptname(script: Instance)
```

Returns the name of a script when it was first loaded.

dumpbytecode

```
string dumpbytecode(target: variant<function, LuaSourceContainer>)
```

Dumps a function or script to the Luau bytecode format. `target` cannot be a Synapse function.

getcallingscript

```
variant<Instance, nil> getcallingscript()
```

Returns the script associated with the current thread or nil.

issynapsethread

```
bool issynapsethread(thread: thread)
```

Returns true if `thread` is owned by Synapse.

setsynapsethread

```
void setsynapsethread(set_to_synapse: bool, target_thread?: thread = nil)
```

Changes whether `target_thread` (or the current thread if `target_thread` is nil) can pass through `checkcaller`. If this is not the case, Synapse-specific overrides like `game.HttpGet` or `Connection.Enabled` will *not work*.

Signal APIs

Functions

getconnections

```
table getconnections(signal: ScriptSignal, context?: integer)
```

Returns a script signal's connections. NOTE: Some events, such as `UserInputService`'s `InputBegan`, actually consist of different signals internally for different security contexts. By default, `getconnections` returns the connections of all signals.

firesignal

```
void firesignal(signal: ScriptSignal, ...any)
```

Fires a signal's Lua connections (excluding CoreScript connections). Roughly equivalent to `lua for i, v in pairs(getconnections(signal)) do local f = v.Function if f then task.spawn(f, ...) end end`

cfiresignal

```
void cfiresignal(signal: ScriptSignal, ...any)
```

Fires a signal, including all engine (C) and CoreScript connections. This function cannot be called on "pseudo" signals such as those returned by `GetPropertyChangedSignal`. Passed values must be of the correct type.

replicatesignal

```
void replicatesignal(signal: ScriptSignal, ...any)
```

Fires a signal on the server. Signal must be replicable.

cansignalreplicate

```
bool cansignalreplicate(signal: ScriptSignal)
```

Returns true if a signal can be replicated to the server (see replicatesignal).

getsignalarguments

```
table getsignalarguments(signal: ScriptSignal)
```

Returns a table of a signal's arguments' types. For example, passing `Instance.AncestryChanged` would return `{ "Instance", "Instance "}`.

isconnectionenabled

```
bool isconnectionenabled(connection: ScriptConnection)
```

Returns true if a connection is enabled.

setconnectionenabled

```
void setconnectionenabled(connection: ScriptConnection, enable: bool)
```

Enables or disables a connection. Disabled connections remain connected, but do nothing when fired.

isluaconnection

```
bool isluaconnection(connection: ScriptConnection)
```

Returns true if `connection` represents a Lua connection.

iswaitingconnection

```
bool iswaitingconnection(connection: ScriptConnection)
```

Returns true if `connection` is the result of a `:Wait()` call.

getconnectionfunction

```
any getconnectionfunction(connection: ScriptConnection, return_raw?: bool =
False)
```

Returns a connection's associated function. The connection must be a non-waiting Lua connection.

NOTE; Arbitrary values can be passed to `.Connect`. In order to prevent accidental mishaps, this function will, by default, filter out any connected value that is not a function or a table with a `__call` metamethod. If `.Connect` was passed table with a `__call` metamethod, the returned value will be the value of that metamethod, or nil if that value is not a function.

The optional second parameter will disable this behavior, and will just return whatever was passed to .Connect.

getconnectionthread

```
thread getconnectionthread(connection: ScriptConnection)
```

Returns a connection's associated thread. The connection must be a Lua connection.

isgamescriptconnection

```
bool isgamescriptconnection(connection: ScriptConnection)
```

Returns true if `connection` represents a Lua connection created by game scripts (as opposed to core scripts).

Table APIs

Functions

getrawmetatable

```
table | nil getrawmetatable(object: any)
```

Returns an object's metatable, ignoring the `__metatable` metamethod. NOTE: this function will error on protected objects.

setrawmetatable

```
table | nil setrawmetatable(object: any, target: table)
```

Sets an object's metatable, ignoring the `__metatable` metamethod. NOTE: this function will error on protected objects. Returns the old metatable.

setreadonly

```
void setreadonly(table: table, value: bool)
```

Sets a table's read-only flag. NOTE: this function will error on protected objects.

setuntouched

```
void setuntouched(target: function | thread | table, value: bool)
```

Sets a Lua environment's untouched flag. This flag is relevant to certain Luau optimizations, namely built-ins. If true, "built-in" globals such as `game` or `print` are fetched from a cache and cannot be modified. If false, the cache is disabled and built-ins are fetched from the environment table as normal. Functions `getfenv` and `setfenv` set this flag to false implicitly.

Example:

```
local env = getfenv() -- untouched implicity set to false
local old_print = print
env.print = function() old_print("overwritten!") end
print("hello")
setuntouched(env, true)
print("hello")
```

Output:

```
overwritten!
hello
```

isuntouched

```
bool isuntouched(target: function | thread | table)
```

Returns a table's untouched flag. If passed a function/thread, returns the untouched flag of their environments.

makewritable

```
void makewritable(table: table)
```

Equivalent to `setreadonly(table, false)`.

makereadonly

```
void makereadonly(table: table)
```

Equivalent to `setreadonly(table, true)`.

isreadonly

```
bool isreadonly(table: table)
```

Returns a table's read-only flag.

isprotected

```
bool isprotected(table: table, description: Returns whether a table or its
metatable is protected. Protected tables cannot be modified.)
```

Websocket APIs

Classes

- WebsocketClient

Legacy Drawing API

Note: `Drawing.new` and `DrawEntry` objects have been deprecated in favor of DrawEntryDynamic and our new Drawing API.

Functions

Drawing.new

```
any Drawing.new(type_name: string)
```

Instantiates a new DrawEntry object. Equivalent to `<Type>.new()`. Valid type names include:

- "Line"
- "Text"
- "Image"
- "Circle"
- "Square"
- "Triangle"
- "Quad"

Classes

- DrawEntry
- Line
- Text
- Image
- Circle
- Square
- Triangle
- Quad

Drawing API

Namespaces

- DrawingImmediate

Functions

setcliprect

```
void setcliprect(z_index: int, rect?: Rect)
```

Defines or undefines the draw area (clip rectangle) for the given z-index.

```
void setcliprect(z_index: int, top_left: Point, bottom_right: Point)
```

Defines the draw area (clip rectangle) for the given z-index.

setfpscap

```
void setfpscap(cap: float)
```

Sets the FPS unlocker cap. The user has to enable the FPS unlocker themselves for this API to work. **Note**: Minimum FPS is 1, maximum FPS is 16384.

getfpscap

```
void getfpscap(cap: float)
```

Returns the current FPS unlocker cap.

getfpsmax

```
void getfpsmax(cap: float)
```

Returns currently active monitor's display rate, in hertz. Returns 0 on failure.

Classes

- DrawFont
- Point

- Point2D
- Point3D
- PointInstance
- PointMouse
- PointOffset
- DrawEntryDynamic
- LineDynamic
- PolyLineDynamic
- TextDynamic
- CircleDynamic
- RectDynamicBase
- RectDynamic
- GradientRectDynamic
- ImageDynamic
- ImageRef

Enums

- XAlignment
- YAlignment
- CFrameRotationType
- Drawing.Fonts

Console APIs

Functions

rconsoletop

```
void rconsoletop(should_be_top: bool)
```

Enables or disables the internal console window being topmost.

rconsoleprint

```
void rconsoleprint(data: string, async?: bool, escape?: bool)
```

Writes text to the internal console. If `async` is true, the function does not block (useful when printing large amounts of text). If `escape` is false, null terminators will not be escaped. Defaults to true.

rconsoleinfo

```
void rconsoleinfo(data: string, async?: bool)
```

Writes info text to the internal console. If `async` is true, the function does not block (useful when printing large amounts of text).

rconsolewarn

```
void rconsolewarn(data: string, async?: bool)
```

Writes warning text to the internal console. If `async` is true, the function does not block (useful when printing large amounts of text).

rconsoleerr

```
void rconsoleerr(data: string, async?: bool)
```

Writes error text to the internal console. If `async` is true, the function does not block (useful when printing large amounts of text).

rconsoleclear

```
void rconsoleclear()
```

Clears the internal console.

rconsolename

```
void rconsolename()
```

Sets the title of the internal console's window.

rconsoleinput

```
string rconsoleinput() [yields]
```

Waits for a line of user input from the internal console and returns the result. Truncated to 4096 characters.

Keep in mind that if a different thread tries to do other console-related functions while this one is running, **the game will stop responding until you give the console an input**.

rconsolehide

```
void rconsolehide()
```

Hides the console.

rconsoleshow

```
void rconsoleshow()
```

Makes the console visible if it wasn't already.

rconsoletoggle

```
void rconsoletoggle()
```

Toggles whether the console is hidden or not.

rconsolehidden

```
bool rconsolehidden()
```

Returns whether or not the console is currently hidden.

printconsole

```
void printconsole(data: string, r: int, g: int, b: int) [parallel_safe]
```

Prints colored text to the Synapse console.

```
void printconsole(data: string) [parallel_safe]
```

Prints text to the Synapse console.

```
void printconsole(data: string, color: Color3) [parallel_safe]
```

Prints colored text to the Synapse console.

clearconsole

```
void clearconsole()
```

Clears the internal and external consoles.

HTTP APIs

Functions

syn.request

```
table syn.request(params: table) [yields]
```

Makes a RESTful HTTP request.

Request Options

Option	Description	Default
Url	The request URL	Required
Method	The request method	"GET"
Headers	A map of header names to header values	{}
Cookies	A map of cookie names to cookie values	{}
Body	The request body. Cannot be used with GET or HEAD requests. It might be necessary to specify the `Content-Type` header when sending JSON or other formats.	nil

Synapse Headers

In addition to headers provided by the user, Synapse X adds the following:

Note: `Syn-Fingerprint` and `Syn-User-Identifier` have been deprecated in favor of the new public key verification system shown below.

Header	Value	Can Override
User-Agent	A string in the format "sx/<build_hash>".	Yes
Syn-Signature	Public-key authenticated headers, base64-encoded. See below for use.	No
Syn-Fingerprint	A string value which uniquely identifies the computer running Synapse X.	No
Syn-User-Identifier	A string value which uniquely identifies the current Synapse X user.	No

Response Table

`syn.request` returns the following table once the request is complete:

Key	Description
Success	Whether the request succeeded
StatusCode	The HTTP status code of the response
StatusMessage	A human-readable version of `StatusCode`
Headers	The response headers
Cookies	The response cookies
Body	The response body

Public Key Verification

Servers can verify a request was made by Synapse X via the public key verification system, along with `syn.crypt.user.sign` to verify extra data sent to the server.

To verify a `Syn-Signature` header, you must use libsodium with the crypto_sign_open function. Pass `qgq26x4+4FWdLzRpGZytZfEQJlOeusryQC8ppC2BEVA=` (Base64 encoded) as the public key. We will always alert developers and users if this key ever changes.

After signature verification succeeds, you will get a JSON encoded payload with the following fields:

Field	Description
authenticationTime	UNIX timestamp when the user authenticated this instance (UTC).
fingerprint	Same as the `Syn-Fingerprint` legacy header.
ipAddress	The IP address that was used to authenticate this instance. Please note this can change if the user was using a mobile network/similar. Can be IPv4 or IPv6.
userIdentifier	Same as the `Syn-User-Identifier` legacy header.
userPublicKey	The Base64 encoded public key for this user. You can use this to verify messages that were signed with the `syn.crypt.user.sign` function. To verify messages, use the libsodium crypto_sign_verify_detached function with this key as the public key.
userPromptPublicKey	The Base64 encoded prompt public key for this user. Like the above public key, this can be used to verify messages that were signed with the `syn.crypt.user.prompt.sign` function.

Please note that *new* fields can be added to this JSON payload at any time, so don't rely on the above for your JSON schemas. We will never remove fields without first alerting developers, though.

todo: add NodeJS, PHP, ASP.NET example code and probably move this whole section (Public Key Verification) to a page in the Developer Guide

Math APIs

Functions

getboundingbox

```
(CFrame, Vector3) getboundingbox(parts: table, orientation?: CFrame)
```

Calculates the bounding box of a list of parts and returns its position (as a CFrame, optionally transformed by `orientation`) and size.

worldtoscreen

```
table worldtoscreen(points: table, offset?: Vector3)
```

Performs world to screen calculations on every `Vector3` or `BasePart` in `points` and returns the result as a table with matching keys. `offset` can be provided to offset every position.

Regex Classes

Classes

- Match
- Regex

Timer APIs

Classes

- Duration
- Stopwatch
- Timer

Parallel APIs

Functions

getactors

```
table getactors()
```

Returns a list of "active" Actor instances (any connected to a Lua state).

getactorstates

```
table getactorstates()
```

Returns a list of LuaStateProxy objects representing all Lua states created by the engine for use by Actors.

getluastate

```
LuaStateProxy getluastate(actor_or_script?: Instance)
```

Returns a LuaStateProxy for the given Actor or loaded script. If not provided, the current LuaStateProxy is returned.

getgamestate

```
LuaStateProxy getgamestate()
```

Returns a LuaStateProxy for the default game state.

checkparallel

```
bool checkparallel()
```

Returns whether this code is executing in parallel.

syn.run_on_actor

```
bool syn.run_on_actor(actor: Instance, source: string, ...any)
```

Schedules code to be executed on an actor's Lua state.

Classes

- LuaStateProxy

Events

```
syn.on_actor_state_created(actor: Instance)
```

Fired upon actor Lua state creation, before any scripts are ran.

Namespace Index

Bit Library

All `bit` library functions take 32-bit unsigned integers and return a *signed* 32-bit result. Take note of this when implementing. If you want unsigned results, we suggest using the `bit32` library.

Functions

badd

```
int bit.badd(...uint)
```

Adds 2 or more integers.

bsub

```
int bit.bsub(...uint)
```

Subtracts 2 or more integers (from left to right).

bmul

```
int bit.bmul(...uint)
```

Multiplies 2 or more integers.

bdiv

```
int bit.bdiv(...uint)
```

Divides 2 or more integers (from left to right).

band

```
int bit.band(...uint)
```

Performs bitwise AND on 2 or more integers.

bor

```
int bit.bor(...uint)
```

Performs bitwise OR on 2 or more integers.

bxor

```
int bit.bxor(...uint)
```

Performs bitwise XOR on 2 or more integers.

bnot

```
int bit.bnot(...uint)
```

Performs bitwise NOT on an integer.

lshift

```
int bit.lshift(value: uint, n: uint)
```

Shifts `value` left by `n` bits.

rshift

```
int bit.rshift(value: uint, n: uint)
```

Shifts `value` right by `n` bits.

arshift

```
int bit.arshift(value: uint, n: uint)
```

Performs an arthimetic shift right on `value` by `n` bits.

rol

```
int bit.rol(value: uint, n: uint)
```

Rotates `value` left `n` bits.

ror

```
int bit.ror(value: uint, n: uint)
```

Rotates `value` right `n` bits.

bpopcount

```
int bit.bpopcount(value: uint)
```

Returns the number of set bits in `value`.

bswap

```
int bit.bswap(value: uint)
```

Inverts `value`'s endianness.

tohex

```
int bit.tohex(value: uint, nibbles?: int = 8)
```

Converts `value` to a hex string.

tobit

```
int bit.tobit(value: uint)
```

Converts `value` into proper form for bitwise operations.

Synapse Library

Namespaces

- Synapse Cryptography Library
- syn.oth

Functions

queue_on_teleport

```
void syn.queue_on_teleport(script: string)
```

Queues `script` to be executed after the next teleport.

clear_teleport_queue

```
void syn.clear_teleport_queue()
```

Removes all queued scripts from the teleport queue.

get_thread_identity

```
int syn.get_thread_identity()
```

Returns the current thread's context level.

set_thread_identity

```
void syn.set_thread_identity(identity: int)
```

Sets the current thread's context level.

protect_gui

```
void syn.protect_gui(target: Instance)
```

`protect_gui` is deprecated. For backwards compatability, this function will cause `target` to be parented the return value of `gethui()` the next time it is parented.

unprotect_gui

```
void syn.unprotect_gui(target: Instance)
```

`unprotect_gui` is deprecated. For backwards compatability, this function will disable the parent-redirection done by `protect_gui`.

trampoline_call

```
(bool, ...any|string) syn.trampoline_call(target: function, call_stack: table,
thread_options: table, ...any)
```

Proxy a call to a Lua function with the given call stack and thread options. `call_stack` is an array of tables, with each sub-table having fields described below.

The `thread` parameter allows you to preset the `script`, `identity`, and `env` fields with the values from that thread. This field is optional, and those fields can be overridden after the fact.

Note: These values do *not* need to correlate with actual information returned by debug.getinfo; they are fully customizable.

Note: The `func` parameter will override all other data you pass here aside from `currentline`!

Call Stack Entry	Description
currentline	The currently executing line of code.
env	The function's environment.
source	The 'source' field returned by `debug.getinfo`.
name	The function's name.
numparams	The number of parameters in the function.
is_vararg	Whether this function takes variadic arguments.
func	A function to copy all information from.

Thread Option Entry	Description
script	The script attached to the thread.
identity	The identity of the new state.
env	The global environment of the new thread.
thread	A thread used as the parent.

toast_notification

```
void syn.toast_notification(options: table)
```

Displays a toast notification in the internal UI. The options table follows the following format:

Option	Description	Default
Type	ToastType enum	Required
Duration	How long the notification should last, in seconds	5
Title	The notification's title	Required
Content	The notification's content	Required
IconColor	Overrides the icon color	Varies by `Type`

ipc_send

```
void syn.ipc_send(data: any)
```

Sends data to the UI.

run_on_actor

```
bool syn.run_on_actor(actor: Instance, source: string, ...any)
```

Schedules code to be executed on an actor's Lua state.

request

```
table syn.request(params: table) [yields]
```

Makes a RESTful HTTP request.

Request Options

Option	Description	Default
Url	The request URL	Required
Method	The request method	"GET"
Headers	A map of header names to header values	{}
Cookies	A map of cookie names to cookie values	{}
Body	The request body. Cannot be used with GET or HEAD requests. It might be necessary to specify the `Content-Type` header when sending JSON or other formats.	nil

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Note: `Syn-Fingerprint` and `Syn-User-Identifier` have been deprecated in favor of the new public key verification system shown below.

Header	Value	Can Override
User-Agent	A string in the format "sx/<build_hash>".	Yes
Syn-Signature	Public-key authenticated headers, base64-encoded. See below for use.	No
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Syn-User-Identifier	A string value which uniquely identifies the current Synapse X user.	No

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StatusMessage	A human-readable version of `StatusCode`
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Cookies	The response cookies
Body	The response body

Public Key Verification

Servers can verify a request was made by Synapse X via the public key verification system, along with `syn.crypt.user.sign` to verify extra data sent to the server.

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After signature verification succeeds, you will get a JSON encoded payload with the following fields:

Field	Description
authenticationTime	UNIX timestamp when the user authenticated this instance (UTC).
fingerprint	Same as the `Syn-Fingerprint` legacy header.
ipAddress	The IP address that was used to authenticate this instance. Please note this can change if the user was using a mobile network/similar. Can be IPv4 or IPv6.
userIdentifier	Same as the `Syn-User-Identifier` legacy header.
userPublicKey	The Base64 encoded public key for this user. You can use this to verify messages that were signed with the `syn.crypt.user.sign` function. To verify messages, use the libsodium crypto_sign_verify_detached function with this key as the public key.
userPromptPublicKey	The Base64 encoded prompt public key for this user. Like the above public key, this can be used to verify messages that were signed with the `syn.crypt.user.prompt.sign` function.

Please note that *new* fields can be added to this JSON payload at any time, so don't rely on the above for your JSON schemas. We will never remove fields without first alerting developers, though.

todo: add NodeJS, PHP, ASP.NET example code and probably move this whole section (Public Key Verification) to a page in the Developer Guide

Events

on_actor_state_created

```
syn.on_actor_state_created(actor: Instance)
```

Fired upon actor Lua state creation, before any scripts are ran.

Synapse Cryptography Library

Namespaces

- syn.crypt.base64
- syn.crypt.hex
- syn.crypt.lz4
- syn.crypt.zstd
- syn.crypt.derive
- syn.crypt.user
- syn.crypt.seal
- syn.crypt.sign
- syn.crypt.custom
- syn.crypt.url

Functions

encrypt

```
string syn.crypt.encrypt(data: string, key: string, additional_data?: string)
```

Encrypts `data` with `key`, and includes `additional_data` if it is passed.

(Uses libsodium secretbox for when `additional_data` isn't passed, and the AEAD form of the same algorithm if it is passed. Nonce is generated and appended before the encrypted message.)

decrypt

```
string syn.crypt.decrypt(ciphertext: string, key: string, additional_data?:
string)
```

Decrypts `ciphertext` with `key`. The data (along with `additional_data` if it is passed) is also authenticated via a MAC before being returned.

(Uses libsodium secretbox or the AEAD form if `additional_data` is passed, like above.)

hash

```
string syn.crypt.hash(data: string, key?: string)
```

Hashes `data` with Blake2B. Optionally, you can pass `key` to create a 'keyed' hash, for which the hash will never be the same for different keys.

(Uses libsodium generic hashing.)

hmac

```
string syn.crypt.hmac(data: string, key: string)
```

Creates a HMAC signature from `data` and `key`. Note this is not the same as passing a `key` to the above function, and uses a different algorithm.

(Uses libsodium authentication.)

random

```
string syn.crypt.random(len: uint)
```

Generates a random string with `size` (cannot be negative or exceed 1024).

syn.crypt.base64

Functions

encode

```
string syn.crypt.base64.encode(input: string)
```

Base64 encodes `input`.

decode

```
string syn.crypt.base64.decode(input: string)
```

Base64 decodes `input`.

syn.crypt.hex

Functions

encode

```
string syn.crypt.hex.encode(input: string)
```

Encodes `input` in hexadecimal.

decode

```
string syn.crypt.hex.decode(input: string)
```

Decodes `input` in hexadecimal.

syn.crypt.lz4

Functions

compress

```
string syn.crypt.lz4.compress(data: string)
```

Compresses `data` with LZ4.

syn.crypt.derive

Functions

key

```
string syn.crypt.derive.key(len: uint, key: string, sub_key_id: uint, context:
string)
```

Derives a cryptographic key from another `key` specified - `len` specifies the length of the generated key, `sub_key_id` is the index of the key to generate, and `context` is a 8-byte string that uniquely identifies the script that is generating this key.

The `context` string can be any 8 ASCII characters. Some examples are `SynapseX`, `MyScript`, and `_Script_`.

Note: Due to Lua's usage of 64 bit floating point numbers, the maximum safe integer to pass to `sub_key_id` is 2^52. Passing a larger number will result in undefined behavior.

(Uses libsodium key derivation.)

```
string syn.crypt.derive.key(len: uint, key: string, id: string)
```

Alternatively, you can derive a cryptographic key from `key` with `len` length from a simple ID passed into `id`. This can be a message of any length.

(Uses libsodium generic hashing, with the `key` being used for a keyed hash.)

password

```
string syn.crypt.derive.password(len: uint, password: string, salt: string,
mode: PasswordDerivationMode) [yields]
```

Derives a cryptographic key from a user-entered `password`. Due to passwords usually being low-complexity and easy to crack, this function uses a *password hashing function* to achieve its goals.

In order to use this function, you must pass a 16-byte `salt`. You can generate this via `syn.crypt.random`.

Password hashing functions are deliberately slow - this is to make bruteforce attacks harder. The `mode` (or `opslimit`/`memlimit`) parameter allows you to specify how much security you want your derived key to have. You should choose the mode you wish to use based on how acceptable the wait for function completion is for your application, and what the security requirements for your application are.

Warning: Using the higher security PasswordDerivationMode options (or a `memlimit` parameter higher then 512MiB) with more then one password hash being processed at once can cause crashes due to high-memory requirements for the hash function.

(Uses libsodium password hashing.)

PasswordDerivationMode

Mode	Note
`Interactive`	The password hash takes ~100 milliseconds to complete on a modern PC.
`Moderate`	The password hash takes ~1 second to complete on a modern PC.
`Sensitive`	The password hash takes ~5 seconds to complete on a modern PC. Please note the warning above, as it particularly affects this.

```
string syn.crypt.derive.password(len: uint, password: string, salt: string,
ops_limit: uint, mem_limit: uint) [yields]
```

syn.crypt.user

Namespaces

- crypto.user.prompt

Functions

encrypt

```
string syn.crypt.user.encrypt(data: string, mode: UserEncryptionMode, key?:
string)
```

Encrypts `data` in a way that only the caller's Synapse X account can decrypt it. You can also pass a `key` to add a secondary key to the encryption if you wish.

Note: If the user resets their Synapse X password, **the output of this function will not be decryptable anymore**. The user simply changing their password when they know their current one will **not** cause this to happen, however.

The `mode` parameter controls how the encryption works.

UserEncryptionMode

Mode	Note
`SynAccount`	Ties the encrypted data to the users Synapse X account. The data **is** decryptable on other machines if the pre-conditions stated above are met.
`WindowsAccount`	Ties the encrypted data to *both* the users Synapse X account and Windows account. The data is *only* decryptable if both the pre-conditions stated above are met and the user does not reset their Windows password.
`WindowsMachine`	Ties the encrypted data to *both* the users Synapse X account and Windows machine. The data is *only* decryptable if both the pre-conditions stated above are met and the user does not reset their Windows PC.

decrypt

```
string syn.crypt.user.decrypt(ciphertext: string, key?: string)
```

Decrypts `ciphertext` from the *Per-User Encrypt* function above. You do not need to pass the `UserEncryptionMode` you used to encrypt this data, but you need to pass the `key` you used to encrypt the data if one was specified. The function will error if decryption fails.

sign

```
string syn.crypt.user.sign(data: string)
```

Signs `data` in a way that only the caller's Synapse X account can produce this signature. Equivalent to `syn.crypt.sign.detached.create` with a user-unique key.

You can verify data was signed with this method from a web request. See the HTTP APIs for more information.

verify

```
bool syn.crypt.user.verify(data: string, signature: string)
```

Verifies `data` was signed by the `syn.crypt.user.sign` function from the caller's Synapse X account. If you want to verify data signed by another user, get their public key from the HTTP APIs.

crypto.user.prompt

All Per-User APIs also have a prompting equivalent under the `syn.crypt.user.prompt` table. These functions make a verification box asking the user to authenticate the request made by the script, and only return the data if the user accepts. This is more useful for more 'high security' data that you dont want cryptographic operations performed on by an unauthorized script.

All of these functions yield as well, with the exclusion of `syn.crypt.user.prompt.verify` which does not need to be authenticated by the user.

Functions

encrypt

```
string syn.crypt.user.prompt.encrypt(data: string, mode: UserEncryptionMode,
key?: string) [yields]
```

Prompt equivalent to syn.crypt.user.encrypt.

decrypt

```
string syn.crypt.user.prompt.decrypt(ciphertext: string, key?: string)
[yields]
```

Prompt equivalent to syn.crypt.user.decrypt

sign

```
string syn.crypt.user.prompt.sign(data: string) [yields]
```

Prompt equivalent to syn.crypt.user.sign.

verify

```
bool syn.crypt.user.prompt.verify(data: string, signature: string)
```

Prompt equivalent to syn.crypt.user.verify.

syn.crypt.seal

Functions

keygen

```
(string, string) syn.crypt.seal.keygen()
```

Generates a new public & secret keypair, and returns it in that order.

derive

```
(string, string) syn.crypt.seal.derive(key: string)
```

TODO

encrypt

```
string syn.crypt.seal.encrypt(plaintext: string, public_key: string)
```

Encrypts `data` with the `public_key`. The data can only be later decrypted via the secret key in the keypair.

decrypt

```
string syn.crypt.seal.decrypt(ciphertext: string, public_key: string,
secret_key: string)
```

Decrypts `data` with the `public_key` and `secret_key`.

syn.crypt.sign

Namespaces

- syn.crypt.sign.detached

Functions

keygen

```
(string, string) syn.crypt.sign.keygen()
```

Generates a new public & secret keypair, and returns it in that order.

NOTE; These keypairs are *NOT* compatible with the ones used for the encryption library above.

derive

```
(string, string) syn.crypt.sign.derive(key: string)
```

TODO

create

```
string syn.crypt.sign.create(data: string, secret_key: string)
```

Creates a signature for `data` with the `secret_key`, and returns the signature combined with the message.

open

```
string syn.crypt.sign.open(data: string, public_key: string)
```

Verifies the `data` passed in with the `public_key`, and returns the original message if the verification succeeds. Errors if verification fails.

syn.crypt.sign.detached

Functions

create

```
string syn.crypt.sign.detached.create(data: string, secret_key: string)
```

Creates a signature for `data` with the `secret_key`, and returns the signature.

verify

```
bool syn.crypt.sign.detached.verify(data: string, signature: string,
public_key: string)
```

Verifies the `data` passed in with the `public_key` and `signature`, and returns `true` if the verification succeeds. Returns `false` if verification fails.

syn.crypt.custom

Functions

encrypt

```
string syn.crypt.custom.encrypt(cipher: string, data: string, key: string, iv:
string)
```

Encrypts `data` with `key` using selected `cipher` and `iv/nonce`.

decrypt

```
string syn.crypt.custom.decrypt(cipher: string, data: string, key: string, iv:
string)
```

Decrypts `ciphertext` with `key` using selected `cipher` and `iv/nonce`.

hash

```
string syn.crypt.custom.hash(cipher: string, data: string)
```

Hashes `data` with `algorithm`.

Custom Hashing Algorithms

MD5	SHA1	SHA2	SHA3	BLAKE
md5	sha1	sha224	sha3-224	blake2b
		sha256	sha3-256	blake2s
		sha384	sha3-384	
		sha512	sha3-512	

hmac

```
string syn.crypt.custom.hmac(cipher: string, data: string, key: string)
```

Creates a HMAC signature from `data` and `key` with `algorithm`.

Custom HMAC Algorithms

MD5	SHA1	SHA2	SHA3
md5	sha1	sha256	sha3-224
		sha384	sha3-256
		sha512	sha3-384
			sha3-512

syn.crypt.url

Functions

encode

```
string syn.crypt.url.encode(data: string)
```

decode

```
string syn.crypt.url.decode(data: string)
```

syn.oth

Functions

hook

```
function syn.oth.hook(target: function, hook: function)
```

A secure version of `hookfunction` for C functions that works by running hook code on separate threads. When a hooked function is called, a new or cached hook thread is resumed with the `hook` and any passed arguments. The returned callback can be used to execute the original function on the original, calling thread.

In the context of a hook thread, the following functions behave as though being called under the original thread:

- getnamecallmethod
- setnamecallmethod
- checkcaller
- checkcallstack
- getcallingscript
- the debug library (debug.*)
- TODO

unhook

```
bool syn.oth.unhook(target: function, hook_or_callback?: function)
```

Un-hooks a function hooked with `syn.oth.hook`. The second parameter is not required if the function has only been hooked once. Returns true upon success.

get_root_callback

```
function syn.oth.get_root_callback()
```

Returns a function that can be used to call the original function in the context of a hook thread. Useful for when a function is hooked multiple times and the callback you receive from `syn.oth.hook` executes the next hook in the chain, not the original function.

is_hook_thread

```
bool syn.oth.is_hook_thread()
```

Returns true if this thread is a hook thread.

get_original_thread

```
thread syn.oth.get_original_thread()
```

Return the original thread this hook comes from, or nil if the current thread is not a hook.

Debug Library

Functions

validlevel

```
bool debug.validlevel(level: int, t?: thread)
```

Checks if `level` is a valid index level for the current thread or `t` if passed.

getcallstack

```
table debug.getcallstack(t?: thread)
```

Returns a table with each index having fields for the `func` being executed at that call stack level, and the `currentline` if it is a Lua closure. Uses `t` instead of the callers thread if one is passed.

getprotos

```
table debug.getprotos(f: function | int | ProtoProxy)
```

Returns a table containing the inner prototypes of function `f`. Use `debug.getproto` with `activated` set to `true` to get a list of closures.

getproto

```
table | ProtoProxy debug.getproto(f: function | int | ProtoProxy, index?: int,
activated?: bool)
```

Gets the inner function of `f` at `index`.

Note: If `activated` is true, it instead will return a table of functions. These are the closures of that proto that exist within the GC.

getstack

```
any debug.getstack(level: int, index?: int)
```

Gets the method stack at level `index`. If `index` is not provided, a table is returned.

setstack

```
void debug.setstack(level: int, index: int, value: any)
```

Sets a stack value at `index` for function at `level` to `value`.

getupvalues

```
table debug.getupvalues(fi: function | int)
```

Retrieve the upvalues in function `fi` or at level `fi`.

getupvalue

```
any debug.getupvalue(fi: function | int, index: int)
```

Returns the upvalue with index `idx` in function or level `fi`.

setupvalue

```
void debug.setupvalue(fi: function | int, index: int, value: any)
```

Sets an upvalue at index `idx` in function or level `fi`.

getconstants

```
table debug.getconstants(f: function | int | ProtoProxy, pseudo_indices?: bool
= False)
```

Retrieve the constants in function `fi` or at level `fi`.

getconstant

```
any debug.getconstant(f: function | int | ProtoProxy, index: int)
```

Returns the constant at index `idx` in function `fi` or level `fi`.

setconstant

```
any debug.setconstant(f: function | int | ProtoProxy, index: int, value: any,
pseudo_indices?: bool = False)
```

Set constant `idx` to tuple `value` at level or function `fi`.

getmetatable

```
table debug.getmetatable(t: table)
```

Equivalent to getrawmetatable.

setmetatable

```
void debug.setmetatable(t: table, mt: table)
```

Equivalent to setrawmetatable.

getregistry

```
table debug.getregistry()
```

Equivalent to getreg.

Drawing

Functions

new

```
any Drawing.new(type_name: string)
```

Instantiates a new DrawEntry object. Equivalent to `<Type>.new()`. Valid type names include:

- "Line"
- "Text"
- "Image"
- "Circle"
- "Square"
- "Triangle"
- "Quad"

Enums

- Fonts

DrawingImmediate

NOTE: DrawingImmediate APIs can only be called during render steps. See DrawingImmediate.GetPaint for more information.

Functions

Line

```
void DrawingImmediate.Line(p1: Vector2, p2: Vector2, color: Color3, opacity:
number, thickness: number)
```

Draws a line.

Circle

```
void DrawingImmediate.Circle(center: Vector2, radius: number, color: Color3,
opacity: number, num_sides: int, thickness: number)
```

Draws a circle.

FilledCircle

```
void DrawingImmediate.FilledCircle(center: Vector2, radius: number, color:
Color3, num_sides: int, opacity: number)
```

Draws a filled circle.

Triangle

```
void DrawingImmediate.Triangle(p1: Vector2, p2: Vector2, p3: Vector3, color:
Color3, opacity: number, thickness: number)
```

Draws a triangle.

FilledTriangle

```
void DrawingImmediate.FilledTriangle(p1: Vector2, p2: Vector2, p3: Vector3,
color: Color3, opacity: number)
```

Draws a filled triangle.

Rectangle

```
void DrawingImmediate.Rectangle(top_left: Vector2, size: Vector2, color:
Color3, opacity: number, rounding: number, thickness: number)
```

Draws a rectangle.

FilledRectangle

```
void DrawingImmediate.FilledRectangle(top_left: Vector2, size: Vector2, color:
Color3, opacity: number, rounding: number)
```

Draws a filled rectangle.

Quad

```
void DrawingImmediate.Quad(p1: Vector2, p2: Vector2, p3: Vector2, p4: Vector2,
color: Color3, opacity: number, thickness: number)
```

Draws a quad.

FilledQuad

```
void DrawingImmediate.FilledQuad(p1: Vector2, p2: Vector2, p3: Vector2, p4:
Vector2, color: Color3, opacity: number)
```

Draws a filled quad.

Text

```
void DrawingImmediate.Text(position: Vector2, font: DrawFont, font_size:
number, color: Color3, opacity: number, text: string, center: bool)
```

Draws text.

OutlinedText

```
void DrawingImmediate.OutlinedText(position: Vector2, font: DrawFont,
font_size: number, color: Color3, opacity: number, outline_color: Color3,
outline_opacity: number, text: string, center: bool)
```

Draws outlined text.

GetPaint

```
SynSignal DrawingImmediate.GetPaint(z_index: int)
```

Returns an event that is fired every render step for a specific z-index. Lower value `z_index` events will fire before higher value events. `DrawingImmediate.*` APIs can only be called under these events.

Class Index

Class: DrawFont

Static Methods

```
DrawFont DrawFont.RegisterDefault(font_name: string, options: table) [yields]
```

```
DrawFont DrawFont.Register(font_data: string, options: table) [yields]
```

```
table DrawFont.ListDefault()
```

Returns a list of the default registered fonts.

Methods

```
Vector2 DrawFont:GetTextBounds(size: float, text: string)
```

Calculates the bounds a string of text occupies given a font size.

Class: Drawing

Methods

```
void Drawing:WaitForRenderer() [yields]
```

Yields until the game renderer is fully initialized. Returns immediately if the renderer is already enabled.

Class: DrawEntry

Properties

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

```
void DrawEntry:Remove()
```

Disables a DrawEntry.

```
void DrawEntry:Destroy()
```

An alias for `Remove`.

```
void DrawEntry:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void DrawEntry:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Line

Static Methods

```
Line Line.new()
```

Properties

```
float Thickness
```

Determines the thickness of a Line in pixels.

```
Vector2 From
```

Determines the starting position of a Line.

```
Vector2 To
```

Determines the end position of a Line.

Inherited from DrawEntry:

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

Inherited from DrawEntry:

```
void Line:Remove()
```

Disables a DrawEntry.

```
void Line:Destroy()
```

An alias for `Remove`.

```
void Line:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void Line:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Text

Static Methods

```
Text Text.new()
```

Properties

```
string Text
```

Determines the text to be displayed.

```
Vector2 TextBounds [readonly]
```

Determines the Vector2 space occupied by a Text object.

```
number Size
```

Determines the font size of a Text object.

```
Drawing.Fonts Font
```

Determines the font of a Text object.

```
bool Centered
```

Determines whether the displayed text is centered.

```
bool Outlined
```

Determines whether the displayed text is outlined.

```
Color3 OutlineColor
```

Determines the outline color of the displayed text.

```
Vector2 Position
```

Determines the position of a Text object.

Inherited from DrawEntry:

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

Inherited from DrawEntry:

```
void Text:Remove()
```

Disables a DrawEntry.

```
void Text:Destroy()
```

An alias for `Remove`.

```
void Text:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void Text:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Image

Static Methods

```
Image Image.new()
```

Properties

```
string Data
```

Determines the raw image data for an Image.

```
Vector2 ImageSize [readonly]
```

Determines the dimensions of the image held by the Data property.

```
Vector2 Size
```

Determines the size of an Image.

```
Vector2 Position
```

Determines the position of an Image.

```
number Rounding
```

Determines the roundness of an Image.

Inherited from DrawEntry:

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

Inherited from DrawEntry:

```
void Image:Remove()
```

Disables a DrawEntry.

```
void Image:Destroy()
```

An alias for `Remove`.

```
void Image:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void Image:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Circle

Static Methods

```
Circle Circle.new()
```

Properties

```
number Thickness
```

Determines the thickness of a Circle.

```
int NumSides
```

Determines the number of segments that make up a Circle.

```
number Radius
```

Determines the radius of a Circle.

```
bool Filled
```

Determines whether a Circle is filled.

```
Vector2 Position
```

Determines the position of a Circle.

Inherited from DrawEntry:

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

Inherited from DrawEntry:

```
void Circle:Remove()
```

Disables a DrawEntry.

```
void Circle:Destroy()
```

An alias for `Remove`.

```
void Circle:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void Circle:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Square

Static Methods

```
Square Square.new()
```

Properties

```
number Thickness
```

Determines the thickness of a Square.

```
Vector2 Size
```

Determines the size of a Square.

```
Vector2 Position
```

Determines the position of a Square.

```
bool Filled
```

Determines whether a Square is filled.

Inherited from DrawEntry:

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

Inherited from DrawEntry:

```
void Square:Remove()
```

Disables a DrawEntry.

```
void Square:Destroy()
```

An alias for `Remove`.

```
void Square:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void Square:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Triangle

Static Methods

```
Triangle Triangle.new()
```

Properties

```
number Thickness
```

Determines a Triangle's thickness.

```
Vector2 PointA
```

The position of a Triangle's first point.

```
Vector2 PointB
```

The position of a Triangle's second point.

```
Vector2 PointC
```

The position of a Triangle's third point.

```
bool Filled
```

Determines whether a Triangle is filled.

Inherited from DrawEntry:

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

Inherited from DrawEntry:

```
void Triangle:Remove()
```

Disables a DrawEntry.

```
void Triangle:Destroy()
```

An alias for `Remove`.

```
void Triangle:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void Triangle:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Quad

Static Methods

```
Quad Quad.new()
```

Properties

```
number Thickness
```

Determines a Quad's thickness.

```
Vector2 PointA
```

The position of a Quad's first point.

```
Vector2 PointB
```

The position of a Quad's second point.

```
Vector2 PointC
```

The position of a Quad's third point.

```
Vector2 PointD
```

The position of a Quad's fourth point.

```
bool Filled
```

Determines whether a Quad is filled.

Inherited from DrawEntry:

```
bool Visible
```

Determines whether a DrawEntry will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntry is rendered relative to other GUIs.

```
float Transparency
```

A V2-era misnomer and now alias for 'Opacity'. Deprecated.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntry, where 0 is fully transparent and 1 is fully opaque.

```
Color3 Color
```

Determines the color of a DrawEntry.

```
Vector3 ColorVec3 [writeonly]
```

Used to set `Color` via a `Vector3`. Write-only.

Methods

Inherited from DrawEntry:

```
void Quad:Remove()
```

Disables a DrawEntry.

```
void Quad:Destroy()
```

An alias for `Remove`.

```
void Quad:MoveToFront()
```

Moves a DrawEntry to the front of the current ZIndex's draw list.

```
void Quad:MoveToBack()
```

Moves a DrawEntry to the back of the current ZIndex's draw list.

Class: Point

Properties

```
Vector2 ScreenPos [readonly]
```

A Point's screen position.

```
bool Visible [readonly]
```

Determines whether a Point is rendered.

```
bool HasColorOverride
```

Toggles the overriding of a Point's color. Used when rendering a Point using a triangulated PolylineDynamic.

```
Color3 ColorOverride
```

Overrides a Point's color when `HasColorOverride` is true.

```
Vector3 ColorOverrideVec3 [writeonly]
```

Sets `ColorOverride` using a Vector3. Write-only.

```
number ColorOverrideOpacity
```

Determines the opacity of a Point's override color.

Class: Point2D

A point in two-dimensional space.

Static Methods

```
Point2D Point2D.new()
```

```
Point2D Point2D.new(point: UDim2)
```

```
Point2D Point2D.new(point: Vector2)
```

```
Point2D Point2D.new(x: number, y: number)
```

```
Point2D Point2D.new(x_scale: number, x_offset: number, y_scale: number,
y_offset: number)
```

Properties

```
UDim2 Point
```

A Point2D's position.

```
Vector2 PointVec2
```

Allows you to get/set `Point` directly as `Vector2`. **Returns only the offset fields of `UDim2`!**

Inherited from Point:

```
Vector2 ScreenPos [readonly]
```

A Point's screen position.

```
bool Visible [readonly]
```

Determines whether a Point is rendered.

```
bool HasColorOverride
```

Toggles the overriding of a Point's color. Used when rendering a Point using a triangulated PolylineDynamic.

```
Color3 ColorOverride
```

Overrides a Point's color when `HasColorOverride` is true.

```
Vector3 ColorOverrideVec3 [writeonly]
```

Sets `ColorOverride` using a Vector3. Write-only.

```
number ColorOverrideOpacity
```

Determines the opacity of a Point's override color.

Class: Point3D

A point in three-dimensional space.

Static Methods

```
Point3D Point3D.new()
```

```
Point3D Point3D.new(point: Vector3)
```

```
Point3D Point3D.new(x: number, y: number, z: number)
```

Properties

```
Vector3 Point
```

A Point3D's position.

Inherited from Point:

```
Vector2 ScreenPos [readonly]
```

A Point's screen position.

```
bool Visible [readonly]
```

Determines whether a Point is rendered.

```
bool HasColorOverride
```

Toggles the overriding of a Point's color. Used when rendering a Point using a triangulated PolylineDynamic.

```
Color3 ColorOverride
```

Overrides a Point's color when `HasColorOverride` is true.

```
Vector3 ColorOverrideVec3 [writeonly]
```

Sets `ColorOverride` using a Vector3. Write-only.

```
number ColorOverrideOpacity
```

Determines the opacity of a Point's override color.

Class: PointInstance

A dynamic point whose position is linked to an instance's 'CFrame' property.

Static Methods

```
PointInstance PointInstance.new(instance?: Instance, offset?: CFrame)
```

Properties

```
Instance Instance
```

Determines the instance a PointInstance will track.

```
CFrame Offset
```

Describes the offset from a PointInstance's instance.

```
CFrameRotationType RotationType
```

Describes how the rotation of `Offset` affects the `WorldPos`. Defaults to `CameraRelative`.

```
Vector3 WorldPos [readonly]
```

Describes a PointInstance's world position. Read only.

Inherited from Point:

```
Vector2 ScreenPos [readonly]
```

A Point's screen position.

```
bool Visible [readonly]
```

Determines whether a Point is rendered.

```
bool HasColorOverride
```

Toggles the overriding of a Point's color. Used when rendering a Point using a triangulated PolylineDynamic.

```
Color3 ColorOverride
```

Overrides a Point's color when `HasColorOverride` is true.

```
Vector3 ColorOverrideVec3 [writeonly]
```

Sets `ColorOverride` using a Vector3. Write-only.

```
number ColorOverrideOpacity
```

Determines the opacity of a Point's override color.

Class: PointMouse

A dynamic point whose position is linked to the user's mouse.

Properties

Inherited from Point:

```
Vector2 ScreenPos [readonly]
```

A Point's screen position.

```
bool Visible [readonly]
```

Determines whether a Point is rendered.

```
bool HasColorOverride
```

Toggles the overriding of a Point's color. Used when rendering a Point using a triangulated PolylineDynamic.

```
Color3 ColorOverride
```

Overrides a Point's color when `HasColorOverride` is true.

```
Vector3 ColorOverrideVec3 [writeonly]
```

Sets `ColorOverride` using a Vector3. Write-only.

```
number ColorOverrideOpacity
```

Determines the opacity of a Point's override color.

Class: PointOffset

A dynamic point whose position is offset from another `Point`.

Static Methods

```
PointOffset PointOffset.new()
```

```
PointOffset PointOffset.new(point: Point)
```

```
PointOffset PointOffset.new(point: Point, offset: Vector2)
```

```
PointOffset PointOffset.new(point: Point, x_offset: number, y_offset: number)
```

Properties

```
Point Point
```

Holds a reference to a `Point`.

```
Vector2 Offset
```

Describes an offset to the `Point`.

Inherited from Point:

```
Vector2 ScreenPos [readonly]
```

A Point's screen position.

```
bool Visible [readonly]
```

Determines whether a Point is rendered.

```
bool HasColorOverride
```

Toggles the overriding of a Point's color. Used when rendering a Point using a triangulated PolylineDynamic.

```
Color3 ColorOverride
```

Overrides a Point's color when `HasColorOverride` is true.

```
Vector3 ColorOverrideVec3 [writeonly]
```

Sets `ColorOverride` using a Vector3. Write-only.

```
number ColorOverrideOpacity
```

Determines the opacity of a Point's override color.

Class: DrawEntryDynamic

Properties

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

```
void DrawEntryDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void DrawEntryDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: LineDynamic

Static Methods

```
LineDynamic LineDynamic.new()
```

```
LineDynamic LineDynamic.new(p1: Point, p2: Point)
```

Properties

```
float Thickness
```

Determines the thickness of a LineDynamic in pixels.

```
Point From
```

Determines the starting `Point` of a LineDynamic.

```
Point To
```

Determines the end `Point` of a LineDynamic.

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

Inherited from DrawEntryDynamic:

```
void LineDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void LineDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: PolyLineDynamic

Static Methods

```
PolyLineDynamic PolyLineDynamic.new(points?: table)
```

Properties

```
float Thickness
```

Determines the thickness of a PolyLineDynamic in pixels.

```
PolyLineFillType FillType
```

Determines how a PolyLineDynamic is filled.

```
table Points
```

The array of points that makeup a PolyLineDynamic.

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

```
void PolyLineDynamic:ReTriangulate()
```

Used to re-triangulate a PolyLineDynamic when 'FillType' is set to `PolyLineFillType.Triangulated`.

```
void PolyLineDynamic:SetPoints(points: table)
```

Sets a PolyLineDynamic's points.

Inherited from DrawEntryDynamic:

```
void PolyLineDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void PolyLineDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: TextDynamic

Static Methods

```
TextDynamic TextDynamic.new(point?: Point)
```

Properties

```
string Text
```

Determines the text to be displayed.

```
Vector2 TextBounds [readonly]
```

Indicates the Vector2 space occupied by a TextDynamic.

```
number Size
```

Determines the font size of a TextDynamic's text.

```
Drawing.Fonts Font
```

Determines the font of a TextDynamic's text.

```
Point Position
```

Determines the `Point` of a TextDynamic object.

```
XAlignment XAlignment
```

Determines the x-axis alignment of a TextDynamic's position.

```
YAlignment YAlignment
```

Determines the y-axis alignment of a TextDynamic's position.

```
XAlignment TextXAlignment
```

Determines the x-axis alignment of a TextDynamic's text when there are multiple lines.

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

Inherited from DrawEntryDynamic:

```
void TextDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void TextDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: CircleDynamic

Static Methods

```
CircleDynamic CircleDynamic.new(point?: Point)
```

Properties

```
number Thickness
```

Determines the thickness of a CircleDynamic.

```
int NumSides
```

Determines the number of segments that make up a CircleDynamic.

```
number Radius
```

Determines the radius of a CircleDynamic. Only used if `Edge` is nil.

```
bool Filled
```

Determines whether a CircleDynamic is filled.

```
Point Position
```

Determines a CircleDynamic's center `Point`.

```
Point Edge
```

Determines a CircleDynamic's edge `Point`. If this field is set to nil, `Radius` is used.

```
XAlignment XAlignment
```

```
YAlignment YAlignment
```

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

Inherited from DrawEntryDynamic:

```
void CircleDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void CircleDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: RectDynamicBase

Properties

```
Vector2 Size
```

A RectDynamicBase's size. Only used if `BottomRight` is not set.

```
Point Position
```

The RectDynamicBase root position.

```
Point BottomRight
```

If set, the bottom-right corner of the `RectDynamicBase`. When used, `Position` ignores alignment and is used as the top-left corner.

```
XAlignment XAlignment
```

How a RectDynamicBase is aligned on the x-axis relative to its Position.

```
YAlignment YAlignment
```

How a RectDynamicBase is aligned on the y-axis relative to its Position.

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

Inherited from DrawEntryDynamic:

```
void RectDynamicBase:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void RectDynamicBase:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: RectDynamic

Static Methods

```
RectDynamic RectDynamic.new(point?: Point)
```

Properties

```
number Thickness
```

The thickness of a RectDynamic, in pixels.

```
bool Filled
```

Whether or not a RectDynamic is filled.

```
number Rounding
```

Describes the roundness of a RectDynamic's corners.

Inherited from RectDynamicBase:

```
Vector2 Size
```

A RectDynamicBase's size. Only used if `BottomRight` is not set.

```
Point Position
```

The RectDynamicBase root position.

```
Point BottomRight
```

If set, the bottom-right corner of the `RectDynamicBase`. When used, `Position` ignores alignment and is used as the top-left corner.

```
XAlignment XAlignment
```

How a RectDynamicBase is aligned on the x-axis relative to its Position.

```
YAlignment YAlignment
```

How a RectDynamicBase is aligned on the y-axis relative to its Position.

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

Inherited from DrawEntryDynamic:

```
void RectDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void RectDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: GradientRectDynamic

Static Methods

```
GradientRectDynamic GradientRectDynamic.new(point?: Point)
```

Properties

```
Color3 ColorUpperLeft
```

Describes a GradientRectDynamic's upper-left color.

```
Color3 ColorUpperRight
```

Describes a GradientRectDynamic's upper-right color.

```
Color3 ColorBottomLeft
```

Describes a GradientRectDynamic's bottom-left color.

```
Color3 ColorBottomRight
```

Describes a GradientRectDynamic's bottom-right color.

```
number OpacityUpperLeft
```

Describes a GradientRectDynamic's upper-left opacity.

```
number OpacityUpperRight
```

Describes a GradientRectDynamic's upper-right opacity.

```
number OpacityBottomLeft
```

Describes a GradientRectDynamic's bottom-left opacity.

```
number OpacityBottomRight
```

Describes a GradientRectDynamic's bottom-right opacity.

```
number Opacity
```

Affects the overall opacity of a GradientRectDynamic.

Inherited from RectDynamicBase:

```
Vector2 Size
```

A RectDynamicBase's size. Only used if `BottomRight` is not set.

```
Point Position
```

The RectDynamicBase root position.

```
Point BottomRight
```

If set, the bottom-right corner of the `RectDynamicBase`. When used, `Position` ignores alignment and is used as the top-left corner.

```
XAlignment XAlignment
```

How a RectDynamicBase is aligned on the x-axis relative to its Position.

```
YAlignment YAlignment
```

How a RectDynamicBase is aligned on the y-axis relative to its Position.

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

Inherited from DrawEntryDynamic:

```
void GradientRectDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void GradientRectDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: ImageDynamic

Static Methods

```
ImageDynamic ImageDynamic.new(point?: Point)
```

Properties

```
string Image [writeonly]
```

Sets the raw image data for an ImageDynamic. Write-only.

```
Vector2 ImageSize [readonly]
```

Returns the dimensions of the image held by the Image property.

```
number Rounding
```

Indicates the roundness of an ImageDynamic.

Inherited from RectDynamicBase:

```
Vector2 Size
```

A RectDynamicBase's size. Only used if `BottomRight` is not set.

```
Point Position
```

The RectDynamicBase root position.

```
Point BottomRight
```

If set, the bottom-right corner of the `RectDynamicBase`. When used, `Position` ignores alignment and is used as the top-left corner.

```
XAlignment XAlignment
```

How a RectDynamicBase is aligned on the x-axis relative to its Position.

```
YAlignment YAlignment
```

How a RectDynamicBase is aligned on the y-axis relative to its Position.

Inherited from DrawEntryDynamic:

```
bool Visible
```

Determines whether a DrawEntryDynamic will be rendered.

```
int ZIndex
```

Determines the order in which a DrawEntryDynamic is rendered relative to other GUIs.

```
float Opacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic.

```
Color3 Color
```

Determines the color of a DrawEntryDynamic.

```
bool Outlined
```

Whether a DrawEntryDynamic is outlined.

```
number OutlineOpacity
```

A value between 0 and 1 that indicates the opacity of a DrawEntryDynamic's outline.

```
number OutlineThickness
```

The thickness of a DrawEntryDynamic's outline, in pixels.

```
Color3 OutlineColor
```

The color of a DrawEntryDynamic's outline.

Methods

Inherited from DrawEntryDynamic:

```
void ImageDynamic:MoveToFront()
```

Moves a DrawEntryDynamic to the front of the current ZIndex's draw list.

```
void ImageDynamic:MoveToBack()
```

Moves a DrawEntryDynamic to the back of the current ZIndex's draw list.

Class: ImageRef

Static Methods

```
ImageRef ImageRef.new()
```

Properties

```
Vector2 ImageSize [readonly]
```

```
number SpeedMultiplier
```

Class: RenderObject

Properties

```
bool Visible
```

Determines whether a RenderObject is displayed.

Class: RenderButton

Properties

```
string Label
```

Determines a RenderButton's text label.

```
Vector2 Size
```

Determines the size of a RenderButton.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderButton.OnUpdated()
```

Fires on button-press.

Class: RenderColorButton

Properties

```
string Description
```

Determines the description RenderColorButton when you hover over it.

```
Vector2 Size
```

Determines the size of a RenderColorButton.

```
Color3 Color
```

Describes the color of a RenderColorButton.

```
number Alpha
```

A RenderColorButton's opacity.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderColorButton.OnUpdated()
```

Fires on button-press.

Class: RenderCheckBox

Properties

```
string Label
```

Determines a RenderCheckBox's text label.

```
bool Value
```

Whether a RenderCheckBox is checked.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderCheckBox.OnUpdated()
```

Fires on checkbox-toggle.

Class: RenderColorPicker

Properties

```
string Label
```

Determines a RenderColorPicker's text label.

```
Color3 Color
```

The currently selected color.

```
number Alpha
```

The currently selected alpha value.

```
bool UseAlpha
```

Toggles a RenderColorPicker's alpha picker.

```
bool ReturnInt
```

Affects the arguments passed to the `OnUpdated` event. Default true.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderColorPicker.OnUpdated(r: number, g: number, b: number, a: number)
```

Fired upon color change. If `ReturnInt` is true, `r`, `g`, `b`, and `a` are integer values (0-255).

Class: RenderCombo

Properties

```
string Label
```

The RenderCombo's label.

```
table Items
```

An array of strings representing a RenderCombo's choices.

```
int SelectedItem
```

The index of the currently selected combo item.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderCombo.OnUpdated(new_selection: int)
```

Fired upon a change in selection.

Class: RenderDrag

Properties

```
string Label
```

A RenderDrag's label.

```
number Speed
```

The drag input's scaling speed.

```
number Min
```

The drag input's minimum value.

```
number Max
```

The drag input's maximum value.

```
number Value
```

The current value of the drag input.

```
bool Clamped
```

Determines whether `Value` should be clamped to [`Min`, `Max`] when set manually.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderDrag.OnUpdated(new_value: number)
```

Fired upon a change in value.

Class: RenderIntDrag

Properties

```
string Label
```

A RenderIntDrag's label.

```
number Speed
```

The drag input's scaling speed.

```
number Min
```

The drag input's minimum value.

```
number Max
```

The drag input's maximum value.

```
number Value
```

The current value of the drag input.

```
bool Clamped
```

Determines whether `Value` should be clamped to [`Min`, `Max`] when set manually.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderIntDrag.OnUpdated(new_value: number)
```

Fired upon a change in value.

Class: RenderTextBox

Properties

```
string Label
```

The RenderTextBox's label.

```
int MaxTextLength
```

The text box's max length, a number between 0 and 16384, inclusive. Defaults to 16384.

```
string Value
```

The RenderTextBox's text input.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderTextBox.OnUpdated(new_selection: int)
```

Fired upon a change in text.

Class: RenderSeparator

Properties

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Class: RenderSlider

Properties

```
string Label
```

A RenderSlider's label.

```
number Min
```

The slider's minimum value.

```
number Max
```

The slider's maximum value.

```
number Value
```

The current value of the slider.

```
bool Clamped
```

Determines whether `Value` should be clamped to [`Min`, `Max`] when set manually with Ctrl+Click.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderSlider.OnUpdated(new_value: number)
```

Fired upon a change in value.

Class: RenderIntSlider

Properties

```
string Label
```

A RenderIntSlider's label.

```
int Min
```

The slider's minimum value.

```
int Max
```

The slider's maximum value.

```
int Value
```

The current value of the slider.

```
bool Clamped
```

Determines whether `Value` should be clamped to [`Min`, `Max`] when set manually with Ctrl+Click.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderIntSlider.OnUpdated(new_value: int)
```

Fired upon a change in value.

Class: RenderSelectable

Properties

```
string Label
```

A RenderSelectable's label.

```
Vector2 Size
```

A RenderSelectable's size.

```
bool Value
```

Whether this RenderSelectable is selected.

```
bool Toggles
```

Determines whether selecting the RenderSelectable toggles `Selected`.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Events

```
RenderSelectable.OnUpdated(new_value: bool)
```

Fired upon a change in value.

Class: RenderChildBase

Properties

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

```
void RenderChildBase:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderChildBase:SetStyle(option: RenderStyleOption, value: float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderChildBase:SetColor(option: RenderColorOption, color: Color3, alpha:
number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderChildBase:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderChildBase:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderChildBase:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderChildBase:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderChildBase:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderChildBase:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderChildBase:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderChildBase:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderChildBase:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderChildBase:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderChildBase:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderChildBase:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderChildBase:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderChildBase:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderChildBase:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderChildBase:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderChildBase:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderChildBase:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderTabMenu

Properties

```
int SelectedItem
```

The index of the selected tab, or zero if none are selected.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

```
void RenderTabMenu:SetTabStyle(option: RenderStyleOption, value:
float|Vector2)
```

Sets a style option for this RenderTabMenu's tabs.

```
void RenderTabMenu:SetTabColor(option: RenderColorOption, color: Color3,
alpha: number)
```

Sets a color option for this RenderTabMenu's tabs.

```
RenderDummyWindow RenderTabMenu:Add(label: string)
```

Creates a new tab.

Inherited from RenderChildBase:

```
void RenderTabMenu:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderTabMenu:SetStyle(option: RenderStyleOption, value: float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderTabMenu:SetColor(option: RenderColorOption, color: Color3, alpha: number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderTabMenu:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderTabMenu:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderTabMenu:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderTabMenu:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderTabMenu:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderTabMenu:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderTabMenu:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderTabMenu:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderTabMenu:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderTabMenu:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderTabMenu:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderTabMenu:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderTabMenu:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderTabMenu:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderTabMenu:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderTabMenu:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderTabMenu:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderTabMenu:Dummy()
```

Creates a RenderDummyWindow child object.

Events

```
RenderTabMenu.OnUpdated(new_tab_index: int)
```

Fired upon tab change.

Class: RenderCollapsable

Properties

```
string HeaderLabel
```

The header label of the RenderCollapsable.

```
bool DefaultOpen [readonly]
```

Whether this RenderCollapsable was set to be open by default.

```
SynSignal OnUpdated
```

Fired when the state of the RenderCollapsable changes from open to closed or vice versa.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

Inherited from RenderChildBase:

```
void RenderCollapsable:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderCollapsable:SetStyle(option: RenderStyleOption, value:
float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderCollapsable:SetColor(option: RenderColorOption, color: Color3,
alpha: number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderCollapsable:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderCollapsable:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderCollapsable:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderCollapsable:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderCollapsable:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderCollapsable:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderCollapsable:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderCollapsable:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderCollapsable:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderCollapsable:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderCollapsable:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderCollapsable:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderCollapsable:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderCollapsable:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderCollapsable:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderCollapsable:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderCollapsable:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderCollapsable:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderChildWindow

Properties

```
Vector2 Size
```

The size of the child window.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

Inherited from RenderChildBase:

```
void RenderChildWindow:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderChildWindow:SetStyle(option: RenderStyleOption, value:
float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderChildWindow:SetColor(option: RenderColorOption, color: Color3,
alpha: number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderChildWindow:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderChildWindow:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderChildWindow:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderChildWindow:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderChildWindow:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderChildWindow:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderChildWindow:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderChildWindow:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderChildWindow:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderChildWindow:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderChildWindow:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderChildWindow:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderChildWindow:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderChildWindow:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderChildWindow:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderChildWindow:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderChildWindow:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderChildWindow:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderSameLine

Properties

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

Inherited from RenderChildBase:

```
void RenderSameLine:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderSameLine:SetStyle(option: RenderStyleOption, value: float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderSameLine:SetColor(option: RenderColorOption, color: Color3, alpha:
number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderSameLine:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderSameLine:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderSameLine:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderSameLine:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderSameLine:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderSameLine:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderSameLine:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderSameLine:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderSameLine:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderSameLine:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderSameLine:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderSameLine:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderSameLine:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderSameLine:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderSameLine:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderSameLine:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderSameLine:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderSameLine:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderIndent

Properties

```
number Pixels
```

The amount of pixels to indent. A negative number of pixels outdents; i.e. goes to the left instead of to the right. Indents by the IndentSpacing style if Pixels is zero.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

Inherited from RenderChildBase:

```
void RenderIndent:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderIndent:SetStyle(option: RenderStyleOption, value: float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderIndent:SetColor(option: RenderColorOption, color: Color3, alpha: number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderIndent:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderIndent:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderIndent:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderIndent:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderIndent:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderIndent:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderIndent:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderIndent:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderIndent:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderIndent:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderIndent:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderIndent:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderIndent:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderIndent:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderIndent:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderIndent:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderIndent:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderIndent:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderFont

Properties

```
DrawFont Font
```

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

Inherited from RenderChildBase:

```
void RenderFont:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderFont:SetStyle(option: RenderStyleOption, value: float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderFont:SetColor(option: RenderColorOption, color: Color3, alpha:
number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderFont:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderFont:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderFont:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderFont:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderFont:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderFont:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderFont:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderFont:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderFont:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderFont:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderFont:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderFont:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderFont:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderFont:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderFont:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderFont:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderFont:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderFont:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderPopup

Properties

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

```
void RenderPopup:Show()
```

Shows this popup window.

Inherited from RenderChildBase:

```
void RenderPopup:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderPopup:SetStyle(option: RenderStyleOption, value: float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderPopup:SetColor(option: RenderColorOption, color: Color3, alpha:
number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderPopup:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderPopup:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderPopup:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderPopup:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderPopup:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderPopup:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderPopup:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderPopup:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderPopup:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderPopup:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderPopup:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderPopup:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderPopup:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderPopup:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderPopup:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderPopup:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderPopup:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderPopup:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderDummyWindow

Properties

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

Inherited from RenderChildBase:

```
void RenderDummyWindow:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderDummyWindow:SetStyle(option: RenderStyleOption, value:
float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderDummyWindow:SetColor(option: RenderColorOption, color: Color3,
alpha: number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderDummyWindow:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderDummyWindow:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderDummyWindow:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderDummyWindow:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderDummyWindow:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderDummyWindow:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderDummyWindow:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderDummyWindow:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderDummyWindow:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderDummyWindow:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderDummyWindow:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderDummyWindow:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderDummyWindow:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderDummyWindow:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderDummyWindow:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderDummyWindow:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderDummyWindow:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderDummyWindow:Dummy()
```

Creates a RenderDummyWindow child object.

Class: RenderWindow

Static Methods

```
RenderWindow RenderWindow.new(window_name: string)
```

Properties

```
string WindowName [readonly]
```

The window's name.

```
Vector2 MinSize
```

A RenderWindow's minimum size.

```
Vector2 MaxSize
```

A RenderWindow's maximum size.

```
Vector2 DefaultSize
```

The initial size of the RenderWindow.

```
bool CanResize
```

Determines whether this RenderWindow can be resized.

```
bool VisibilityOverride
```

Unties the window's visibility from that of the internal UI, and instead uses the `Visible` field. Best used with `setmousestate`.

Inherited from RenderObject:

```
bool Visible
```

Determines whether a RenderObject is displayed.

Methods

```
void RenderWindow:Emplace(new_name?: string)
```

If the window is not already in the render list, add it. Optionally changes the title window.

Inherited from RenderChildBase:

```
void RenderWindow:Clear()
```

Removes all sub-objects from this RenderChildBase.

```
void RenderWindow:SetStyle(option: RenderStyleOption, value: float|Vector2)
```

Sets a style option for this RenderChildBase.

```
void RenderWindow:SetColor(option: RenderColorOption, color: Color3, alpha:
number)
```

Sets a color option for this RenderChildBase.

```
RenderButton RenderWindow:Button()
```

Creates a RenderButton child object.

```
RenderCheckBox RenderWindow:CheckBox()
```

Creates a RenderCheckBox child object.

```
RenderColorPicker RenderWindow:ColorPicker()
```

Creates a RenderColorPicker child object.

```
RenderColorButton RenderWindow:ColorButton()
```

Creates a RenderColorButton child object.

```
RenderCombo RenderWindow:Combo()
```

Creates a RenderCombo child object.

```
RenderTextBox RenderWindow:TextBox()
```

Creates a RenderTextBox child object.

```
RenderLabel RenderWindow:Label()
```

Creates a RenderLabel child object.

```
RenderSlider RenderWindow:Slider()
```

Creates a RenderSlider child object.

```
RenderIntSlider RenderWindow:IntSlider()
```

Creates a RenderIntSlider child object.

```
RenderSelectable RenderWindow:Selectable()
```

Creates a RenderSelectable child object.

```
RenderSeparator RenderWindow:Separator()
```

Creates a RenderSeparator child object.

```
RenderTabMenu RenderWindow:TabMenu()
```

Creates a RenderTabMenu child object.

```
RenderSameLine RenderWindow:SameLine()
```

Creates a RenderSameLine child object.

```
RenderFont RenderWindow:WithFont()
```

Creates a RenderFont child object.

```
RenderIndent RenderWindow:Indent()
```

Creates a RenderIndent child object.

```
RenderCollapsable RenderWindow:Collapsable()
```

Creates a RenderCollapsable child object.

```
RenderChildWindow RenderWindow:Child()
```

Creates a RenderChildWindow child object.

```
RenderDummyWindow RenderWindow:Dummy()
```

Creates a RenderDummyWindow child object.

Class: FilterBase

Class: NotFilter

Static Methods

```
NotFilter NotFilter.new(target: FilterBase)
```

Properties

```
FilterBase Target
```

Class: AnyFilter

Static Methods

```
AnyFilter AnyFilter.new(filters?: table)
```

Properties

```
table Filters
```

A list of filters.

Class: AllFilter

Static Methods

```
AllFilter AllFilter.new(filters?: table)
```

Properties

```
table Filters
```

A list of filters.

Class: TypeFilter

Static Methods

```
TypeFilter TypeFilter.new(index: int, type: string)
```

Properties

```
int ArgumentIndex
```

```
string ArgumentType
```

Class: NamecallFilter

Static Methods

```
NamecallFilter NamecallFilter.new(method: string)
```

Properties

```
string NamecallMethod
```

Class: InstanceTypeFilter

Static Methods

```
InstanceTypeFilter InstanceTypeFilter.new(argument_index: int, instance_type: string)
```

Properties

```
int ArgumentIndex
```

```
string InstanceType
```

Class: UserdataTypeFilter

Static Methods

```
UserdataTypeFilter UserdataTypeFilter.new(argument_index: int, userdata_type:
userdata)
```

Properties

```
int ArgumentIndex
```

```
userdata UserdataType [writeonly]
```

Class: ArgumentFilter

Static Methods

```
ArgumentFilter ArgumentFilter.new(argument_index: int, argument: any)
```

Properties

```
int ArgumentIndex
```

```
any Argument
```

```
boolean StripNull
```

Class: ArgCountFilter

Static Methods

```
ArgCountFilter ArgCountFilter.new(argument_count: int)
```

Properties

```
int ArgumentCount
```

Class: CallerFilter

Static Methods

```
CallerFilter CallerFilter.new(invert: bool)
```

Properties

```
bool Invert
```

Class: SynSignal

Static Methods

```
SynSignal SynSignal.new()
```

Creates a new SynSignal that can be called with `:Fire()`.

Methods

```
SynConnection SynSignal:Connect(f: function)
```

Connects a listener to this signal. Errors if called on a Lua state different to the one used to create this signal.

```
any SynSignal:Wait() [yields]
```

Yields the current thread until the next time this signal is fired. Returns any invocation parameters. Errors if called on a Lua state different to the one used to create this signal.

```
void SynSignal:Fire(...any)
```

Fires this signal. Only usable when this signal is created via `SynSignal.new()`. Equivalent behavior exists via the `__call` metamethod; i.e. instead of `sig:Fire(1, 2, 3)` you can also do `sig(1, 2, 3)`.

Class: SynConnection

Methods

```
void SynConnection:Disconnect()
```

Disconnects this connection from its `SynSignal`.

Class: ProtoProxy

A wrapper around the internal structure that describes a Lua function.

Properties

```
int CodeHash
```

A fingerprint of this Proto's bytecode.

Class: ReadonlyTableProxy

Provides recursive read-only access to a table.

Class: LuaStateProxy

Represents a Lua state.

Static Methods

```
LuaStateProxy LuaStateProxy.new()
```

Properties

```
int Id [readonly]
```

An identifier for this Lua state.

```
bool IsActorState [readonly]
```

Whether this state was created for use by Actors.

Methods

```
table LuaStateProxy:GetActors()
```

Returns a list of Actor instances associated with this Lua state.

```
void LuaStateProxy:Execute(source: string, ...any)
```

Schedules code to be executed on this Lua state.

Events

```
LuaStateProxy.Event()
```

A generic event for communication between Lua states.

Class: Match

Properties

```
table Captures
```

A list of captures. Each capture table has the substring, the start index, and the length, in that order. The first capture is the entire matched expression.

Class: Regex

Static Methods

```
Regex Regex.new(pattern: string)
```

Constructs a new `Regex` object. Errors if the pattern is invalid.

```
string Regex.Escape(contents: string)
```

Escapes a string for use by regex.

Methods

```
Match | nil Regex:Match(contents: string)
```

Matches `contents` against this Regex object and returns the first `Match`, or nil if no match was found.

```
table Regex:MatchMany(contents: string)
```

Matches `contents` against this Regex object and returns all `Match`es found.

```
string Regex:Replace(contents: string, replace_with: string)
```

Replaces the first match of this Regex object in `contents` with `replace_with`.

Class: Duration

A time duration

Static Methods

```
Duration Duration.TimeSinceEpoch()
```

Returns the time difference between the Unix epoch and now.

```
Duration Duration.FromNanoseconds(nanoseconds: int)
```

```
Duration Duration.FromMicroseconds(microseconds: int)
```

```
Duration Duration.FromMilliseconds(milliseconds: int)
```

```
Duration Duration.FromSeconds(seconds: int)
```

```
Duration Duration.FromMinutes(minutes: int)
```

```
Duration Duration.FromHours(hours: int)
```

```
Duration Duration.FromDays(days: int)
```

```
Duration Duration.FromMonths(months: int)
```

```
Duration Duration.FromYears(years: int)
```

Properties

```
number Nanoseconds [readonly]
```

This Duration in nanoseconds.

```
number Microseconds [readonly]
```

This Duration in microseconds.

```
number Milliseconds [readonly]
```

This Duration in milliseconds.

```
number Seconds [readonly]
```

This Duration in seconds.

```
number Minutes [readonly]
```

This Duration in minutes.

```
number Hours [readonly]
```

This Duration in hours.

```
number Days [readonly]
```

This Duration in days.

```
number Months [readonly]
```

This Duration in months.

```
number Years [readonly]
```

This Duration in years.

Class: Stopwatch

A stopwatch

Static Methods

```
Stopwatch Stopwatch.new()
```

Properties

```
Duration ElapsedTime [readonly]
```

The elapsed time between Start() and Stop() calls.

Methods

```
void Stopwatch:Start()
```

Starts the stopwatch.

```
void Stopwatch:Stop()
```

Stops the stopwatch.

```
void Stopwatch:Reset()
```

Resets the stopwatch.

Class: Timer

A timer

Static Methods

```
Timer Timer.new()
```

Properties

```
bool Enabled
```

Whether this Timer is enabled.

```
int RepetitionCount
```

How many times this timer should repeat, or `-1` if it should repeat indefinitely.

```
Duration Interval
```

The interval between `OnElapsed` invocations.

```
Duration TimeLeft [readonly]
```

The time left before the timer elapses.

```
Duration LastElapsed [readonly]
```

A timestamp (time since epoch) of the last elapse.

Events

```
Timer.OnElapsed(delta: Duration)
```

Fired every elapse.

Class: Value

Holds a value

Static Methods

```
Value Value.new(value: any)
```

Methods

```
any Value:Get()
```

Returns the underlying value.

```
void Value:Set(value: any)
```

Sets the underlying value.

Class: WebsocketClient

A websocket client

Static Methods

```
WebsocketClient WebsocketClient.new(url_connection_string: string)
```

Properties

```
string Url [readonly]
```

Methods

```
void WebsocketClient:Disconnect() [yields]
```

Disconnects the websocket. Yields until the client is fully disconnected.

```
void WebsocketClient:Connect(connection_info: table) [yields]
```

Connects the websocket. `connection_info` may contain the following:

Header	Description	Default
Headers	A map of header names to header values.	{}
Cookies	A map of cookie names to cookie values.	{}

In addition to any user-specified headers, Synapse X will add `Syn-Signature`, `Syn-Fingerprint`, and `Syn-User-Identifier` as specified here.

```
void WebsocketClient:Send(message: string, is_binary?: bool = False)
```

Sends a payload.

Events

```
WebsocketClient.DataReceived(payload: string, is_binary: bool)
```

Fires when data is received.

```
WebsocketClient.ConnectionClosed()
```

Fires when the connection is closed. Can be for reasons other than :Disconnect(); i.e. on a sudden loss of connection.

Class: DirectoryWatcher

A filesystem monitor.

Static Methods

```
DirectoryWatcher DirectoryWatcher.new(Path: string, Recursive?: boolean)
```

Properties

```
string Path [readonly]
```

The path targeted by this DirectoryWatcher.

```
boolean Recursive
```

Determines whether the DirectoryWatcher watches directories recursively or not. Defaults to `true` unless explicitly specified otherwise in the constructor.

Events

```
DirectoryWatcher.OnChanged()
```

Fires on file contents being changed.

```
DirectoryWatcher.OnCreated()
```

Fires on a file being created.

```
DirectoryWatcher.OnDeleted()
```

Fires on a file being deleted.

```
DirectoryWatcher.OnRenamed()
```

Fires on a file being renamed.

```
DirectoryWatcher.OnOverflow()
```

This event is called when there are too many directory changes at once, and exists due to a fundamental flaw in the Windows API. An internal workaround is possible but would be relatively memory-intensive, so this is the "fix" used for now. It is called for every currently active DirectoryWatcher. Cases where this happens are relatively rare, but may still exist; e.g. in the case of batch depletions of large folders. Users are recommended to treat this as a change to every relevant file.

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Name	Value
CameraRelative	0
TargetRelative	1
Ignore	2

Drawing.Fonts

Name	Value
UI	0
System	1
Plex	2
Monospace	3

PasswordDerivationMode

Name	Value
Interactive	0
Moderate	1
Sensitive	2

RenderColorOption

Name	Value
Text	0
TextDisabled	1
WindowBg	2
ChildBg	3
PopupBg	4
Border	5
BorderShadow	6
FrameBg	7
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Name	Value
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Name	Value
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WindowRounding	3
WindowBorderSize	4
WindowMinSize	5
WindowTitleAlign	6
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ChildBorderSize	8
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Name	Value
None	0
Success	1
Warning	2
Error	3
Info	4

UserEncryptionMode

Name	Value
SynAccount	0
WindowsAccount	1
WindowsMachine	2

XAlignment

Name	Value
Left	0
Right	1
Center	2

YAlignment

Name	Value
Top	0
Bottom	1
Center	2