Ruby vs Kickboxer

Selena Small &
Michael Milewski

@selenasmall88 @saramic

What is Ruby vs Kickboxer?

Kickboxer 🥊

COVID 😷

Lockdown 🔐

No sparring ↔

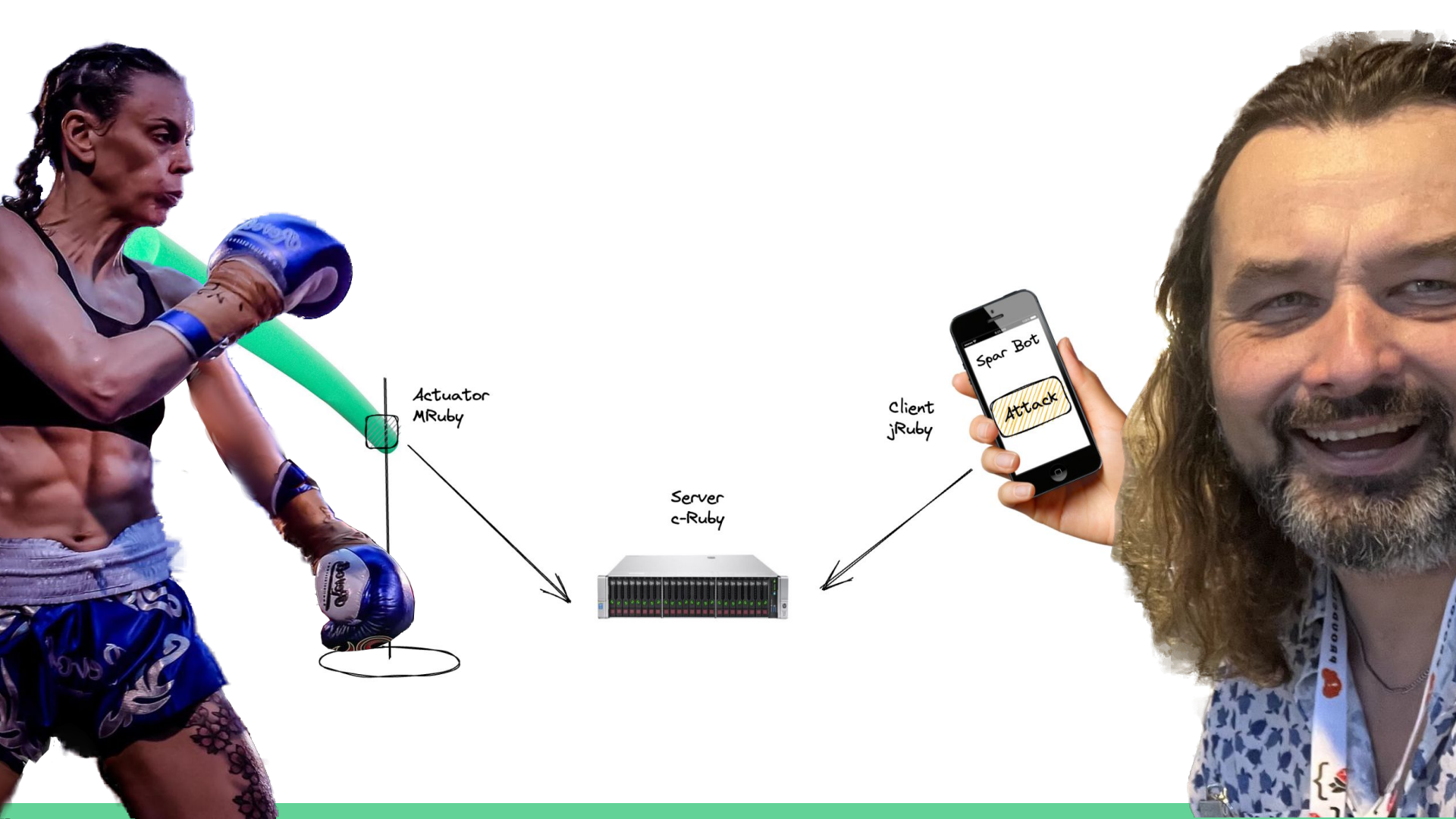
Idea

What is Ruby vs Kickboxer?

What is Ruby vs Kickboxer?

The plan

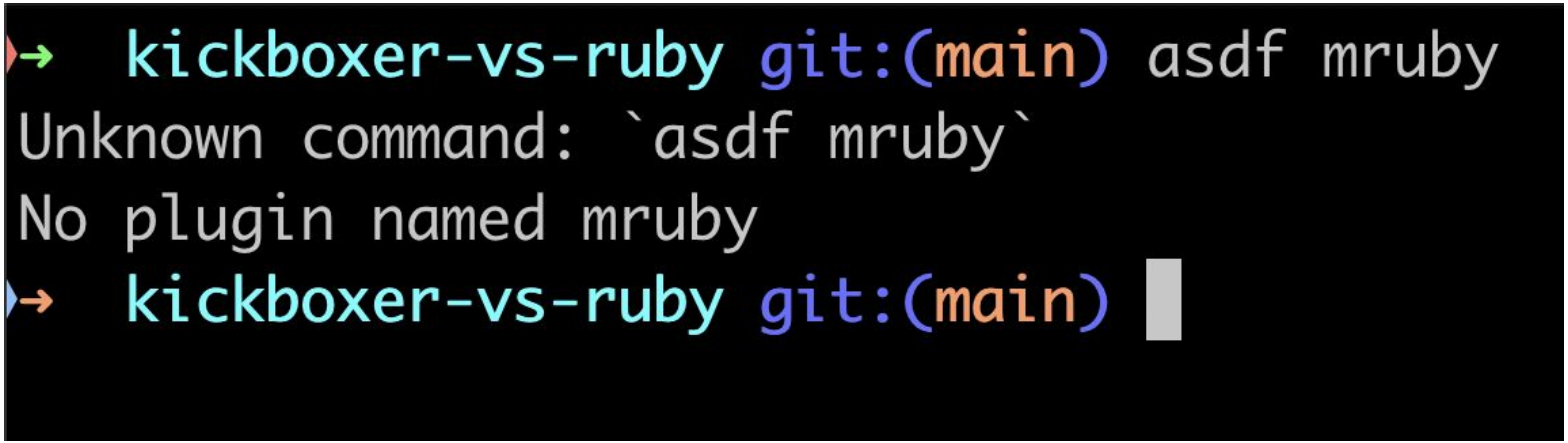
How will the different moving parts work together?


Actuator
MRuby
Server
c-Ruby
Client
jRuby
Spar Bot
Attack

Actuator (mRuby)

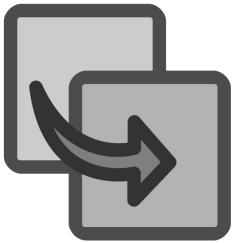
Hopefully this works?

Actuator - mRuby



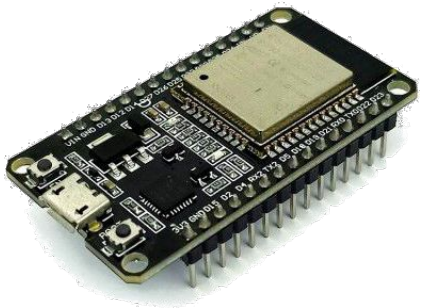
Actuator - mRuby

- C project files
- mRuby source files
- mRuby components
- ESP-IDF
- Push code to ESP32



mruby

ESPRESSIF



Actuator - mRuby

ESP32 C

```
#define LED_BUILTIN 2          // ESP32 built in led

void setup() {
  pinMode(LED_BUILTIN, OUTPUT);
}

void loop() {
  digitalWrite(LED_BUILTIN, HIGH);
  delay(1000);
  digitalWrite(LED_BUILTIN, LOW);
  delay(1000);
}
```

mruby

```
led = ESP32::GPIO::GPIO_NUM_2 # ESP32 default led pin


ESP32::GPIO.pinMode(led, ESP32::GPIO::OUTPUT)


loop do
  ESP32::GPIO.digitalWrite(led, ESP32::GPIO::HIGH)
  ESP32::System.delay(1000)
  ESP32::GPIO.digitalWrite(led, ESP32::GPIO::LOW)
  ESP32::System.delay(1000)
end
```

Actuator - mRuby

ESP32 C

```
#include "EspMQTTClient.h"
// a WiFi.h gets installed with EspMQTTClient and ArduinoJson
#ifdef ESP32
#include <WiFi.h>
#else
#include <ESP8266WiFi.h>
#endif
#include "secrets.h"
#include <HTTPClient.h>
#include <WiFiClientSecure.h>
#include <ESPmDNS.h>
#include <PubSubClient.h>

WiFiClientSecure net = WiFiClientSecure();
WiFiClient espClient;
PubSubClient client(espClient);
long lastMsg = 0;
long hitStart = 0;
char actuator_topic[] = "kick/xx:xx:xx:xx:xx:xx"; // buffer
char serverIp[] = "xxx.xxx.xxx.xxx"; // buffer
char clientName[] = "ESP32/xx.xx.xx.xx.xx.xx"; // buffer

#define LED_BUILTIN 2           // ESP32 builtin led

void connectWifi() {
  WiFi.mode(WIFI_STA);
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);

  Serial.println("Connecting to Wi-Fi");

  int count = 0;
  while (WiFi.status() != WL_CONNECTED) {
    count++;
    delay(500);
    Serial.print(".");
    if (count % 20 == 0) {
      count = 0;
      Serial.println();
      WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
      Serial.println("Connecting to Wi-Fi");
    }
```

mruby

```
# frozen_string_literal: true

last_msg = 0
hit_start = 0

wifi = ESP32::WiFi.new

puts "Connecting to wifi"

wifi.connect("loki", "password") # TODO: how best to externalise secrets
# client_name = "ESP32/#{wifi.mac_address}" # TODO: why no client name
actuator_topic = "kick/wifi.mac_address"

puts "Connected"

led = ESP32::GPIO::GPIO_NUM_2 # ESP32 default led pin
ESP32::GPIO.pinMode(led, ESP32::GPIO::OUTPUT)

mqtt = ESP32::MQTT::Client.new("failure-driven.local", 1883)
mqtt.connect
mqtt.publish("kick/manage", '{ "message":"OK", "actuator":"' +
actuator_topic + '" }')
mqtt.subscribe(actuator_topic)

loop do
  now = ESP32::Timer.get_time
  if (now - last_msg) > 5_000_000 # 5 second ping
    last_msg = now
    mqtt.publish("kick/manage", '{ "message":"OK", "actuator":"' +
actuator_topic + '" }')
  end
  if hit_start > 0 && now - hit_start > 170_000 # 170 milliseconds
    hit_start = 0
    ESP32::GPIO.digitalWrite(led, ESP32::GPIO::LOW)
  end
  ESP32::System.delay(20)

  # this seems to block
  topic, _message = mqtt.get
  if topic == actuator_topic
    puts "HIT"
    ESP32::GPIO.digitalWrite(led, ESP32::GPIO::HIGH)
    hit_start = ESP32::Timer.get_time
  end
end
```

Actuat Ruby

ESP32 C

mruby

```
# frozen_string_literal: true

last_msg = 0
hit_start = 0

wifi = ESP32::WiFi.new

puts "Connecting to wifi

wifi.connect("loki",  t to externalise secrets
# client_name = "ESP  DO: why no client name
actuator_topic = "ki

puts "Connected"

led = ESP32::GPIO::G  pin
ESP32::GPIO.pinMode(led,  )

mqtt = ESP32::MQTT::Clie  n.local", 1883)
mqtt.connect
mqtt.publish("kick/mana  "actuator":"' +
actuator_topic + '" }')
mqtt.subscribe(actuator

loop do
  now = ESP32::Timer.ge
  if (now - last_msg)  ng
    last_msg = now
    mqtt.publish("kick/ma  "me  K", "actuator":"' +
actuator_topic + '" }')
  end
  if hit_start > 0 && now  tart >  # 170 milliseconds
    hit_start = 0
    ESP32::GPIO.digitalWrit  ESP32::  OW)
  end
  ESP32::System.delay(20)

  # this seems to block
  topic, _message = mqtt.ge
  if topic == actuator_topic
    puts "HIT"

    ESP32::GPIO.digitalWrite  ESP32::GPIO:  H)
    hit_start = ESP32::Tim  ime
  end
end
```

Actuator - mRuby

ESP32 C

```
void connectWifi() {
  WiFi.mode(WIFI_STA);
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);

  Serial.println("Connecting to Wi-Fi");

  int count = 0;
  while (WiFi.status() != WL_CONNECTED) {
    count++;
    delay(500);
    Serial.print(".");
    if (count % 20 == 0) {
      count = 0;
      Serial.println();
      WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
      Serial.println("Connecting to Wi-Fi");
    }
  }
}
```

mruby

```
wifi = ESP32::WiFi.new

puts "Connecting to wifi"

wifi.connect("kickboxer", "password")
```

Actuator - mRuby

ESP32 C

```
char serverIp[] = "xxx.xxx.xxx.xxx"; // buffer

char * mdns = NULL;

IPAddress resolve_mdns_host(const char * hostname)
{
  IPAddress ip = MDNS.queryHost(hostname, 2000); //  2 second timeout
  Serial.printf(
    "found failure-driven: %s.%s.%s.%s\n",
    String(ip[0]),
    String(ip[1]),
    String(ip[2]),
    String(ip[3])
  ); // how to IPAddress toString
  return ip;
}
...
  if (!MDNS.begin("ESP32_Browser")) {
    Serial.println("Error setting up MDNS responder!");
    while (1) {
      delay(1000);
    }
  }
  resolve_mdns_host(MQTT_SERVER_NAME).toString().toCharArray(serverIp,
16);
  Serial.printf("found %s: %s\n", MQTT_SERVER_NAME, serverIp);
```

mruby

```
mqtt = ESP32::MQTT::Client.new(
  "failure-driven.local", 1883,
)
mqtt.connect
```

Actuator - mRuby

ESP32 C

```
void connectMQTT(const char * mqtt_server) {
  client.setServer(mqtt_server, 1883);
  client.setCallback(callback);
  reconnect();
  Serial.println("MQTT IoT Connected!");
}

void loop() {
  long now = millis();
  if (now - lastMsg > 5000) { // 5 second ping
    lastMsg = now;
    Serial.println("management ping");
    char buffer[60];
    strcpy(
      Buffer,
      "{\"message\":\"OK\",\"actuator\":\"");
    strcat(buffer, actuator_topic);
    strcat(buffer, "\"}");
    client.publish("kick/manage", buffer);
  }
```

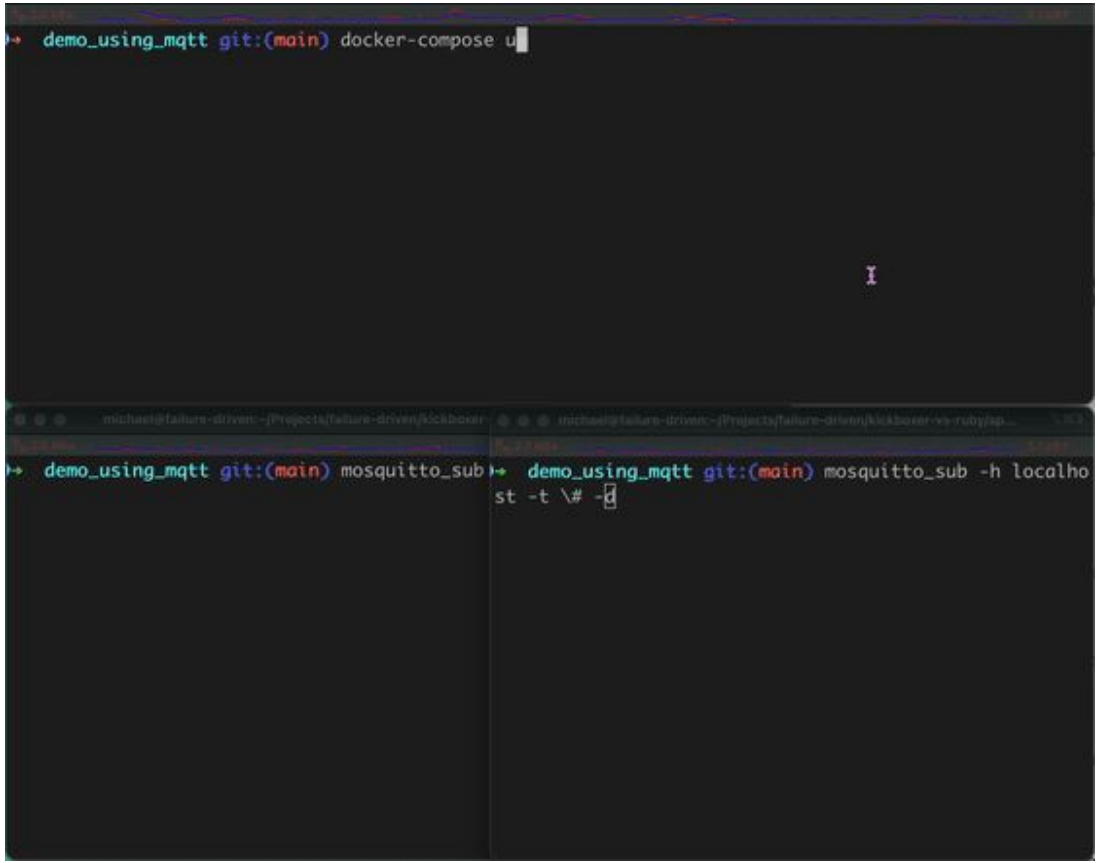
mruby

```
mqtt = ESP32::MQTT::Client.new(
  "failure-driven.local", 1883
)
mqtt.connect
mqtt.subscribe(actuator_topic)

loop do
  now = ESP32::Timer.get_time
  if (now - last_msg) > 5_000_000 # 5 second ping
    last_msg = now
    mqtt.publish(
      "kick/manage",
      '{ "message":"OK", "actuator":"' +
        actuator_topic + '" }',
    )
  End
```

Server (cRuby)

Piece of cake!

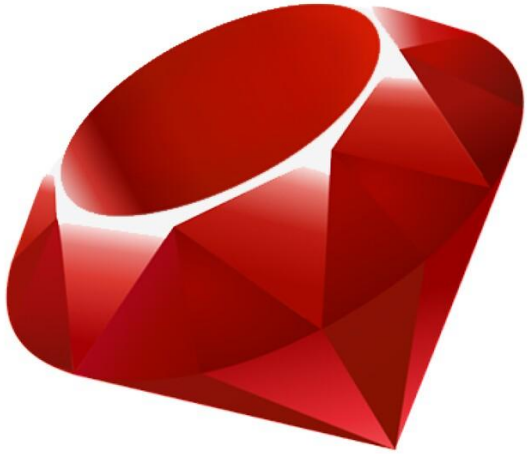
Server - cRuby



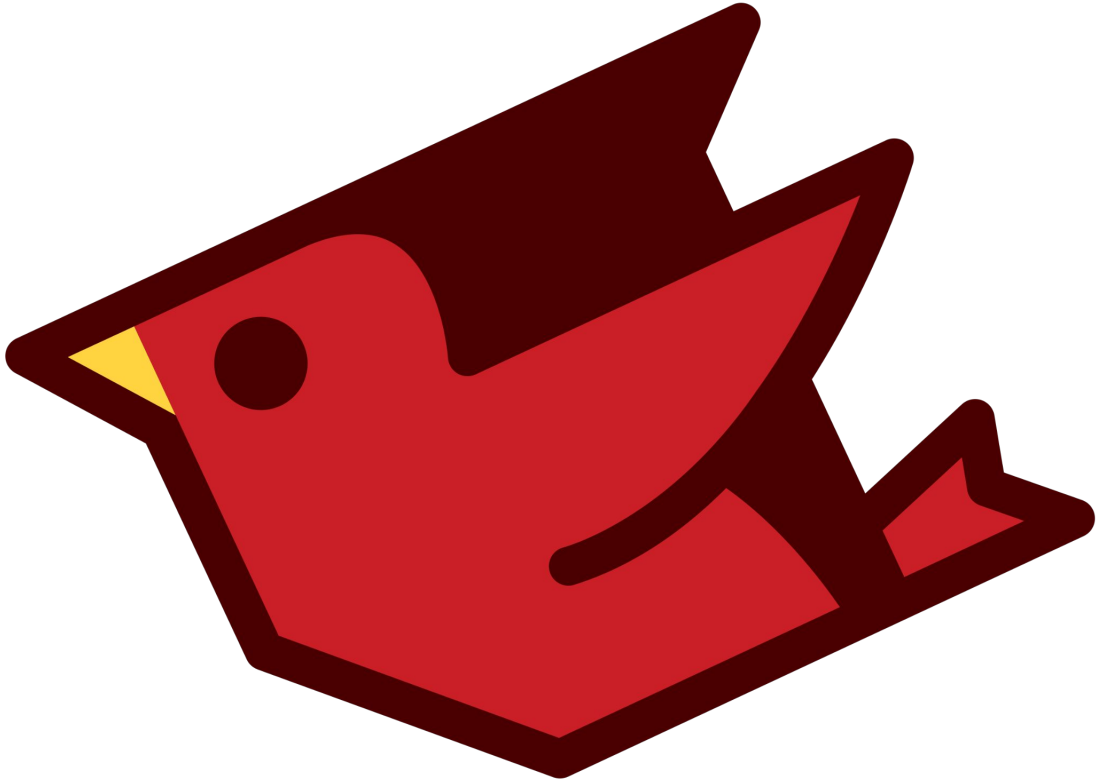
Client (jRuby)

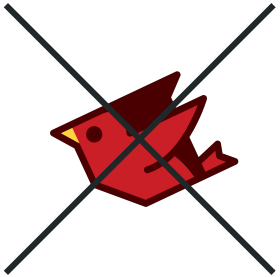
Surely it just works on Android devices

Client - Ruby



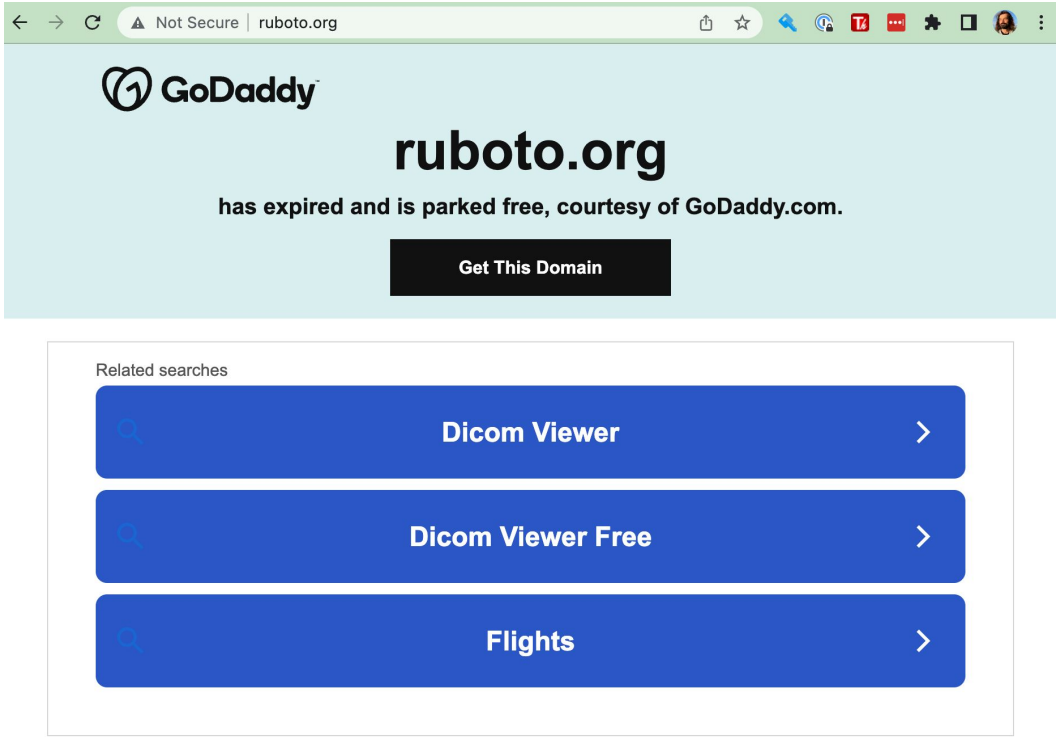
Client - jRuby





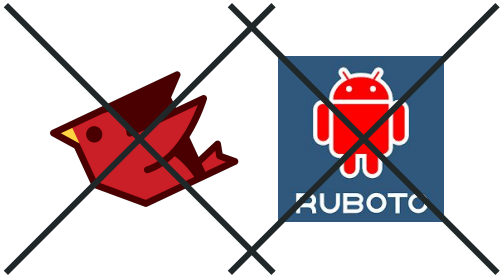
Client - Ruboto

Client - Ruboto



Client - Ruboto


```
$ export ANDROID_HOME=/Users/michael/Library/Android/sdk
$ export PATH=/Users/michael/Library/Android/sdk/platform-tools/:$PATH
$ asdf shell ruby jruby-9.4.2.0
$ ruby -v
  jruby 9.4.2.0 (3.1.0) 2023-03-08 90d2913fda OpenJDK 64-Bit Server VM 20+36-2344 on 20+36-2344 +jit
[arm64-darwin]
$ gem install ruboto
  Fetching ruboto-1.6.1.gem
  Successfully installed ruboto-1.6.1
  1 gem installed
$ ruboto gen app --package com.failure-driven --name Test --target android-30

/Users/michael/.asdf/installs/ruby/jruby-9.4.2.0/lib/ruby/gems/shared/gems/ruboto-1.6.1/lib/ruboto/util/objectspace.rb:5: warning: ObjectSpace impacts performance. See https://github.com/jruby/jruby/wiki/PerformanceTuning#dont-enable-objectspace
/Users/michael/.asdf/installs/ruby/jruby-9.4.2.0/lib/ruby/gems/shared/gems/ruboto-1.6.1/lib/ruboto/util/main_fix.rb:7: warning: finalizer references object to be finalized
F, [2023-05-05T08:57:08.616086 #32463] FATAL -- : uninitialized constant Main::GetoptLong::FALSE (NameError)
org/jruby/RubyModule.java:4309:in `const_missing'
/Users/michael/.asdf/installs/ruby/jruby-9.4.2.0/lib/ruby/gems/shared/gems/main-5.3.2/lib/main/getoptlong.rb:73:in `initialize'
```


RUBOTO

Client - RubyMotion

Client - RubyMotion

```
download http://www.rubymotion.com/download
```

Client - RubyMotion

```
download http://www.rubymotion.com/download
motion android-setup
January 16, 2019
---------------------------------------
Accept? (y/N): Y
[=======================================] 100% Unzipping... android-13/framework
[=======================================] 100% Unzipping... x86_64/VerifiedBootP
[=======================================] 100% Unzipping... src/tck/java/time/TC
[=======================================] 100% Unzipping... android-13/llvm-rs-c
[=======================================] 100% Unzipping... platform-tools/NOTIC
```

Client - RubyMotion

```
[====================================] 100% Unzipping... android-13/llvm-rs-c
[====================================] 100% Unzipping... platform-tools/NOTIC
January 16, 2019
------------------------------------
Accept? (y/N): Y
[====================================] 100% Unzipping... android-ndk-r21e/wra
[====================================] 100% Unzipping... android-8.0.0/templa
[====================================] 100% Unzipping... src/android/telecom/
[====================================] 100% Unzipping... android-8.0.0/zipali
[====================================] 100% Unzipping... android-8.1.0/build.
...
[====================================] 100% Unzipping... android-12/framework
[====================================] 100% Unzipping... src/tck/java/time/TC
[====================================] 100% Unzipping... android-12/llvm-rs-c
[====================================] 100% Computing updates...
[====================================] 100% Computing updates...
[====================================] 100% Computing updates...
To install legacy android sdks (API < 26), run `motion android-setup-legacy`
================================================================================
WARNING: Additional commands need to be downloaded. Please run: `motion repo`.
================================================================================
```

Client - RubyMotion

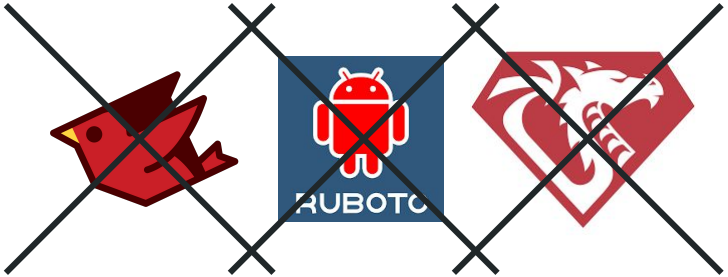
```
To install legacy android sdks (API < 26), run `motion android-setup-legacy`
================================================================================
WARNING: Additional commands need to be downloaded. Please run: `motion repo`.
================================================================================
motion repo
Cloning RubyMotion templates. Feel free to browse /Users/michael/.rubymotion/rubymotion-templates to see how
they're built.
Cloning into '/Users/michael/.rubymotion/rubymotion-templates'...
remote: Enumerating objects: 1244, done.
remote: Counting objects: 100% (26/26), done.
remote: Compressing objects: 100% (14/14), done.
remote: Total 1244 (delta 13), reused 12 (delta 12), pack-reused 1218
...
Cloning into '/Users/michael/.rubymotion/rubymotion-command'...
remote: Enumerating objects: 70, done.
remote: Counting objects: 100% (10/10), done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 70 (delta 4), reused 7 (delta 2), pack-reused 60
Receiving objects: 100% (70/70), 19.36 KiB | 9.68 MiB/s, done.
Resolving deltas: 100% (23/23), done.
INFO: Repository synchronization performed on: 2023-05-05.
```

Client - RubyMotion

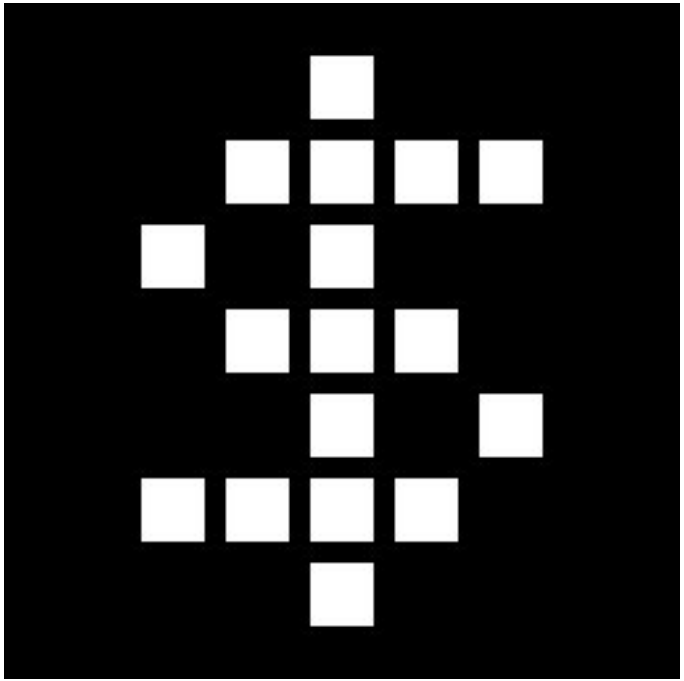
```
$ motion create --template=android ruby_motion_mqtt_blink
[!] You may want to run `motion repo` if it's been a while since you've updated templates.
    Create ruby_motion_mqtt_blink
    Create ruby_motion_mqtt_blink/.gitignore
    Create ruby_motion_mqtt_blink/Gemfile
    Create ruby_motion_mqtt_blink/Rakefile
    Create ruby_motion_mqtt_blink/app/main_activity.rb
    Create ruby_motion_mqtt_blink/spec/main_spec.rb
```

Client - RubyMotion

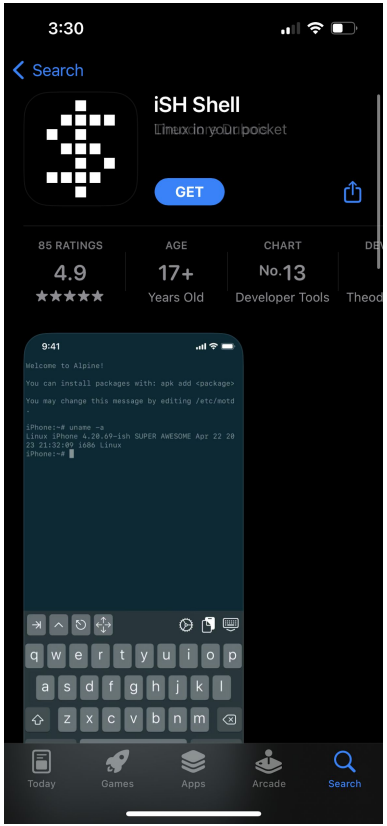
```
$ motion create --template=android ruby_motion_mqtt_blink
[!] You may want to run `motion repo` if it's been a while since you've updated templates.
    Create ruby_motion_mqtt_blink
    Create ruby_motion_mqtt_blink/.gitignore
    Create ruby_motion_mqtt_blink/Gemfile
    Create ruby_motion_mqtt_blink/Rakefile
    Create ruby_motion_mqtt_blink/app/main_activity.rb
    Create ruby_motion_mqtt_blink/spec/main_spec.rb

$ cd ruby_motion_mqtt_blink

$ rake

Resolving dependencies...
    ERROR! app.sdk_path should point to a valid Android SDK directory. Run 'motion android-setup-legacy' to
install the latest SDK version.
```

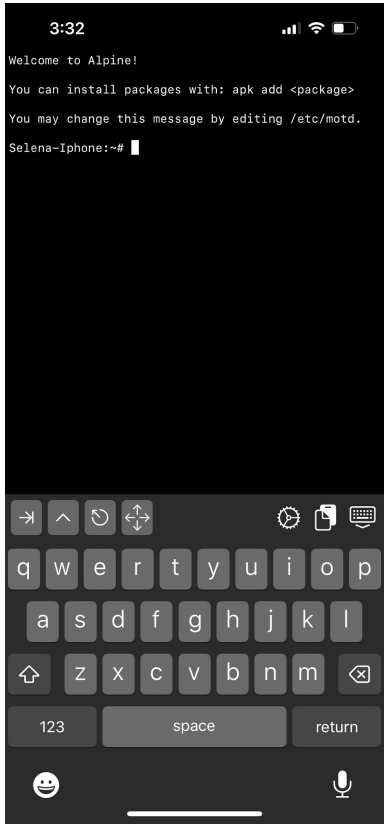

RUBOTC

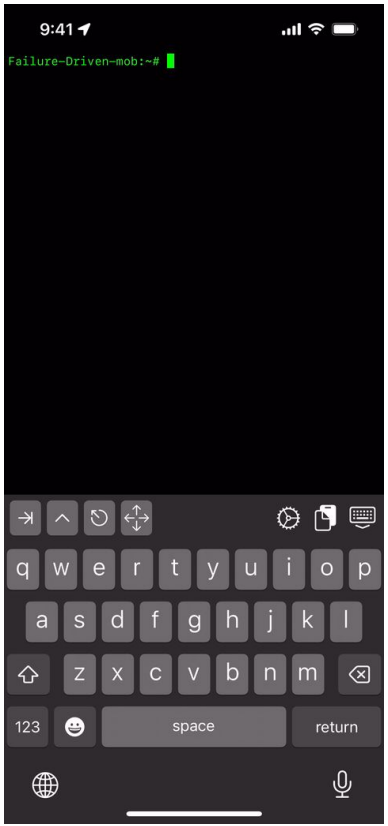
Client - iSH



Client - iSH


3:30
Search
iSH Shell
Linux in your pocket
GET
85 RATINGS
4.9
AGE
17+
Years Old
CHART
No.13
Developer Tools
Today
Games
Apps
Arcade
Search

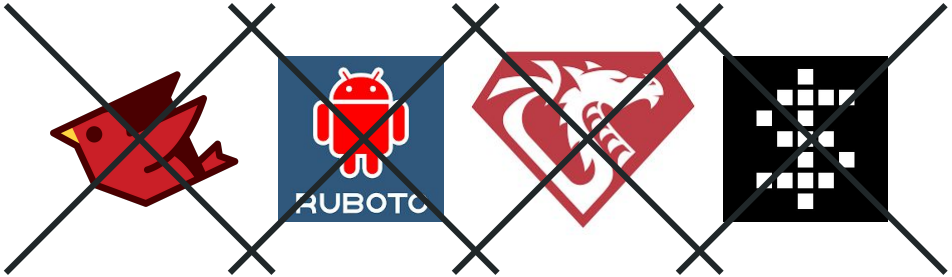

3:32
Welcome to Alpine!
You can install packages with: apk add <package>
You may change this message by editing /etc/motd.
Selena-Iphone:~#
123
space
return


9:41
Failure-Driven-mob:~#
123
space
return

Client - iSH

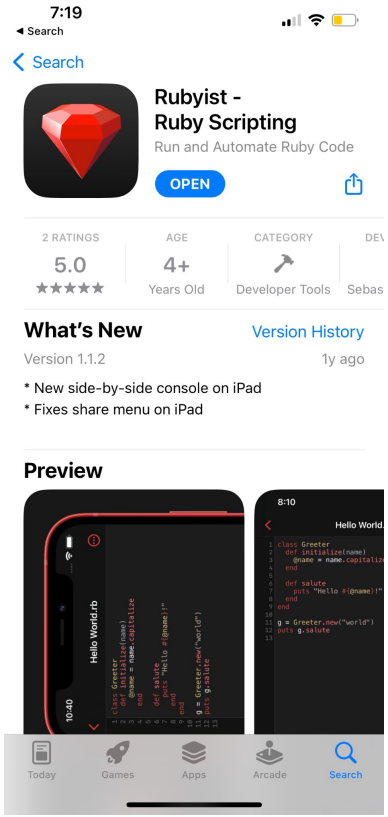
Client - iSH

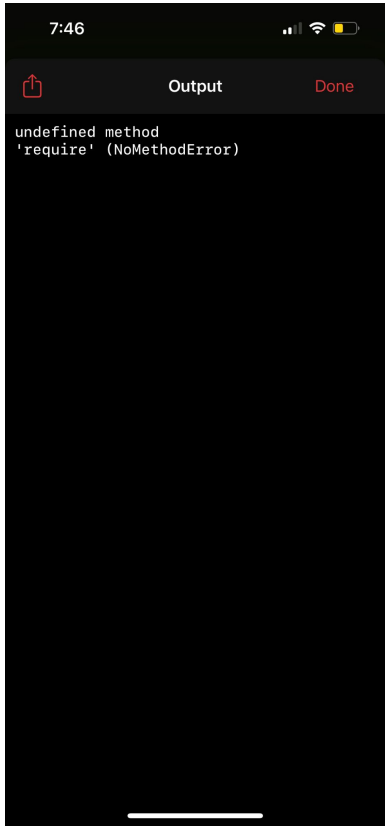

9:41
Failure-Driven-mob:~/kickboxer-vs-ruby-main/apps/demo_using_mqtt#

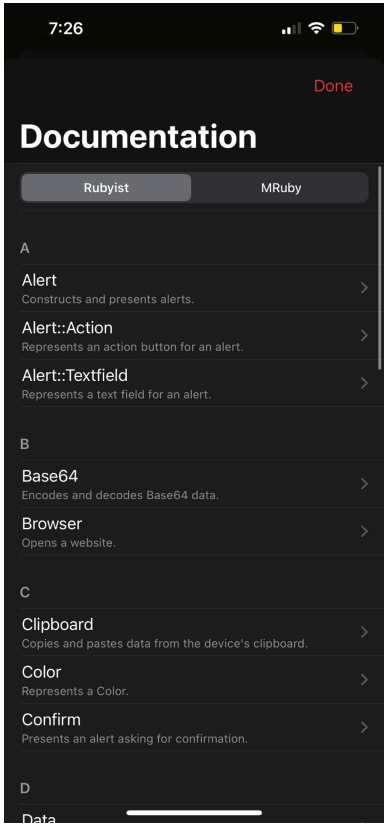

RUBOTC

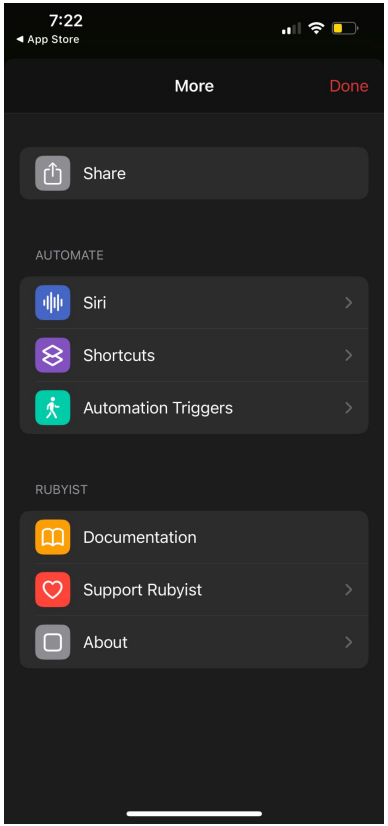
Client - Rubyist

Client - Rubyist

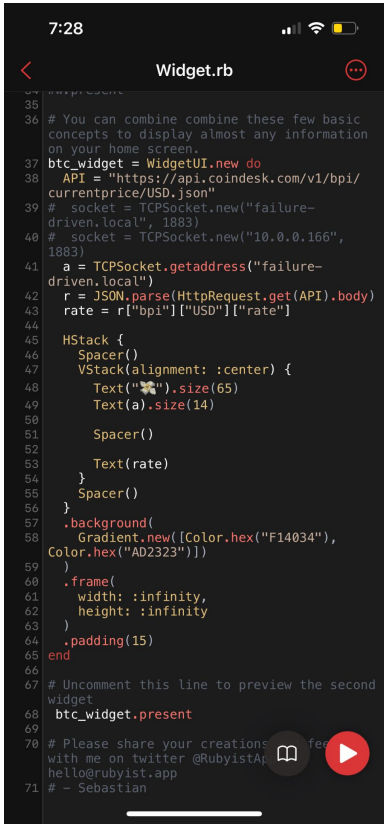


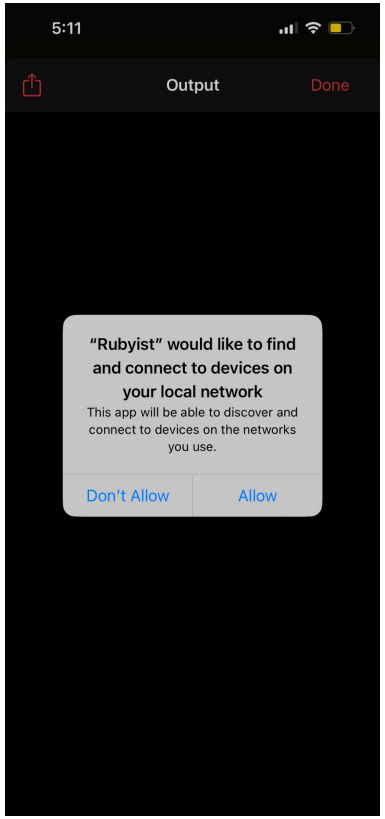


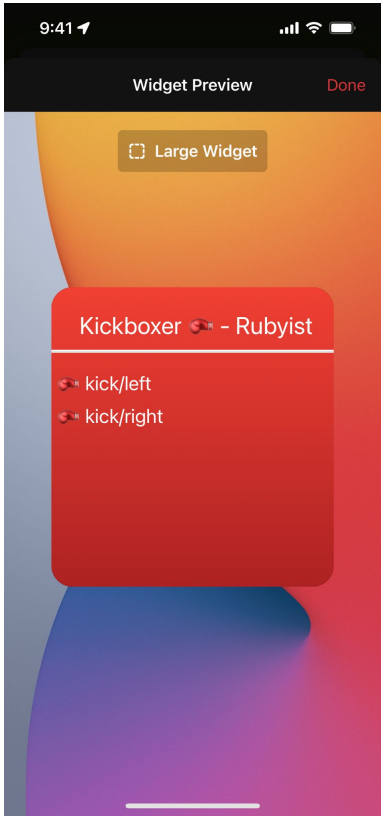


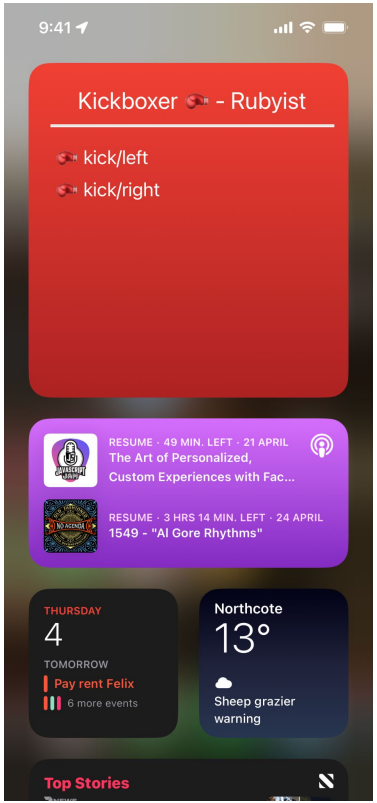


Client - Rubyist










RUBOTO

Client - Termux

Client - Termux

Termux Docs Posts Packages Donate Privacy Policy en

Termux is an **Android terminal emulator and Linux environment app** that works directly with no rooting or setup required. A minimal base system is installed automatically - additional packages are available using the APT package manager.

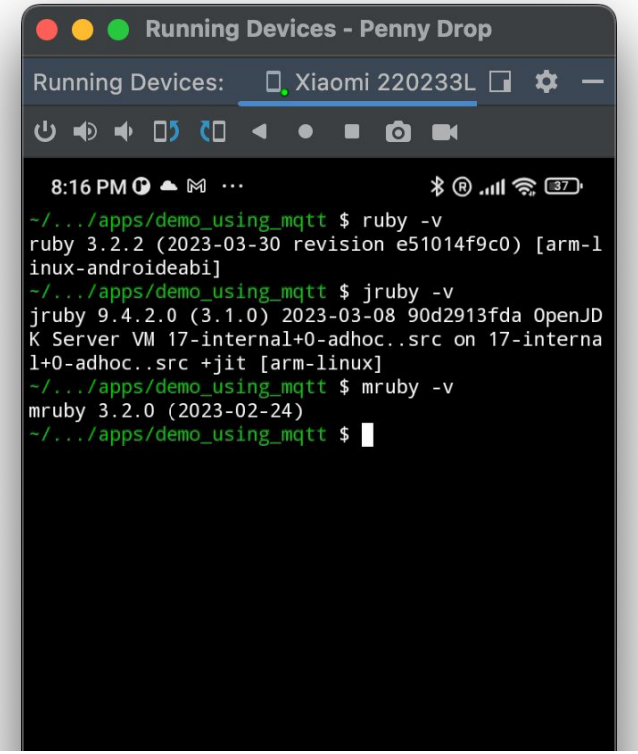
GET IT ON GitHub

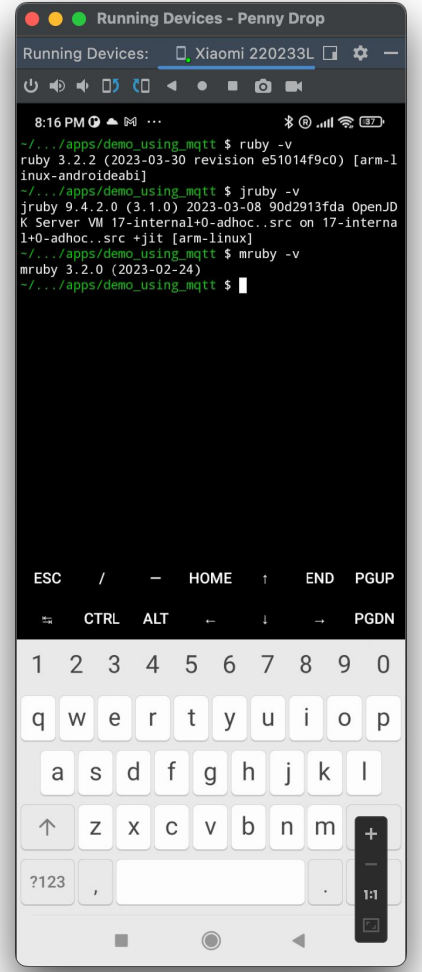
GET IT ON F-Droid

Secure. Access remote servers using the ssh client from OpenSSH. Termux combines standard packages with accurate terminal emulation in a beautiful open source solution.

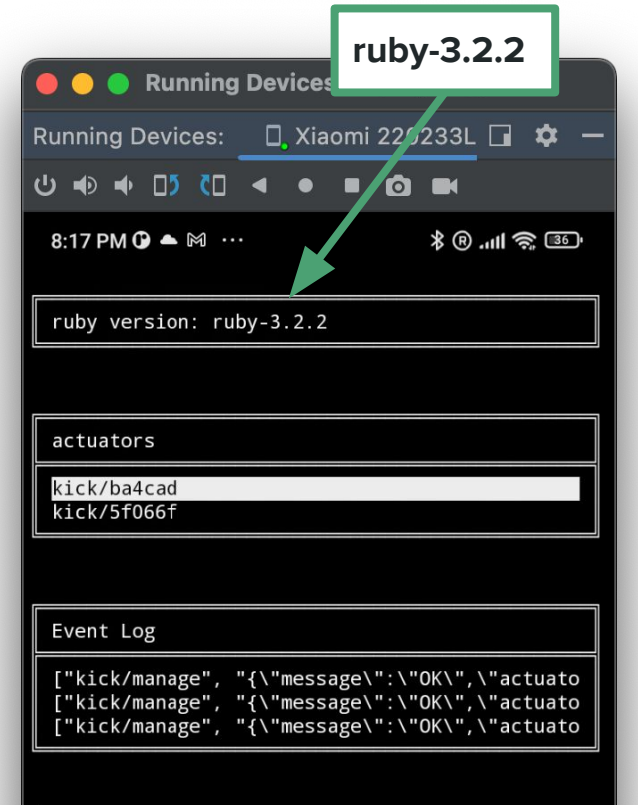
Feature packed. Take your pick between Bash, fish or Zsh and nano, Emacs or Vim. Grep through your SMS inbox. Access API endpoints with curl and use rsync to store backups of your contact list on a remote server.

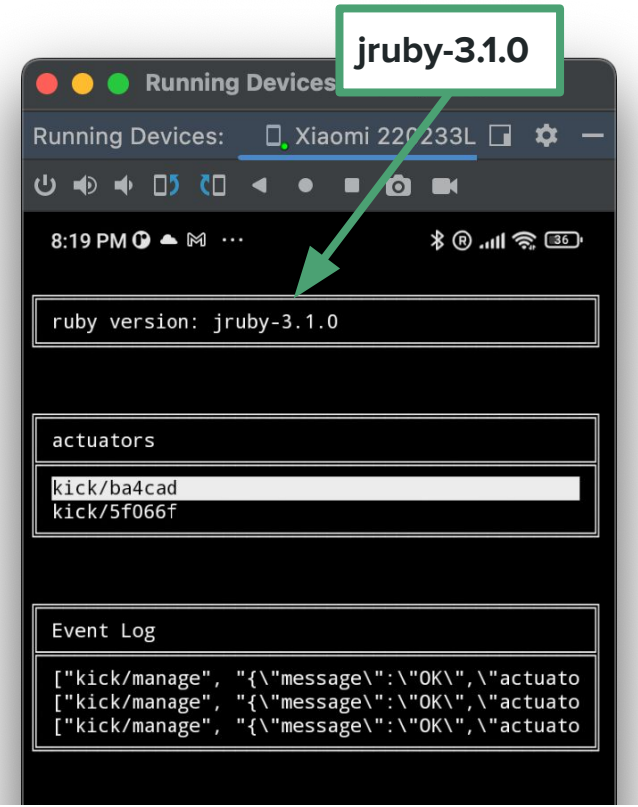
Client - Termux

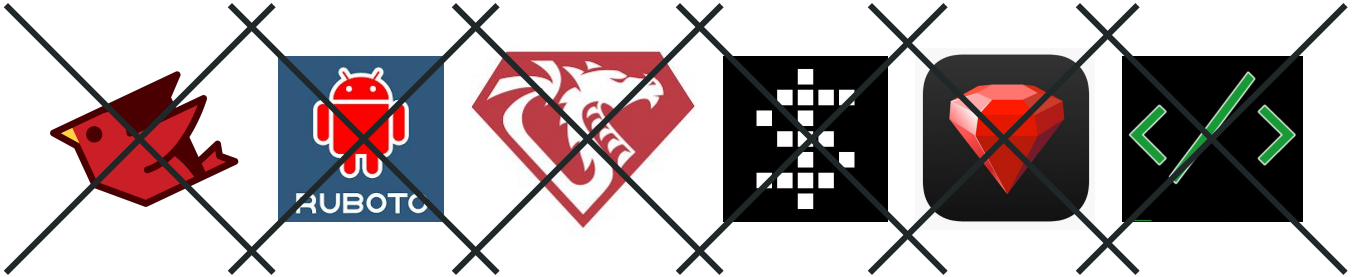




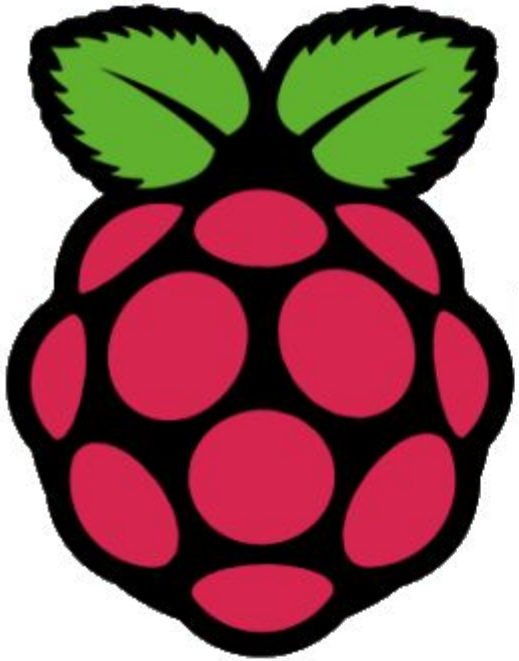
Client - Termux






RUBOTO

Client - jRuby on RasPi



Client - jRuby on RasPi

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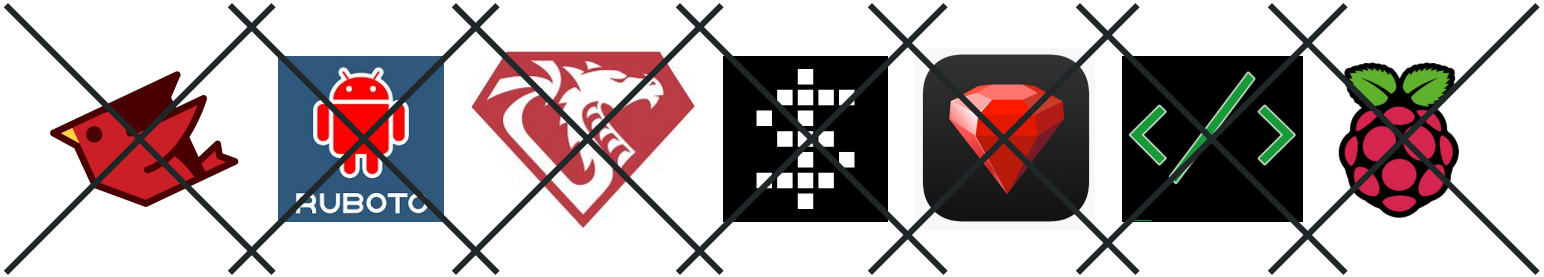
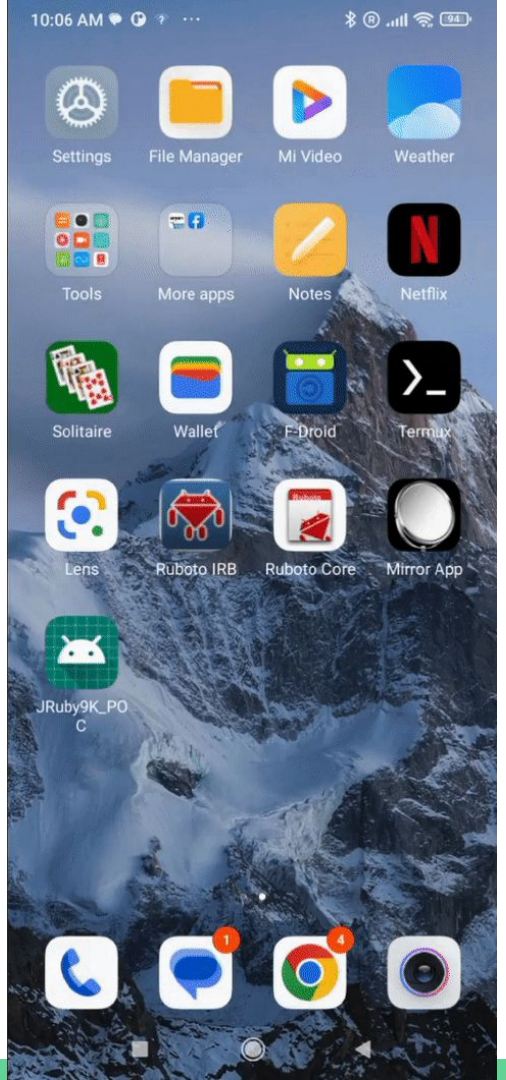

RUBOTO

Client - Ruboto + Arduino

+

Client Ruboto + Arduino



RUBOTO + ARDUINO

Client - Ruboto + Arduino

Demo - placeholder

What worked

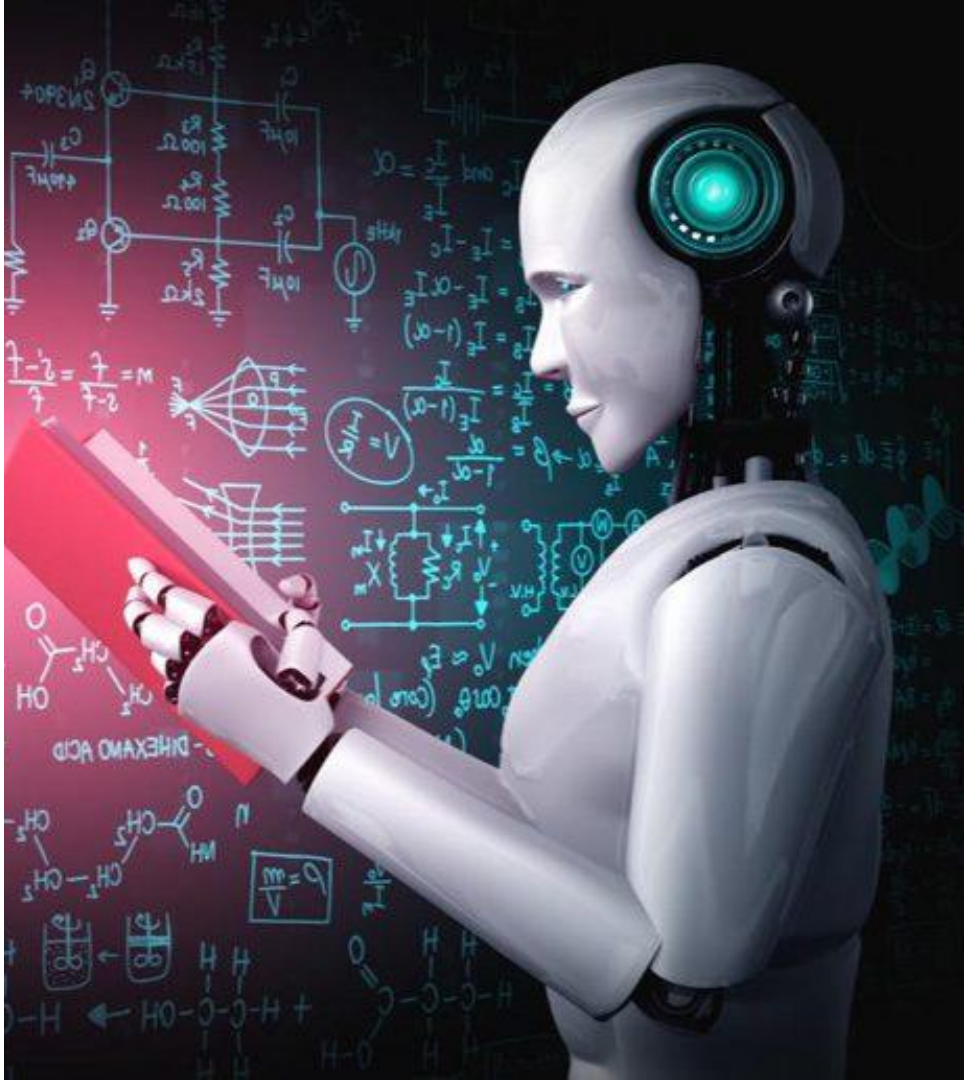
1. mRuby on ESP32 actuator
2. MQTT messaging service
3. cRuby on iSH (iOS)
4. mRuby on Rubyist (iOS)
5. cRuby and jRuby on Termux (Android)

What didn’t work

1. Ruboto - needs updating
2. Ruby on Mobile? Is it a good idea

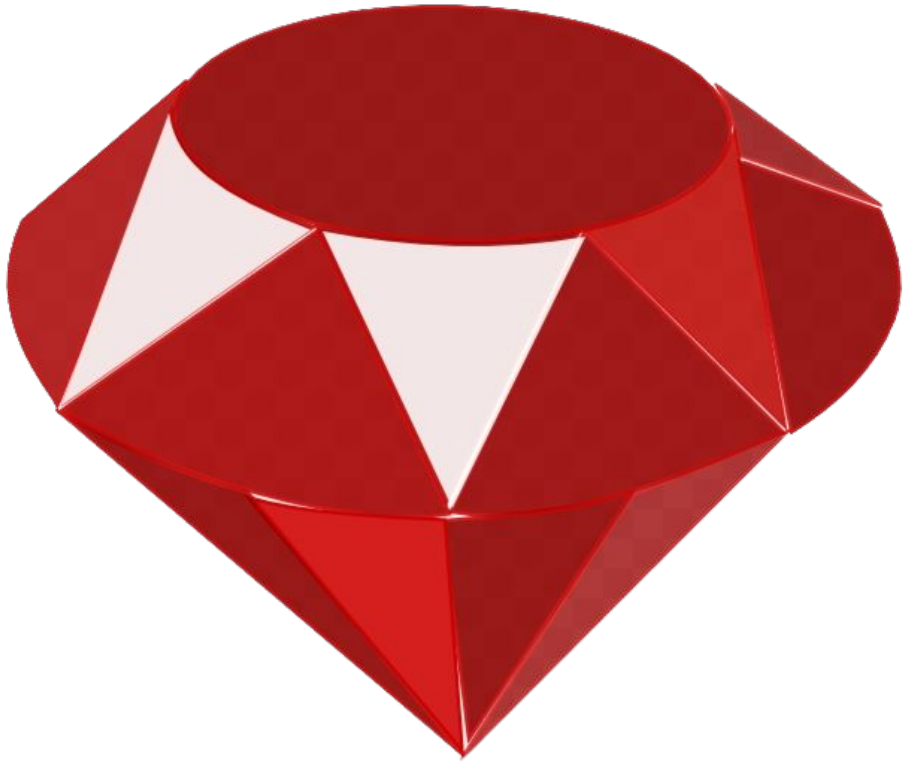
What’s next?

- Machine Learning - iRuby



What’s next?

- Machine Learning - iRuby
- Actually rewrite C code in Ruby



What’s next?

- Machine Learning - iRuby
- Actually rewrite C code in Ruby
- Contribute to Ruboto

What’s next?

- Machine Learning - iRuby
- Actually rewrite C code in Ruby
- Contribute to Ruboto
- Get involved in mRuby

Selena Small & Michael Milewski

@selenasmall 88

FRESHO

FAILURE DRIVEN

@saramic

zepto