

Build your own tools

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Self introduction

- Shugo Maeda
- Ruby committer
- Secretary General at Ruby Association
- Director at Network Applied Communication Laboratory Ltd. (NaCl)

Proposed features

- protected
- callcc
- Refinements
- puts

Ruby Association

- Foundation dedicated to Ruby
 - Maintenance of the stable version of Ruby
 - Grant
 - Conferences and Seminars
 - Case studies at www.ruby.or.jp
 - Examination

[ANN] Grant report

- Date: 2018-07-07
- Venue: Shinagawa, Tokyo
- Speakers: Matz, Naotoshi Seo, Uchio Kondo, Takashi Kokubun
- [https://
rubyassociation.doorkeeper.jp/
events/74355](https://rubyassociation.doorkeeper.jp/events/74355)

[ANN] RubyWorld Conference

- Date: 2018-11-01 ~
2018-11-02
- Venue: Matsue, Shimane
- Keynote Speakers: Matz, Chad Fowler
- <http://www.rubyworld-conf.org>

NaCl

- Commissioned development of Web (and other) applications
- Focused on FLOSS
- Matz belongs to NaCl since 1997
- Head office in Shimane /
Branch office in Tokyo

FLOSS

- Free/Libre and Open Source Software

Free software

- ~~Free as in beer~~
- Free as in speech
- 自由ソフトウェア
- Social movement

Open source software

- Open Source Definition
 - Published by the Open Source Initiative
 - Based on Debian Free Software Guidelines
- Development methodology

Microsoft

- Joined the Linux Foundation
 - <https://www.linuxfoundation.org/press-release/microsoft-fortifies-commitment-to-open-source-becomes-linux-foundation-platinum-member/>
- Joined the Open Source Initiative
 - <https://opensource.org/node/901>

Did FLOSS win?

Web applications

- Everyone use them
- FLOSS used often
 - Linux, GNU toolchain, Apache, Ruby, Rails...

I hate Web applications

I hate

- Gmail
- Google Docs, Sheets, and Slides
- Cloud9

These are OK

- tDiary
- Redmine
- Amazon (shopping site)
- Netflix

What is common to these?

SaaS

- \neq SaaS (Software as a Service)
- **S**ervice **a**s **a** **S**oftware **S**ubstitute
 - <https://www.gnu.org/philosophy/who-does-that-server-really-serve.html>
- Services for your computing

Non SaaS

- FLOSS
 - tDiary
 - Redmine
- Not for your computing
 - Amazon
 - Netflix

**Take back control over
your computing**

Build your own tools

Why?

- You can't always get what you want
- Serve yourself
- For fun

Why Ruby?

- Availability
- Productivity
- Text handling power
- Ecosystem
- Fun

My own tools

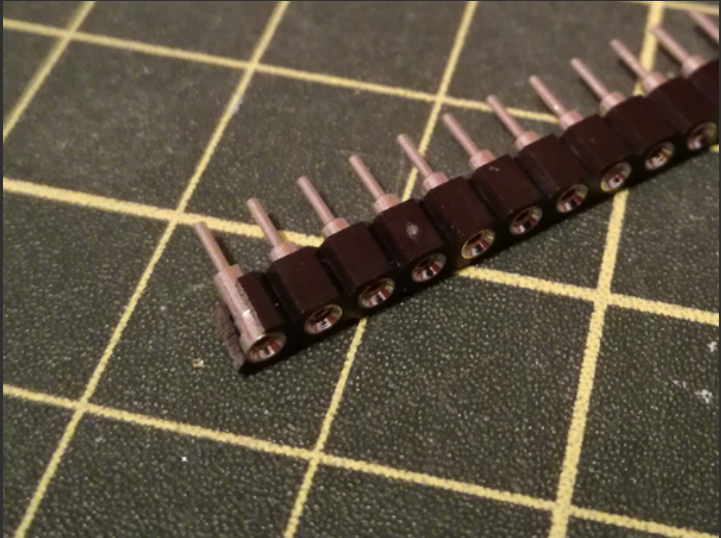
Keyboard



Viterbi

- Split Ortholinear keyboard kit
- Available at <https://keep.io>

Hard to fix hardware



Free keyboard

QMK Firmware

- Open source firmware for AVR and ARM based keyboards
- Licensed under GPL

T-Code Keyboard

- T-Code
 - Direct Kanji Input
 - No Kana-to-Kanji conversion
 - Kanji composition
 - e.g. 五 + 口 = 吾
- Implemented on QMK Firmware

No Ruby Inside

- Max firmware size: 28KB
- Even mruby/c is too large
- Written in C
- <http://nacl-ltd.github.io/2018/01/23/japanese-input-by-qmk.html>

Table generation

```
require_relative "tc_tbl"

puts "/* Generated by gentbl.rb; DO NOT EDIT! */"
puts "const uint16_t PROGMEM tcode_table[] = {\n"
TC_TBL.flat_map { |row|
  row.gsub(" ", "").each_char.map { |ch|
    "0x%04X" % ch.ord
  }
}.each_slice(8) do |cs|
  puts "  " + cs.join(", ") + ",\n"
end
puts "};\n"
```


Generated table

```
* Generated by gentbl.rb; DO NOT EDIT! */
const uint16_t PROGMEM tcode table[] = {
    0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0,
    0x25A0, 0x25A0, 0x30EE, 0x30F0, 0x30F1, 0x30F5, 0x30F6, 0x8ACB,
    0x5883, 0x7CFB, 0x63A2, 0x8C61, 0x308E, 0x3090, 0x3091, 0x25A0,
    0x25A0, 0x76DB, 0x9769, 0x7A81, 0x6E29, 0x6355, 0x25A0, 0x25A0,
    0x25A0, 0x25A0, 0x25A0, 0x4F9D, 0x7E4A, 0x501F, 0x9808, 0x8A33,
    0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0,
    0x25A0, 0x25A0, 0x4E11, 0x81FC, 0x5BB4, 0x7E01, 0x66F3, 0x5C1A,
    0x8CC0, 0x5CB8, 0x8CAC, 0x6F01, 0x65BC, 0x6C5A, 0x4E59, 0x7A4F,
    0x25A0, 0x76CA, 0x63F4, 0x5468, 0x57DF, 0x8352, 0x25A0, 0x25A0,
    0x25A0, 0x25A0, 0x25A0, 0x7E54, 0x7236, 0x679A, 0x4E71, 0x9999,
    0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0,
    0x25A0, 0x25A0, 0x9B3C, 0x865A, 0x72ED, 0x8105, 0x9A5A, 0x820E,
    0x559C, 0x5E79, 0x4E18, 0x7CD6, 0x5947, 0x65E2, 0x83CA, 0x537A,
    0x4EAB, 0x5EB7, 0x5F92, 0x666F, 0x51E6, 0x305C, 0x25A0, 0x25A0,
    0x25A0, 0x25A0, 0x25A0, 0x8B72, 0x30D8, 0x6A21, 0x964D, 0x8D70,
    0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0, 0x25A0,
```

Small scripts

ftpup

- Upload files via FTP
- FTP was used to upload HTML files in the past
- Using Net::FTP

imaparchive

- Move or Delete old mails on IMAP servers
- Using Net::IMAP

rd2sxi

- Convert RD to OpenOffice Impress slides

rd2latex

- Convert RD to LaTeX files

Programming languages

demi

- Original language for JVM
- Lisp-1
- No class definition
- for expression
- Closures
- REPL (**R**ead-**E**val-**P**rint **L**oop)

Example

```
frame = new Frame("Test");
frame.setLayout(new FlowLayout());
hello = new Button("Hello");
hello.addActionListener([ e:
    println("Hello, World!");
]);
frame.add(hello);
```

babel

- Sather Compiler for .NET
- Not a JavaScript compiler

Sather

- Statically typed object oriented language
- Separation of Subtyping and Code Inclusion
- Iterators
- Closures

Example

```
abstract class $PERSON is
  say;
end;

class HELLO_MIXIN is
  say is
    #OUT + "hello.\n";
  end
end;

class PERSON < $PERSON is
  include HELLO_MIXIN;
end
```

Servers

rskkserv

- Dictionary server for SKK
- SKK: Japanese Input Method
- Binary search

ximapd

- eXperimental IMAP server
- Use mailbox names as search queries

TUI applications

TUI

- Text-based User Interface
- Used on terminals
- More rich than CUI

Textbringer

- Emacs-like text editor
- Less parentheses
 - Matz Lisp a.k.a. Ruby
- Cool name

Mournmail

- MUA (**M**essage **U**ser **A**gent)
- Textbringer plugin
- Gmail like search interface
 - Powered by Groonga/Rroonga
- Multi account support
- Unstable specification

Groonga/Rroonga

- Groonga
 - Full-text search engine
- Rroonga
 - Ruby interface for Groonga

Good support



Shugo Maeda @shugomaeda · 5月1日

rrongaってselectでmatch_columnsは指定できないんだろうか。
default_column:は一つだけのようだし



1



す

@ktou

フォロー中

返信先: @shugomaedaさん

github.com/ranguba/rrong ... です！



ranguba/rronga

The Ruby bindings of Groonga. Contribute to rroonga development by creating an account on GitHub.

github.com

9:40 · 2018年5月1日



1



Search multiple columns

```
# query = "jemalloc"
# query = "from:@matz subject:@ruby"
messages = Groonga["Messages"].select { |record|
  record.match(query) { |match_record|
    match_record.subject | match_record.body
  }
}.paginate([[ "date", :desc ]], page: page, size: 100)
```

Demo

How to build tools

Materials

- Motivation
- Time
- Skills

Feel good about yourself

- Many geniuses in the world
- I'm not...
- But it's OK

Find your favorite theme

- Text editors?
- Programming languages?
- Graphical tools?
- Machine learning?

Start with something easy

- One liners
- Small scripts

Examples

- Mail archivers over Message user agents
- Slide generators over Presentation tools

Physical LOC

imaparchive	99
ftpup	294
rskkserv	316
Mournmail	2236
ximapd	5101
Textbringer	6526
babel	11822
demi	12205

- excluding test code

Cut corners

- Create a Minimum Viable Product before getting bored
- Reinvent the wheel only when you want to
- Inconvenience vs Implementation cost

Examples in programming languages

- Use existing virtual machines
- Use existing libraries

Examples in text editors

- ASCII support only at first
- Text User Interface
- Redisplay by curses

Postpone test writing

- You don't know what you want at first
- Use it everyday instead
- Test code should help changes

Specification bugs

- What's wrong in the following code?

```
def move_mail(src_mailbox, uid, dst_mailbox)
  src_path = Mournmail.mail_cache_path(src_mailbox, uid)
  dst_path = Mournmail.mail_cache_path(dst_mailbox, uid)
  begin
    File.rename(src_path, dst_path)
  rescue Errno::ENOENT
  end
end
```

UID is mailbox local

- UID is changed after COPY
- Change cache paths
 - Old: mailbox/uid
 - New: 00-ff/hash

Take risks

- eval
- monkey patching
- refinements
- callcc

Protect your data

- Leave mails on the IMAP server
- Dump unsaved files on crash
- Backup / Use VCS for important data

Make it extensible

- Small core with extensions
- Emacs = **E**ditor **MAC**ro**S**

Emacs vs vi

- Key bindings don't matter
- Extensible or not?
- Vim is an Emacs-type editor

Extension languages

	Host language	Extension language
GNU Emacs	C	Emacs Lisp
Vim	C	Vim script
Textbringer	Ruby	Ruby

Ruby

- Suitable for extensions
- Dynamic
- Brief notation

Customization

```
def load_user_config
  config_file = File.expand_path("~/textbringer.rb")
  begin
    load(config_file)
  rescue LoadError
  end
end
```

~/textbringer.rb

```
CONFIG[:east_asian_ambiguous_width] = 2
Buffer.detect_encoding_proc = Buffer::NKF_DETECT_ENCODING

Face.define :mode_line, foreground: "#ffffff", background: "#75507b"

add_hook :c_mode_hook, -> {
  buf = Buffer.current
  if buf.file_name &&
    File.dirname(buf.file_name).end_with?("/ruby")
    buf[:indent_level] = 4
    buf[:tab_width] = 8
    buf[:indent_tabs_mode] = true
    buf[:c_continued_statement_offset] = 4
    buf[:c_case_label_offset] = -2
    buf[:c_label_offset] = -2
  end
}
```

Plugins

- Load files in `~/.textbringer/plugins`
- Packaging system
 - RubyGems

Gem.find_latest_files

```
def self.load_plugins
  files = Gem.find_latest_files("textbringer_plugin.rb", false) +
    Dir.glob(File.join(directory, "**/textbringer_plugin.rb"))
  files.each do |file|
    begin
      load(file)
    rescue Exception => e
      show_exception(e)
    end
  end
end
```

Interactive programming

- Change behavior of object at runtime
- load, eval, open classes
- REPL
- Examples in Textbringer
 - eval_buffer, eval_region, eval_expression

Unreloadable code

```
module Mournmail  
  @current_mailbox = nil
```


Keep states on reload

```
module Mournmail
  def self.define_variable(name, initial_value: nil,
                          attr: nil)
    var_name = "@" + name.to_s
    if !instance_variable_defined?(var_name)
      instance_variable_set(var_name, initial_value)
    end
    ...
  end

  define_variable :current_mailbox, attr: :accessor
```

Local monkey patching

```
module FillExtension
  refine Buffer do
    def fill_region(s, e)
      ...
    end
  end
end

module Commands
  using FillExtension
  define_command(:fill_region) do
    |s = Buffer.current.point, e = Buffer.current.mark|
    Buffer.current.fill_region(s, e)
  end
end
```

Internal DSLs

- Declarative
- Too much DSLs decrease readability as **Ruby code**

Parser combinator

```
using RaddDjur::DSL

grammar = RaddDjur::Grammar.new(:additive) {
  # additive ← multitive '+' additive / multitive
  define :additive do
    :multitive.bind { |x|
      "+" .bind {
        :additive.bind { |y|
          ret x + y
        }
      }
    }
  } / :multitive
end
```

Bootstrapping

- Self-compiling compiler
 - $C \rightarrow \text{Language X} \rightarrow \text{Language X}$
- Self-editing text editor
 - $\text{Vim} \rightarrow \text{Textbringer} \rightarrow \text{Textbringer}$

After finished

Osusowake

- Japanese word meaning sharing
 - Share meals when cooked too much
- Software never decrease
- Share your software as FLOSS

Summary

- Take back control over your computing
- Build your own tools by Ruby
- Share your tools as FLOSS