IRB Reboot: Modernize Implementation and Features

ITOYANAGI Sakura

RubyKaigi 2018

Greeting

1st day's morning,

it was cloudy.

Greeting

2nd day's morning,

it was rainy.

Greeting

But today...

Greeting

It's a beautiful day outside.

Greeting

Birds are singing, flowers are blooming...

Greeting

On days like these...

IRB Reboot: Modernize Implementation and Features

Let me introduce myself

name

ITOYANAGI Sakura

GitHub

aycabta

maintainer

RDoc

Community: Asakusa.rb

Asakusa.rb every Ruby Tuesday

Company:
Space Pirates, LLC.

Space Pirates, LLC.

Hobby: Climbing

I planed to climb Mt. Zao, it's the highest mountain in Miyagi. The highest mountain is the nearest place to space. It fits for Space Pirates.

Hobby: Climbing

But it's so far from this venue, so I went to **gorge** near here.

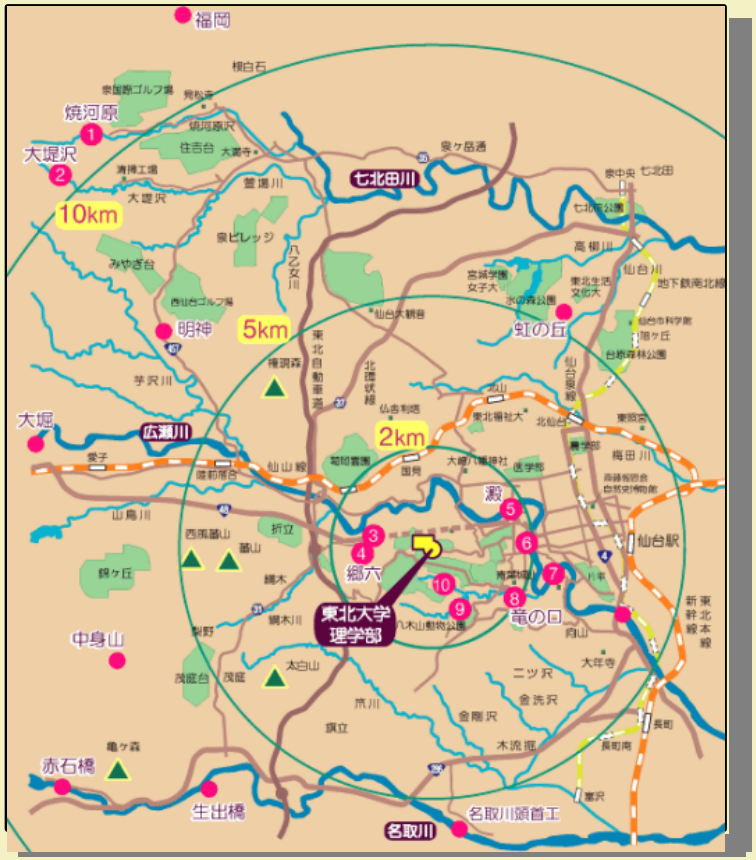
Hobby: Climbing

The **gorge** means narrow river between escarpments.

Hobby: Climbing

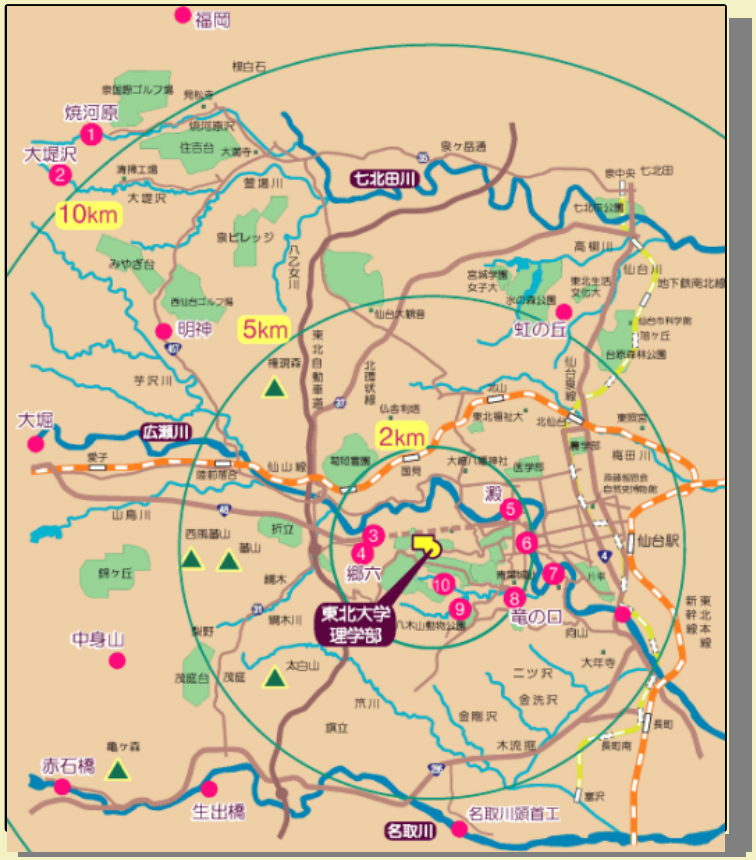
The Tohoku University official web site provides digging points map for fossils.

Hobby: Climbing



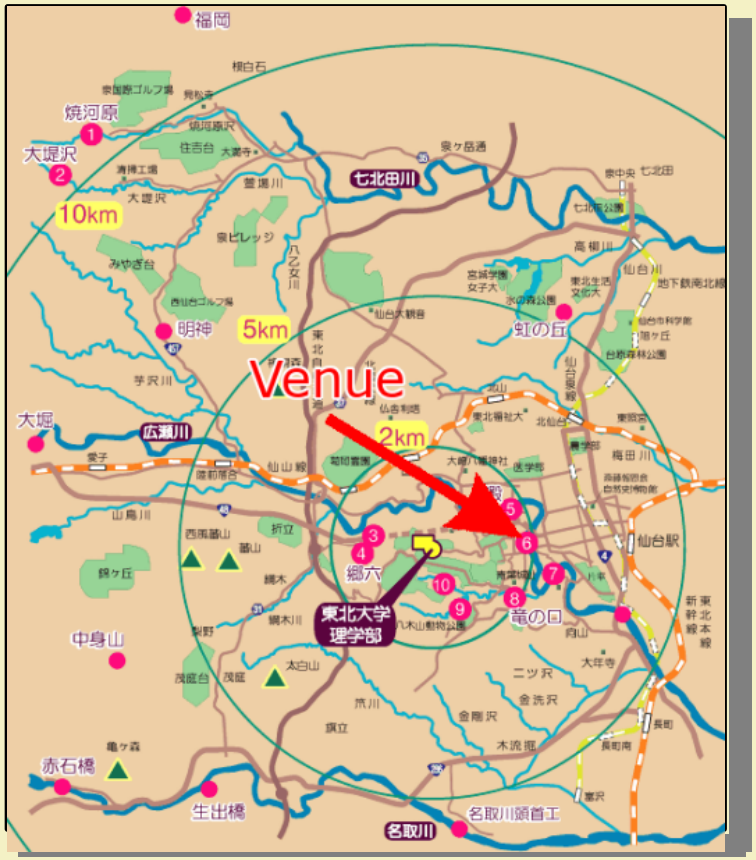
http://www.museum.tohoku.ac.jp/exhibition_info/mini/fosss/locality/locmap.html

Hobby: Climbing



A dozen pink points are fossils digging points.

Hobby: Climbing

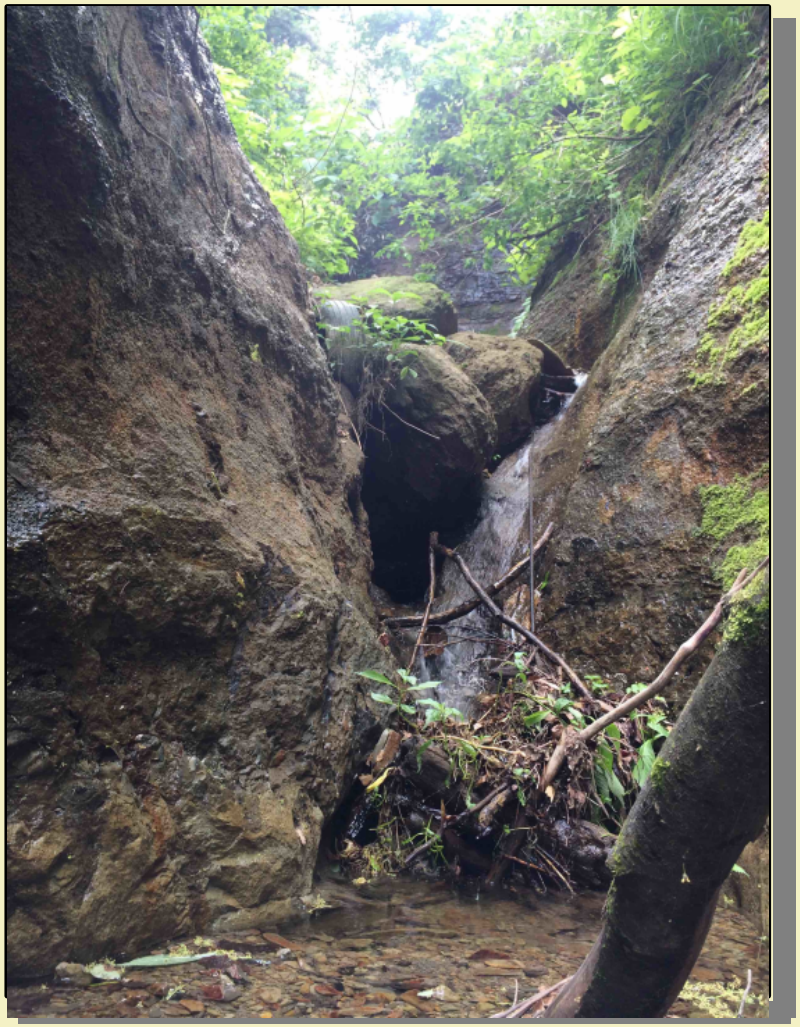


This venue is hemmed in by many fossils digging points.

Hobby: Climbing

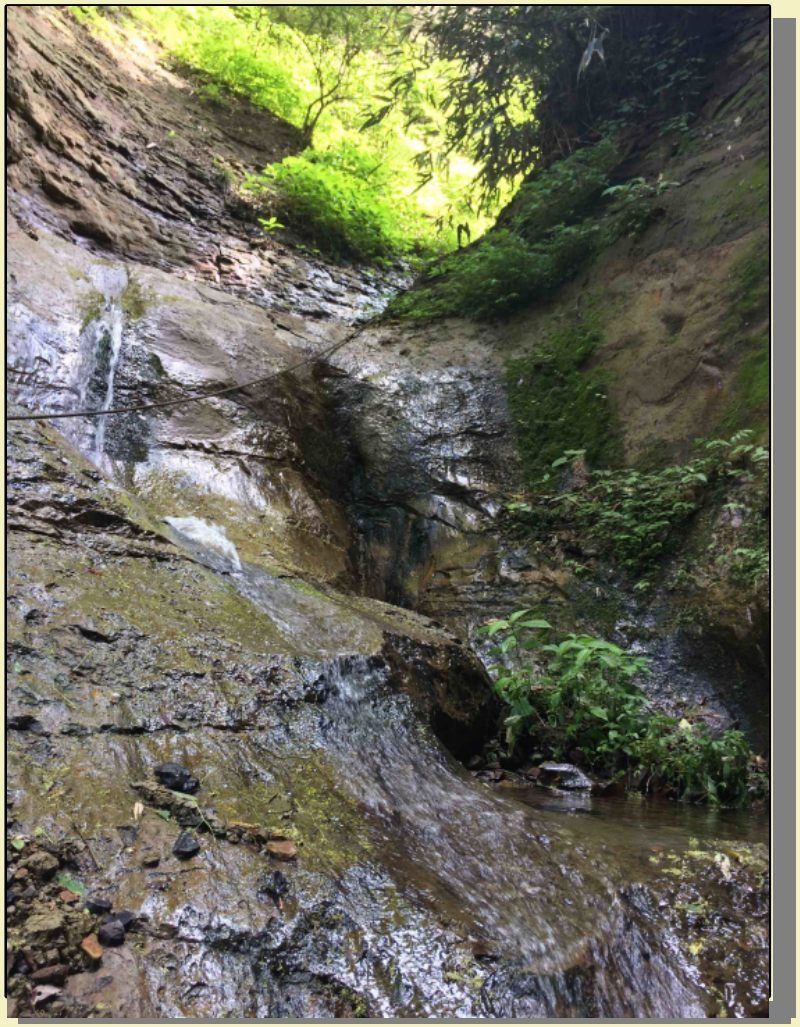
I went to some digging points.

Hobby: Climbing



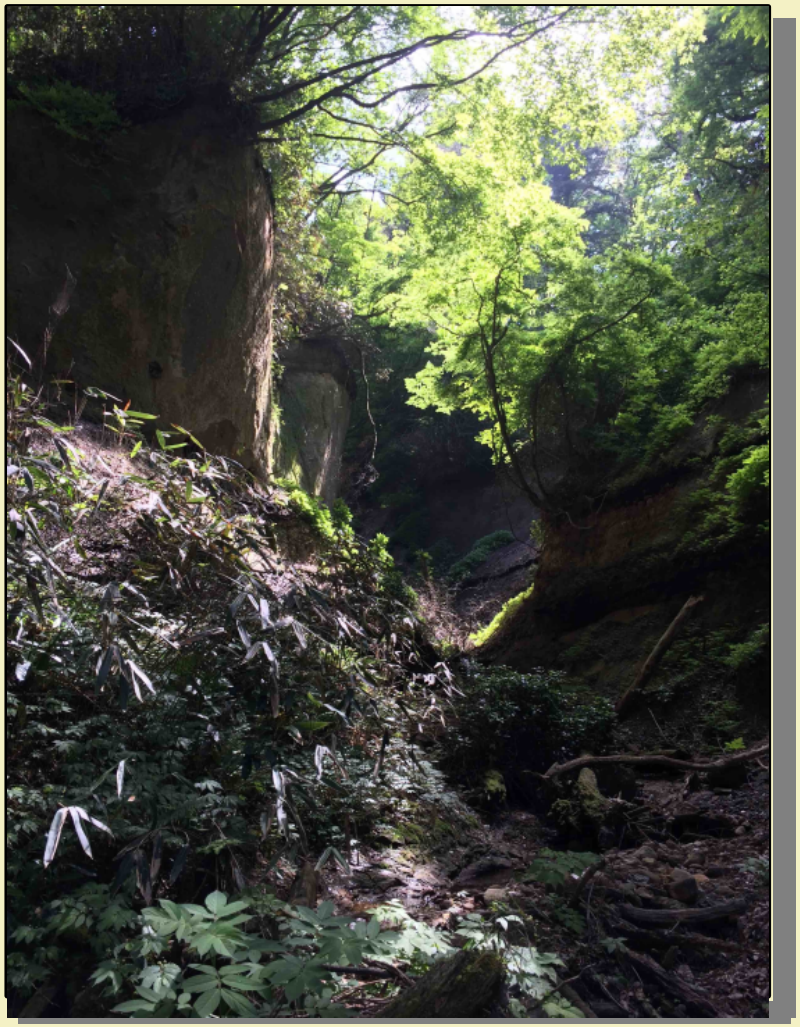
Waterfall

Hobby: Climbing



Waterfall

Hobby: Climbing



Gorge

Hobby: Climbing

Gorge

Hobby: Climbing

I burst through from 4m to 10m many waterfalls into several kilometers gorge.

Hobby: Climbing

I bivouacked in the gorge with a bonfire for cooking rice and miso soup.

Hobby: Climbing

When I was cooking rice and miso soup early morning by bonfire I was given notice "Today, we have Asakusa.rb" so I escaped the gorge quickly and went to Asakusa.rb by bullet train and joined it and went back to Sendai by midnight highway bus,

Hobby: Climbing

in a 24 hours period.

And joined pre-party of RubyKaigi.

Hobby: Climbing

It was the hardest experience of this RubyKaigi.

Hobby: Climbing

In gorge, I didn't find a fossil of the aimed whale, but found so many **shell beds(dense shell fossils)** and leaf's fossils.

Hobby: Climbing

Shell...?

Today's topic

IRB Reboot:
Modernize Implementation and Features

Recent years keiju-san's

In the several past RubyKaigis, keiju-san who is godfather of Ruby and the author of IRB talked about old Ruby.

Recent years keiju-san's

He said

"The first language design of Ruby was like shell."

in "Ruby Archaeology"
at RubyKaigi 2013.

Recent years keiju-san's

After that, keiju-san carries on talking about Ruby and shell.

Recent years keiju-san's

- 2014: Reish, an unix shell for rubyist.
- 2015: Usage and implementation of Reish which is an Unix shell for Rubyist
- 2017: Irb 20th anniversary memorial session: Reish and Irb2

Recent years keiju-san's

Next session of Hagi(#rubykaigiC) is keiju-san's one, don't miss it.

Today's topic

Let's back up a minute.

Today's topic

I sent 2 patches to IRB.

- #14683 IRB with Ripper
- #14787 Show documents when completion

#14683 IRB with Ripper ...How use RDoc use Ripper

I talked about RDoc with Ripper,

"Ruby Parser
In IRB 20th Anniversary...
Now Let Time Resume"

at RubyKaigi 2017.

#14683 IRB with Ripper ...How use RDoc use Ripper

Ruby syntax is very complex.

#14683 IRB with Ripper ...How use RDoc use Ripper

Ruby's parser is spaghetti.

- Lexical analyzer is tightly coupled with parser
- parse.y has over 11,000 lines
- The overwhelming weight of **syntax** to come and the uncertainty of `lex_state`

#14683 IRB with Ripper ...How use RDoc use Ripper

Ruby's syntax is
very dirty.

#14683 IRB with Ripper ...How use RDoc use Ripper

Ruby's syntax is very 🤷~~dirty~~🤷.

#14683 IRB with Ripper ...How use RDoc use Ripper

Ruby's syntax is very 🤷complex🤷.

#14683 IRB with Ripper ...How use RDoc use Ripper

Ruby's syntax
😉abrades😉 parser developer.

#14683 IRB with Ripper ...How use RDoc use Ripper

But, the abradable syntax for parser developer
is gentle for Ruby users
by matz.

It's great point of Ruby.

#14683 IRB with Ripper ...How use RDoc use Ripper

So RDoc had very many bugs in parsing Ruby code.

#14683 IRB with Ripper ...How use RDoc use Ripper

I fixed so many bugs of RDoc, and replaced it fixed RDoc with Ripper version.

#14683 IRB with Ripper ...How use RDoc use Ripper

Ripper is one of Ruby's standard libraries of lexical analysis by parse.y.

#14683 IRB with Ripper ...How use RDoc use Ripper

I think that Ripper is best way for parsing Ruby code, for following latest Ruby syntax.

#14683 IRB with Ripper

But IRB implement pure Ruby parser. It's hard to support Ruby's new syntax.

#14683 IRB with Ripper

I thought that Ripper makes IRB's source code parsing better.

#14683 IRB with Ripper

I discussed Ruby's REPL with matz, and matz said "I implemented mruby's REPL(mirb), learning from IRB's history".

#14683 IRB with Ripper

REPL needs when code block will end(close) because REPL evaluates it at the timing.

#14683 IRB with Ripper

The mirb uses

- token's `lex_state`
  - `parser->lstate`
- syntax error messages
  - `parser->error_buffer[0].message`

(The `parser` is a `struct mrb_parser_state`)

#14683 IRB with Ripper

In CRuby,

- token's `lex_state`
  - `Ripper`
- syntax error messages
  - `RubyVM::InstructionSequence`

#14683 IRB with Ripper

I ported mirb's implementation to IRB.

#14683 IRB with Ripper

IRB has some prompt features, `PROMPT_N`, `PROMPT_S`, and `%NNi`.

#14683 IRB with Ripper

- `PROMPT_N`
  - Prompt when
    the code line is continued
- `PROMPT_S`
  - Prompt when
    the code block is in literal
- `%NNi`
  - Nesting level of
    the code block

#14683 IRB with Ripper

- PROMPT_N
  - **Ripper**
- PROMPT_S
  - **Ripper**
- %NNi
  - **Ripper**

#14683 IRB with Ripper

In CRuby, I could resolve the parameters of prompt by Ripper.

#14683 IRB with Ripper

The `PROMPT_N` is a part of "when the code block is ended" logic.

#14683 IRB with Ripper

Inside "splitted sentence", IRB uses `PROMPT_N` prompt.

Like:

```
method(a,
       b,
       c)
```

#14683 IRB with Ripper

The `PROMPT_S` is implemented by checking corresponding open and close tokens of literals.

#14683 IRB with Ripper

Literal tokens:

- "
- '
- percent literals
  - %q{ and }
  - %w{ and }
  - blah blah blah
- here-document

#14683 IRB with Ripper

Example:

```
"This
 is
 multiline
 string"
```

#14683 IRB with Ripper

Example:

```
%w{
   array
   of
   strings
}
```

#14683 IRB with Ripper

Inside String or other literal, IRB uses `PROMPT_S` prompt.

#14683 IRB with Ripper

The `%NNi` is implemented by count corresponding name space open and close tokens.

#14683 IRB with Ripper

- Increase nesting level when takes open token
  - `if`, `unless`, `while`, `until`, `rescue`
    - skip post-fix version (it doesn't need `end`)
  - `def`, `do`, `case`, `for`, `begin`, `class`, `module`
  - `[`, `{`, `(`

#14683 IRB with Ripper

- Decrease down nesting level when takes open token
  - `end`
  - `], }, )`

#14683 IRB with Ripper

```
                    # nesting level is 0
class C             # increase nesting level to 1
  def m             # increase nesting level to 2
    if true         # increase nesting level to 3
      1 if true     # skip (post-fix if)
    end             # decrease nesting level to 2
  end               # decrease nesting level to 1
end                 # decrease nesting level to 0
# <=== evaluation!
```

#14683 IRB with Ripper

Actual example by default:

```
                  ↓ %NNi (nesting level)
irb(main):001:0> def foo(a,
irb(main):002:2*           b)  # PROMPT_N
irb(main):003:1>   <<-EOM
irb(main):004:1" Hello,        # PROMPT_S
irb(main):005:1" World!        # PROMPT_S
irb(main):006:1"   EOM         # PROMPT_S
irb(main):007:1> end
=> :foo
irb(main):008:0>
```

#14683 IRB with Ripper

https://bugs.ruby-lang.org/issues/14683

#14683 IRB with Ripper

This removes

- lib/irb/slex.rb (283 lines)
- lib/irb/ruby-token.rb (268 lines)

#14683 IRB with Ripper

This simplifies

- lib/irb/ruby-lex.rb (1181 to 287 lines)

#14683 IRB with Ripper

Ruby parser of IRB was shrunk from total 1732 lines to 287 lines.

#14683 IRB with Ripper

The simple implementation is best, because Ruby syntax is complex.

The simple implementation is easy to support and keep the gentleness of Ruby.

#14787 Show documents when completion

This is second patch for IRB.

#14787 Show documents when completion

I talked about this Q&A time at RubyKaigi 2017.

#14787 Show documents when completion

First, RDoc's RI binary files are installed to Ruby's directory.

#14787 Show documents when completion

CRuby:

```
$ tar xvzf ruby-2.5.1.tar.gz
$ cd ruby-2.5.1
$ autoconf
$ ./configure
$ make
$ make install # <=== RDoc runs inside
```

#14787 Show documents when completion

CRuby:

```
$ rbenv install 2.5.1 # <=== RDoc runs inside
```

#14787 Show documents when completion

RubyGems:

```
$ gem install rails # <=== RDoc runs inside
```

#14787 Show documents when completion

But many users set:

```
$ gem install rails --no-document
```

#14787 Show documents when completion

Many blogs recommend:

```
$ cat ~/.gemrc
install: --no-document
update: --no-document
```

#14787 Show documents when completion

Unfortunately many users don't need documents data, but I understand it.

#14787 Show documents when completion

Because it's **just** for RI(`ri` command).

#14787 Show documents when completion

Usage of class:

```
$ ri 'String'
```

#14787 Show documents when completion

Usage of instance method:

```
$ ri 'String#gsub'
```

#14787 Show documents when completion

Usage of class method:

```
$ ri 'String.new'
```

#14787 Show documents when completion

Bothersome.

#14787 Show documents when completion

I wrote on the ticket:

> *RDoc installs all documents to Ruby's directory by default.*
>
> *[cited from `#14787']*

#14787 Show documents when completion

> *Many users never use it because it's just for RI("ri" command).*
>
> *[cited from `#14787']*

#14787 Show documents when completion

> *I think that it is a reason of that many users don't attach importance to documentation.*
>
> *[cited from `#14787']*

#14787 Show documents when completion

I want to improve the importance of RDoc's data.

#14787 Show documents when completion

shevegen (Robert A. Heiler) replied to the ticket:

> *I also do not use "ri" on the commandline.*
>
> *[cited from `#14787 shevegen']*

#14787 Show documents when completion

> *I would not know why, because I myself simply do not use local look-up ways for documentation normally.*

[cited from `#14787 shevegen']

#14787 Show documents when completion

It's the same opinion of me.

#14787 Show documents when completion

And the continuation of shevegen's comment:

#14787 Show documents when completion

> *I really "just google".*
>
> *[cited from `#14787 shevegen']*

#14787 Show documents when completion

> *And using the browser is about 100x more convenient for me as well.*
>
> *[cited from `#14787 shevegen']*

#14787 Show documents when completion

It's the exact same opinion of me.

#14787 Show documents when completion

Perfect.

#14787 Show documents when completion

I'm actually sad.

#14787 Show documents when completion

I want to improve the importance of RDoc's data(2).

#14787 Show documents when completion

IRB(with Readline) completes namespace such as classes, modules, methods and so on when it caught TAB key.

#14787 Show documents when completion

In the patch of this ticket, I use RDoc as a library.

#14787 Show documents when completion

When you press TAB key one more just after that namespace is exact matched, RI document is shown.

#14787 Show documents when completion

Demonstration

#14787 Show documents when completion

This is just an aside, I want Ruby's documentation **design**.

#14787 Show documents when completion

In the ticket, I talked about language documentation design.

#14787 Show documents when completion

> *Perl has "perldoc" feature and users easily access documents of modules by "perldoc" command.*
>
> *[cited from `#14787']*

#14787 Show documents when completion

> *Python has "docstring" feature and users can access it on REPL.*
>
> *[cited from `#14787']*

#14787 Show documents when completion

> *Those are each language's design of importance.*
>
> *[cited from `#14787']*

#14787 Show documents when completion

> *Users use the language on the documentation design, so library developers write documents on the documentation design.*

[cited from `#14787']

#14787 Show documents when completion

> *Ruby doesn't have documentation design like Perl and Python.*
>
> *[cited from `#14787']*

#14787 Show documents when completion

Ruby just has RDoc, IRB, and any other supports, but these are just fragmented features, these are not a documentation design.

[cited from `#14787']

Documentation design

I want to improve Ruby's documentation design.

Documentation design

This ticket is a slice of my documentation design.

Documentation design

I want to improve
the gentleness
of Ruby's documentation
design.

Documentation design

I think that
the gentleness for users
is very important in Ruby.

Documentation design

Please remove
`--no-document`
for
improvement documentation
at Ruby 2.6 or later.

Thank you for your attention

Please write documents!