

TRICK
@jimmynguyc

What is **TRICK**

- **T**ranscendental **R**uby **I**mbroglio **C**ontest for Ruby**K**aigi
- A Ruby programming contest started and held in RubyKaigi 2013
- TRICK2015 is happening this year 🙌

What is **TRICK**

- Transcendental /ˌtrænˌsenˈden(t)l/
 - of or relating to a spiritual or nonphysical realm
 - unworldly
- Imbroglia /imˈbrōlyō/
 - an extremely confused, complicated, or embarrassing situation

Goal of **TRICK**

- Write the most Transcendental, Imbroglia Ruby Program
- To illustrate some of the subtleties (and design issues) of Ruby.
- To show the robustness and portability of Ruby interpreters.
- To stabilize the spec of Ruby by the presence of valuable but unmaintainable code.

Related Contests

- **IOCCC**: International **O**bfuscated **C** **C**ode **C**ontest
- **UCC**: **U**nderhanded **C** **C**ontest
- **OPC**: **O**bfuscated **P**erl **C**ontest
- **IORCC**: International **O**bfuscated **R**uby **C**ode **C**ontest

IOCCC Winner 2014

```
#include <stdlib.h>
#include <string.h>
#include <unistd.h>
#include <fcntl.h>
#include <sys/stat.h>
```

```
#define A calloc(1, sizeof(m))
#define D m.
#define L ->
#define P malloc(
#define R &&
#define S ++
#define U for(
#define V if(
#define W L i
#define X L a
#define Y L b
#define Z L c
```

```
typedef struct T*_; struct T{ int t,i; char*a; *_b,c,d,e,f; } m,x,y; struct stat z; int u; void * H;
int K(int c){ return strchr(" \n\t",c); } void B(_ s,_ p) { s Y=realloc(s Y,S s W*sizeof(_)); s Y [s
W-1]=p; } _ C(char*d,int l){ _ s=A; s X=d?d:P 1); s W=l<0?d?strlen(d):0:l; return s; } _ E(_ s){ _ r
=A; int i=0; U; i<s W; ){ U; i<s W R K(s X[i]); )i S; int j=i; U; j<s W R !K(s X[j]); )j S; V j-i)B(
```

```

r,C(s X+i,j-i)); i=S j; } return r; } int F(_ a,_ b){ return a W==b W R !memcmp(a X,b X,a W); } void
l( _ s,char c ) { char*d=P 1); *d=c ; B(s,C(d,1) ); } void
J ( char*d,int l ,int o,_ v){ _ n= C(d,l); _ w; U l= 0; l
<D d W; ) { w= D d Y[l S ]; V F( w Z,n)){ V o>w W return; goto O; } }
B( D d,w= A ); w Z=n; O:w W =o ; w L d=v; } int M( _ b,int p,char*t,int
g ){ _ f= A; f L e= A; f X=t; int h=g ,i=0,j=0,n=b
W; char c=0, d,*o =b X ; U; p<n; ){ t=j?"":f X ;
int k=p; _ r=H ; U; p <n; ){ int l = 0; U; p<n R o[p]==92 ; ){ l S; p S; } c=o
[p S ]; V c^10||! l%2 ||!g){ d=c== 35 R !l R!g|| c== 10 R g^2; V d||strchr(t,c
)) { r=C(o+k,p-k- d*l/ 2-1); V d R l%2) { r X[r W-1] =c^35 ?32:
c; c =0; } break; } } c=0; } V!j)B (f L e,r?:C(o+k, n-k) ); r
=A; switch(c){ case 35:j S; case 0:break; case 10:goto O; case 36:switch(d=o[p S]){ case 36:l(f L e,
d); break; default:l(r Z=A,d); goto o; case 40:case 123:r L f=f; r L e=A; r X=d^40?"$":"")$"; f=r; }
break; default:V f L f){ r Z=f L e; f=f L f; o:r L t S; B(f L e,r); } else goto O; } i=f L f R g==1;
g=i?0:h; } O: x.c=f L e; x.t=c; return p; } _ N(_ s){ _ o=C(H,0); U int i=0; i<s W; ){ _ p=s Y[i S];
V p L t){ _ n=N(p Z); p=C(H,0); U int j=0; j<D d W; ){ _ w=D d Y[j S]; V F(w Z,n)){ M(w L d,0,"$,2)
; p=N(x.c); break; } } } o X=realloc(o X,o W+=p W); memcpy(o X+o W-p W,p X,p W); } return o; } _ O(_
t){ U int i=0; i<D e W; ){ _ s=D e Y[i S]; V F(s Z,t))return s; } _ s=A; s Z=t; s L d=A; s L t--; B(D
e,s); return s; } void Q(_ s){ _ d=s Z; V!stat(memcpy(calloc(1,d W+1),d X,d W),&z))s L t=z.st_mtime;
V!s W S){ u=!s L d W R s L t<0; int i=0,j,k=s L t<0; _ c=H,t; U; !u R i<s L d W; ){ _ a=s L d Y[i S]
; U j=0; !u R j<a L d W; ){ Q(t=O(a L d Y[j S])); k|=t L t<0||t L t>s L t; } V a Z W){ c=a Z; V a L
d W)J("<", 1, 0, *a L d Y); } } U j=0; !u R c R k R j<c W; ){ J("@",1,0,d); s=N(c Y[j S]); U; s W R
strchr("@+-",*s X); )s X S; u=system(s X); } } } void G(_ b){ U; b W R K(*b X); ){ b X S; b W--; } }

```

```

int main(int i,char**a,char**e){ D d=A; D e=A; D c=A; char p[]="NBLF\1Nblfgjmf\1",*q=p; U; (*q++)--;
); J(p,4,0,C(*a S,-1)); U i=0; i<3; i+=2){ U; *a; ){ q=*a; U; *q R*q^61; )q S; V*q)J(*a,q-*a,i+1,C(q
+1,-1)); else V!i)B(D c,C(*a,-1)); a S; } a=e; } stat(p+5,&z); i=z.st_size; _ b=C(H,0),c,d; b W=read
(open(p+5,0),b X=P i,i); U; u<i; ){ V b X[u]^9){ U; u<i R K(b X[u]); )u S; u=M(b,u,"=$",0); y = x;
switch(x.t){ case 58:u=M(b,u,"$",0); D f=c=A; c L d=E(N(x.c)); c Z=A; d=E(N(y.c)); U; d W--; )B(O(*d
Y S) L d,c); break; case 61:u=M(b,u,"",0); G(c=N(x.c)); G(d=N(y.c)); U; d W--R K(d X[d W]); ); J(d X
,S d W,2,c); } } else { u=M(b,S u,"$",1); l(x.c,0); B(D f Z,x.c); } } V!D c W R D e W)B(D c,D e Y[0
Z); U u=0; !u R D c W--; )Q(O(*D c Y S)); return u; }

```

TRICK 2013

- Judges

- Yusuke Endoh (@mametter. **R**uby committer. IOCCC winner)
- Koichiro Eto (@eto. Media Artist. Chairman at NicoNicoGakkai Beta)
- Shinichiro Hamaji (@shinh. The admin of anarchy golf. IOCCC winner)
- Yutaka Hara (@yhara. The author of Japanese esolang book)
- Yukihiro Matsumoto (a.k.a. matz. @yukihiro_matz. The creator of **R**uby)
- Sun Park (a.k.a. leonid. The 1st super **R**uby golfer.)
- Hirofumi Watanabe (@eban. **R**uby committer. The 2nd super **R**uby golfer)

TRICK 2013

- Judging process
 - Each judge scores each entry on 10 point scale
 - Judge has no rights to score own entry
 - Judge keeps each entry anonymous during judgement
 - 10 winning entries

Top 6 Entries

- **No. 6** - “Best way to return true”
- **No. 5** - “Most Competitive”
- **No. 4** - “Worst abuse of constants”
- **Bronze** - “Most Classical”
- **Silver** - “Most Readable”
- **Gold** - “Best Pangram”

“Best way to **R**eturn true”

```
$ruby.is_a?(Object){|oriented| language}
```

by Nakamura Usaku

Key **TRICKS** / Exploits

```
$ruby.is_a?(Object){|oriented| language}
```

- nil (like almost everything in **R**uby) is an Object
- methods don't check if it accept blocks
- codes that are not evaluated until needed

“Most Competitive”

```
eval$s      =( %q( ;eval( (%w(Z=" \s"*2;V="1sj6w3u1i kfyikb6y01xsjdcda
j4".to      _i(36);R=0..9;a,b= [[*$s.lines],[*$<] ].map{|s|n=0;1.ste
p(w=s.      map{|l|l.chomp.siz e}.max,2+3*m=48/(w -70)){|x|n=n*10+R.
find{|n|R.al l?{|i| V[n*15 +i]<1= =Z<(s[ i/3*3+
1][i%3*m+x]| |Z)}}} ;n};d= 10**(( b-a)/4 e2);[[
STDOUT,a+d=d *32/(d +1)],[ $stdou t,b-d] ].map{
|o,n|;      s="eval$s=( %q("+$s [/(.*? ~){3}/ m];15. times{
|y|l="      %d"%(n+0.5);l=(1.b ytes.m ap{|c| (0..2) .map{|
x|"x\s      "[V[c*15-720+y/3*3 +x]]*( 24/l.s ize))* "";}*Z
).rstr      ip.gsu b(?x){ s<<V.t o_s(20 )};s.sl
ice!(/      \S/)); o.puts (y<14? 1:l[0. .-4]+"
~))" )}      ;o.put s))*"" ));;%~ 7h7hhf 1j626e
0dh6392fa6b6b45iid c59c7h7hhf1j626e0d h6392fa6b6b45iidx5 9c7h7hhf1j626e0dh6
392fa6b6b45iidx59c 7h7hhf1j626e0dh639 2fa6b6b45iidx59c7h 7hhf1j626e0dh6392f
a6b6b45iidx59c7h7h hf1j626e0dh6392fa6 b6b45iidx59c7h7hhf 1j626e0dh6392fa~))
```

by Yusuke Endoh

Demo

Key **TRICKS** / Exploits

```
eval$s      =( %q( ;eval( (%w(Z=" \s"*2;V="1sj6w3u1i kfyikb6y01xsjdcda
j4".to      _i(36);R=0..9;a,b= [[*$s.lines],[*$<] ].map{|s|n=0;1.ste
p(w=s.      map{|l|l.chomp.siz e}.max,2+3*m=48/(w -70))){|x|n=n*10+R.
find{|n|R.al 1?{|i| V[n*15 +i]<1= =Z<(s[ i/3*3+
1][i%3*m+x]| |Z)}}} ;n};d= 10**(( b-a)/4 e2);[[
STDOUT,a+d=d *32/(d +1)],[ $stdou t,b-d] ].map{
|o,n|;      s="eval$s=(%q("+ $s [/(.*? ~){3}/ m];15. times{
|y|l="      %d"%(n+0.5);l=(1.b ytes.m ap{|c| (0..2) .map{|
x|"x\s      "[V[c*15-720+y/3*3 +x]]*( 24/l.s ize)}* "";}*Z
).rstr      ip.gsu b(?x){ s<<V.t o_s(20 )};s.sl
ice!(/      \S/)); o.puts (y<14? 1:l[0. .-4]+"
~))")})    ;o.put s})*"" ));;%~ 7h7hhf 1j626e
0dh6392fa6b6b45iid c59c7h7hhf1j626e0d h6392fa6b6b45iidc5 9c7h7hhf1j626e0dh6
392fa6b6b45iidc59c 7h7hhf1j626e0dh639 2fa6b6b45iidc59c7h 7hhf1j626e0dh6392f
a6b6b45iidc59c7h7h hf1j626e0dh6392fa6 b6b45iidc59c7h7hhf 1j626e0dh6392fa~))
```

- Quine
- formatting code
- cheat OCR
- calculating Elo Rating
- abuse of -i

Dissection

```
eval$s=(%q(;eval
(
  (
    %w(
      Z="\s"*2;V="1sj6w3u1ikfyikb6y01xsjdcjedaj4".to_i(36);
      R=0..9;
      a,b=[[*$s.lines],[*$<]].map{|s|
        n=0;
        1.step(w=s.map{|l|l.chomp.size}.max,2+3*m=48/(w-70)){|x|
          n=n*10+R.find{|n|
            R.all?{|i|
              V[n*15+i]<1==Z<(s[i/3*3+1][i%3*m+x]||Z)
            }
          }
        }
      };
      n
    };
    d=10**((b-a)/4e2);
    [
      [STDOUT,a+d=d*32/(d+1)],
      [$stdout,b-d]
    ].map{|o,n|
      ;s="eval$s=(%q("+s[/(. *?~){3}/m];
      15.times{|y|
        l="%d"%(n+0.5);
        l=(l.bytes.map{|c|
          (0..2).map{|x|
            "x\s"[V[c*15-720+y/3*3+x]]*(24/l.size)}*"";
          }*Z).rstrip.gsub(?x){s<<V.to_s(20);
            s.slice!(/\S/)
          }
        };
        o.puts(y<14?l:l[0..-4]+"~)")
      };
      o.puts})*""
    )
  )
);;
```

```
%~
7h7hhf1j626e0dh6392fa6b6b45iidc59c
7h7hhf1j626e0dh6392fa6b6b45iidc59c
7h7hhf1j626e0dh6392fa6b6b45iidc59c
7h7hhf1j626e0dh6392fa6b6b45iidc59c
7h7hhf1j626e0dh6392fa6b6b45iidc59c
7h7hhf1j626e0dh6392fa6b6b45iidc59c
7h7hhf1j626e0dh6392fa~
)
```

- Calculate Elo Rating
- Output code to OCR
- Fillers

“Worst Abuse of Constants”

```
def _(&b)$><<->(x){x ? (String===x ?x.upcase:
(Class===x ? x : x.class).name[$a?0:($a=5)]):
" "[ begin b[];rescue Exception;$!;end ] end

- { return }
- { method(:p).unbind }
- { eval "{ " }
- { Thread.current.join }
- { nil }
- { select }
- { ruby }
- { self.class }
- { Thread.current.group }
- { nil.to_h }
- { "\xFF".encode("big5") }
- { raise }
- { [0][1] }
- { Regexp.compile "*" }
- { RUBY_COPYRIGHT[32] }
- { binding }
- { :s.class.name[1] }
- { warn }
- { [a: :b][0] }
- { methods }
- { IO.class }
- { {}.fetch(0) }
- { open " " }
- { 1000000.chr }
```

by Yutaka Hara



Dishonorable
Mention

Demo

Key **TRICKS** / Exploits

- Ruby Constants
- \$!

```
def _(&b)$><<->(x){x ? (String===x ?x.upcase:
(Class===x ? x : x.class).name[$a?0:($a=5)]):
" "[ begin b[];rescue Exception;$!;end ] end

- { return }
- { method(:p).unbind }
- { eval "{ " }
- { Thread.current.join }
- { nil }
- { select }
- { ruby }
- { self.class }
- { Thread.current.group }
- { nil.to_h }
- { "\xFF".encode("big5") }
- { raise }
- { [0][1] }
- { Regexp.compile "*" }
- { RUBY_COPYRIGHT[32] }
- { binding }
- { :s.class.name[1] }
- { warn }
- { [a: :b][0] }
- { methods }
- { IO.class }
- { {}.fetch(0) }
- { open " " }
- { 1000000.chr }
```

Dissection

```
def _(&b)
  $><<
  ->(x){
    x ? (String === x ? x.upcase :
(Class===x ? x : x.class).name[$a?0:($a=5)]) : "
"
  }[
    begin
      b[]
    rescue Exception
      $!
    end
  ]
end

- { return }
- { method(:p).unbind }
- { eval "{ " }
- { Thread.current.join }
- { nil }
- { select }
- { ruby }
- { self.class }
- { Thread.current.group }
- { nil.to_h }
- { "\xFF".encode("big5") }
- { raise }
- { [0][1] }
...

```

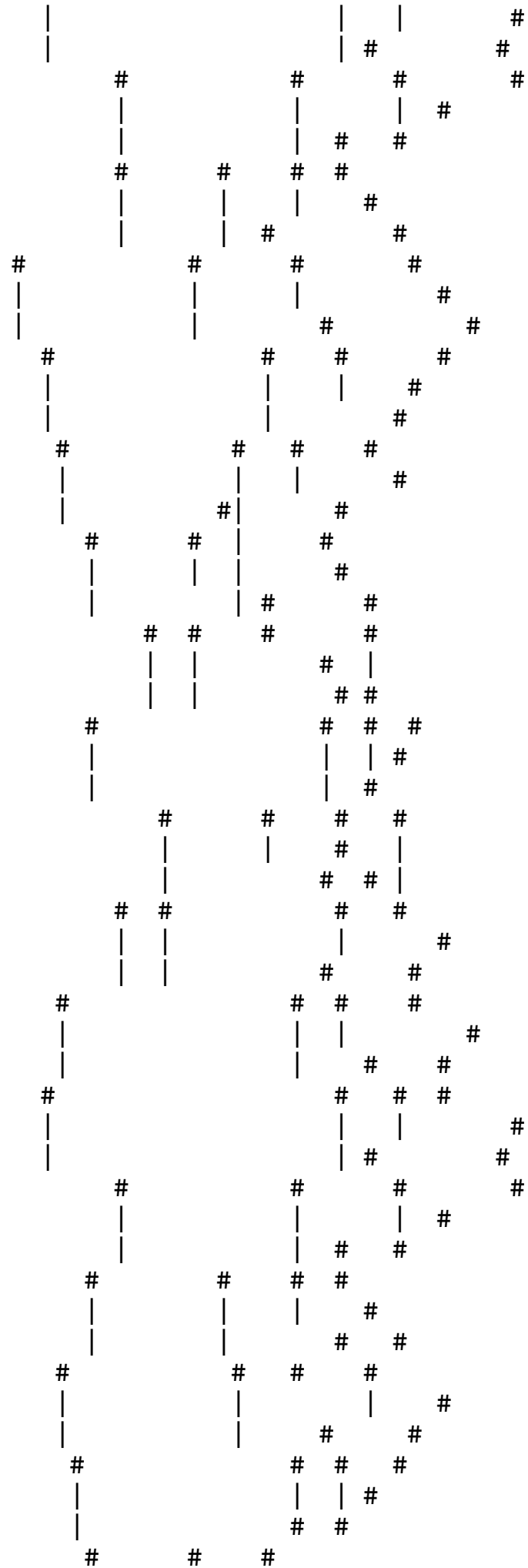
- `$><<` to replace “puts”
- `===`
- `[]` to execute block
- `$!` to return Exception

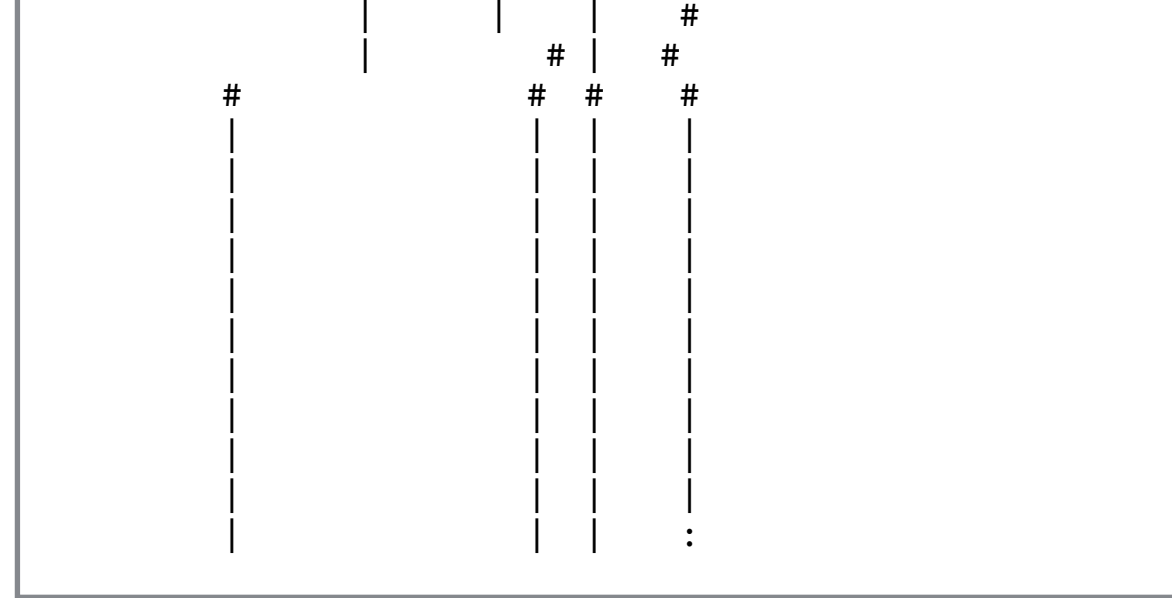
“Most Classic”

```
eval$C=%q(at_exit{
IO.popen("./pl", "wb"){|g|h=[0]*80
$><<"\s"*18+"eval$C=%q(#$C);S=%:"
(S<<m=58).lines{|l|s=[128]*n=20E2
t=0;                                h.map!{|v|d=?!=1[
t]?1                                : (1[
t]==                                ?#)?
0*v=                                6:03
(v<1                                ?[:
0..n                                -1).
each                                {|z|
s[z]                                +=2*
M.sin(($*[0]                        ||1)
.to_f*M.sin(y=                      40*(z+m)*2**
(t/12E0)/463)+                      y)*(v-z*d/n)};
t+=1;v-d};m+=                      n;g.flush<<(s.
pack"C*");                          puts(1)}}};M=
                                   Math);S=%:
```

Jesu, Joy of Man's Desiring
Johann Sebastian Bach

The diagram illustrates a sparse matrix structure. It consists of a grid of positions where some positions contain a hash symbol (#) and others contain a vertical bar (|). The symbols are arranged in a way that suggests a banded or sparse pattern, with most positions being empty. The symbols are distributed across the grid, with some appearing in pairs (one # and one |) and others appearing alone.





by Yusuke Endoh

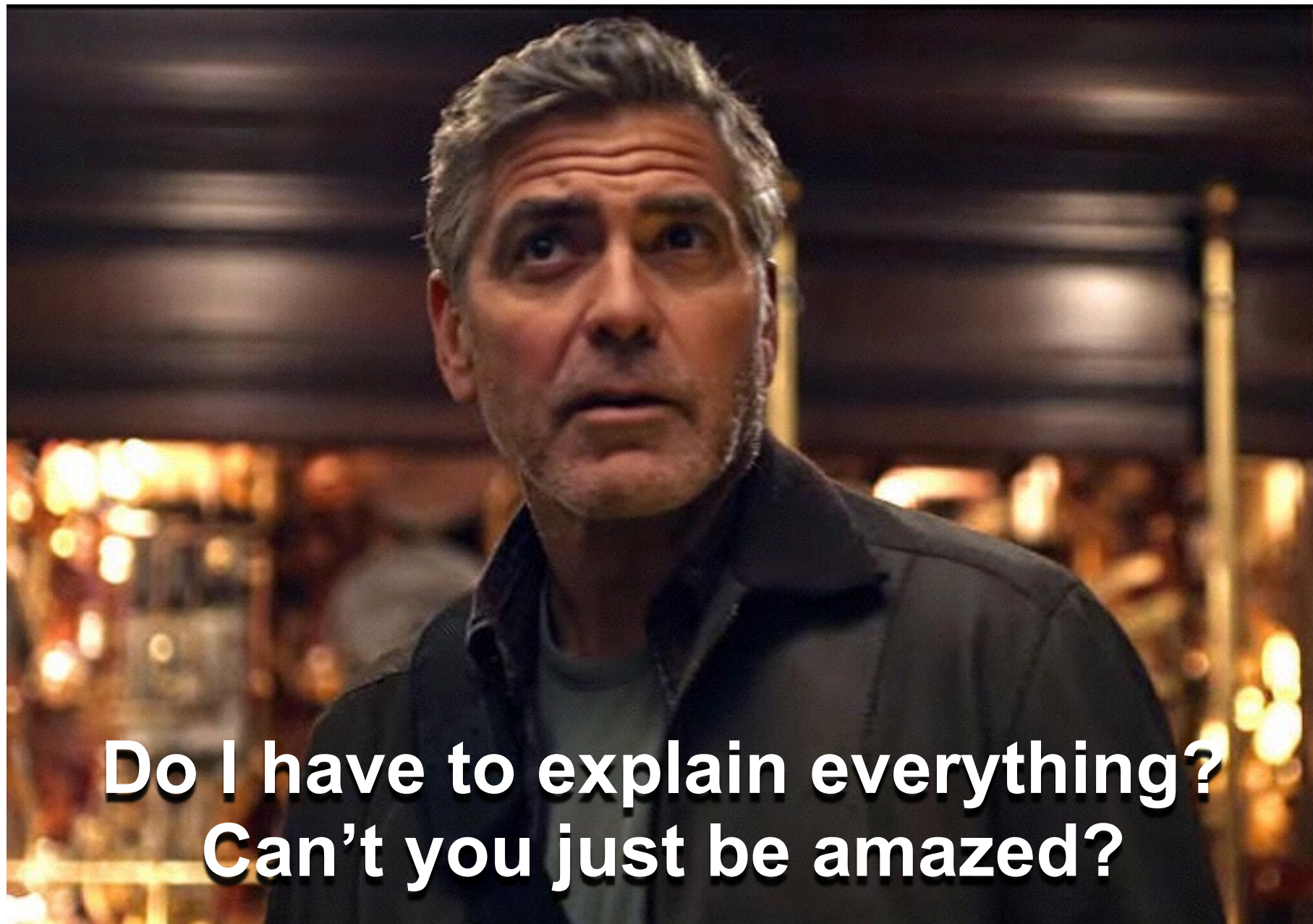


Demo

Key **TRICKs** / Exploits

- Quine + music box
- Frequency modulation synthesis
- Uses sound server e.g. PulseAudio

Dissection



“Most **R**eadable”

```
begin with an easy program.  
you should be able to write  
a program unless for you,  
program in ruby language is  
too difficult. At the end  
of your journey towards the  
ultimate program; you must  
be a part of a programming  
language. You will end if  
you != program
```

by Shinichiro Hamaji



Demo

Key **TRICKS** / Exploits

```
begin with an easy program.  
you should be able to write  
a program unless for you,  
program in ruby language is  
too difficult. At the end  
of your journey towards the  
ultimate program; you must  
be a part of a programming  
language. You will end if  
you != program
```

- begin .. end if false
- for statement for defining variables

Dissection

whitequark/parser



AST



mbj/unparser

```
begin
```

```
  with an easy program.you  
  should be able to write
```

```
  a program unless for you,  
program in ruby language is  
too difficult. At the end
```

```
  of your journey towards the  
ultimate program;  
you must  
be a part of a programming  
language. You will
```

```
end if you != program
```

```
begin
```

```
  with(an(easy(program.you(should(be(able(to(write))))))))
```

```
  unless (for you, program in ruby(language(is)) do  
    too(difficult.At(the))
```

```
  end)
```

```
    a(program())
```

```
  end
```

```
  of(your(journey(towards(the))))
```

```
  ultimate(program)
```

```
  you(must)
```

```
  be(a(part(of(a(programming)))))
```

```
  language.You(will)
```

```
end if (you != program)
```

“Best Pangram”

```
!@THEqQUICKbBROWNfFXjJMPSvVLAZYDGgkyz&[%r{"}mosx,4>6]|?'while(putc  
3_0-~$.+=9/2^5;)<18*7and:`#
```

by Kinaba



Demo

What's a Pangram

- a sentence using every letter of the alphabet at least once

Key **TRICKs** / Exploits

- Contains & Prints ASCII Character from 0x20 to 0x7e exactly once
- $0x20_{16} = 32_{10} \quad \dots \quad 0x7e_{16} = 126_{10}$
- `!"#$%&'()*+,-./0123456789:;<=>?`
`@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a`
`bcdefghijklmnopqrstuvwxyz{|}~`

Key **TRICKs** / Exploits

- `32.upto(126){|x| puts x}`
- `$.`
- `3_0 = 30`
- Escape quotes as `\` and `'` and `:`

Dissection

```
!@THEqQUICKbBROWNfFXjJMPSvVLAZYDGgkyz&[%r{"}mosx,4>6]|?'while(putc  
3_0-~$.+=9/2^5;)<18*7and:`#
```

```
while ((putc(30 - (~($. += ((9 / 2) ^ 5)))) < (18 * 7)) && :`)  
  ((!@THEqQUICKbBROWNfFXjJMPSvVLAZYDGgkyz) & [/"mosx, (4 > 6)]) | "'"  
end
```

Most Interesting Part

```
3_0-~$.+=9/2^5;)<18*7
```

\$. => 1 # ruby golfer's best friend

Google Search Term:
“trick 2013 rubykaigi”

<https://github.com/tric/trick2013>

Upcoming **TRICK**

<https://github.com/tric/trick2015>