

aesthetic
programming
with Ruby

Sam Aaron

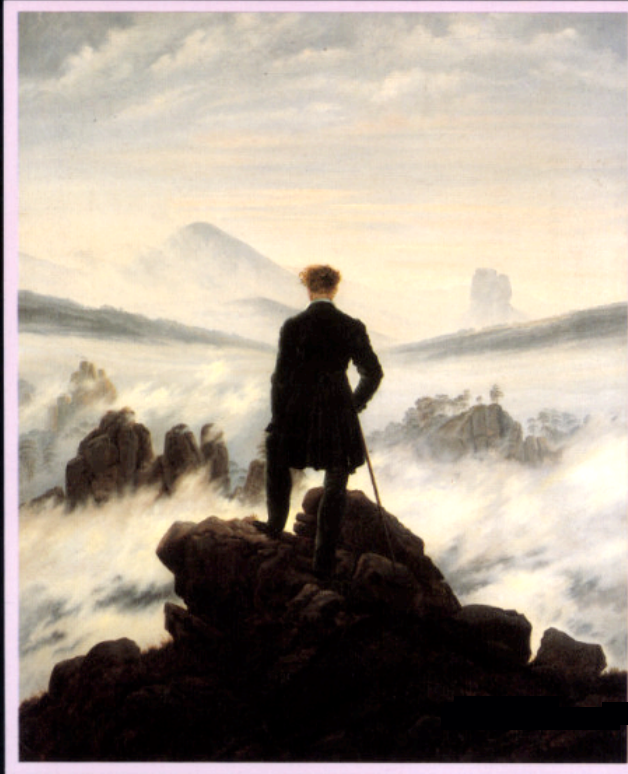


INNOVATION FACTORY



aesthetics

THE IDEOLOGY OF THE AESTHETIC



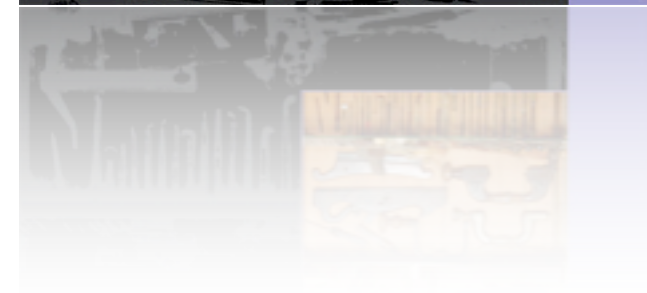
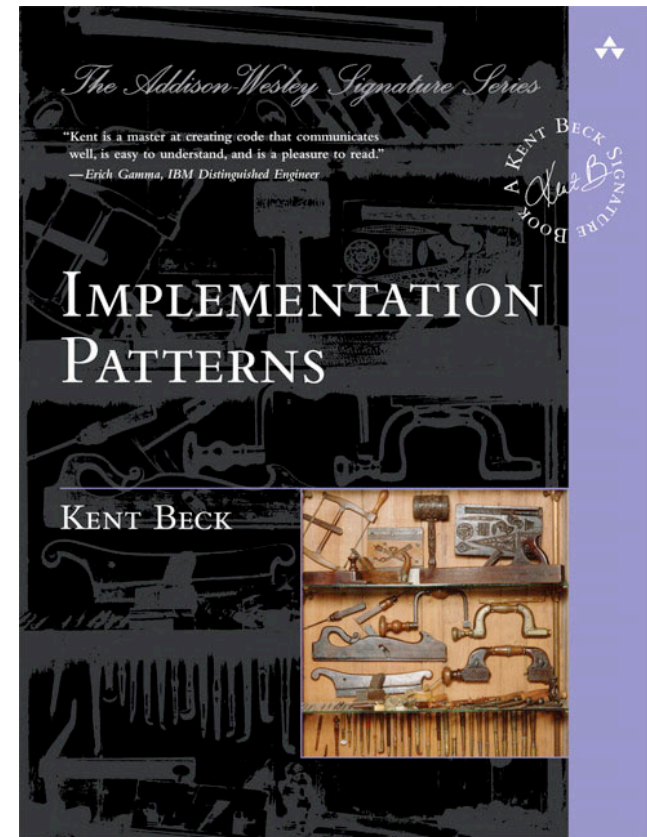
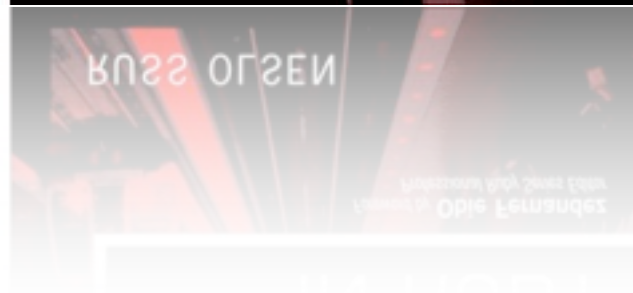
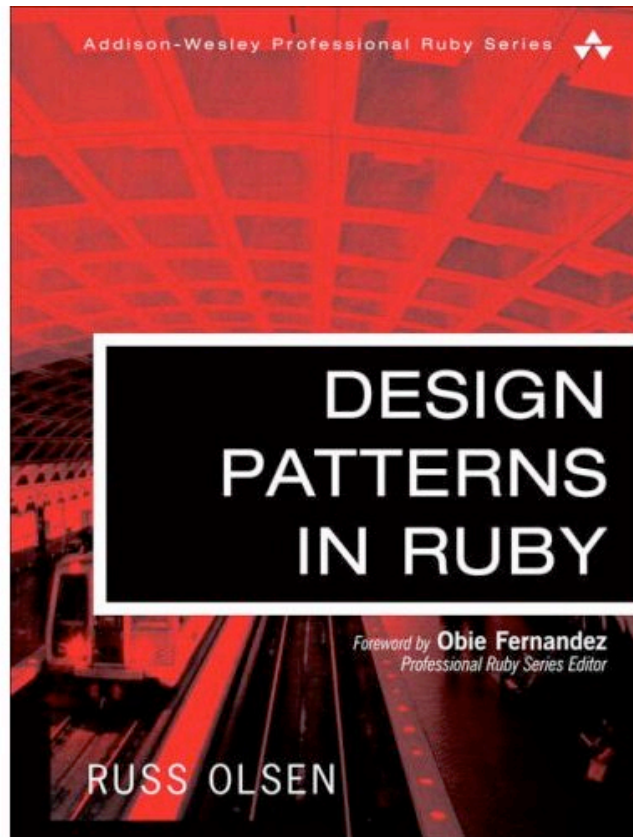
Terry Eagleton

LEILA EAGLETON



"The aesthetic is at once, as I try to show, the very secret prototype of human subjectivity in early capitalist society, and a vision of human energies as radical ends in themselves which is the implacable enemy of all dominative or instrumentalist thought".

Terry Eagleton



aes•thet•ic | es' θ etik | (also **es•thet•ic**)

adjective

concerned with beauty or the appreciation of beauty : *the pictures give great aesthetic pleasure.*

- giving or designed to give pleasure through beauty; of pleasing appearance.

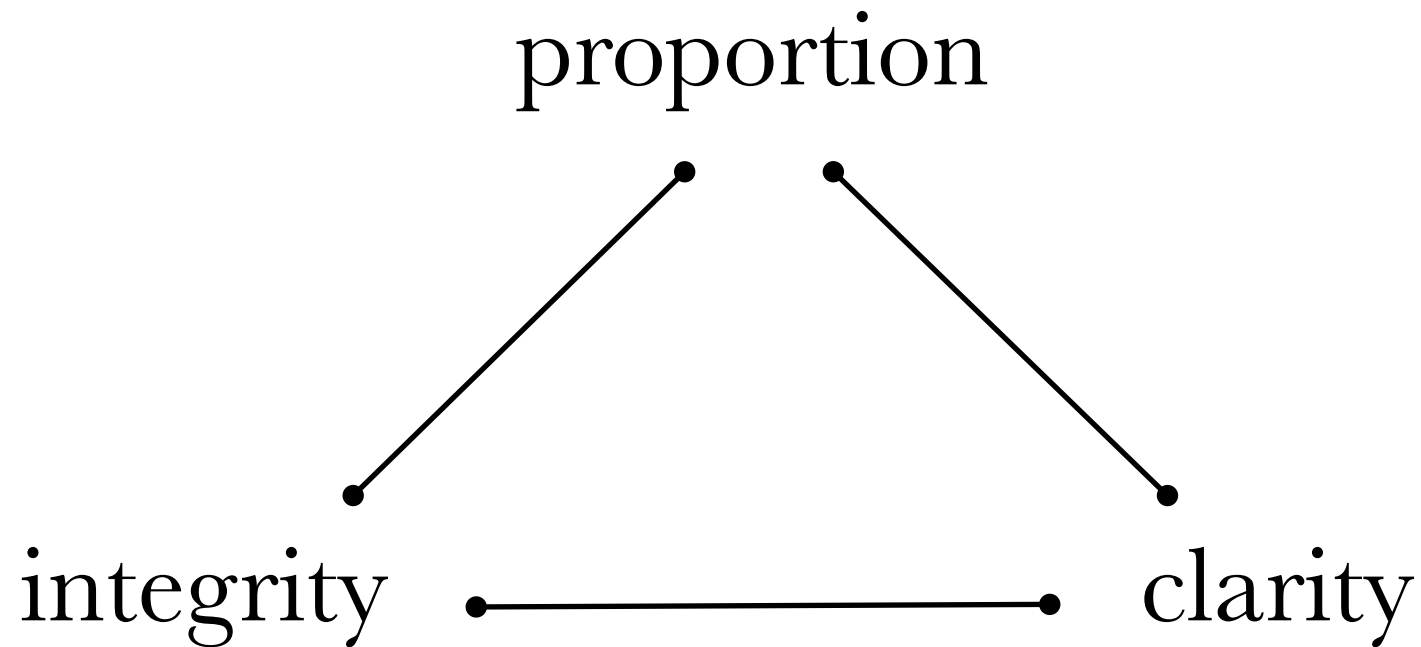


“Good software = beautiful software”
Marcel Molina Jr

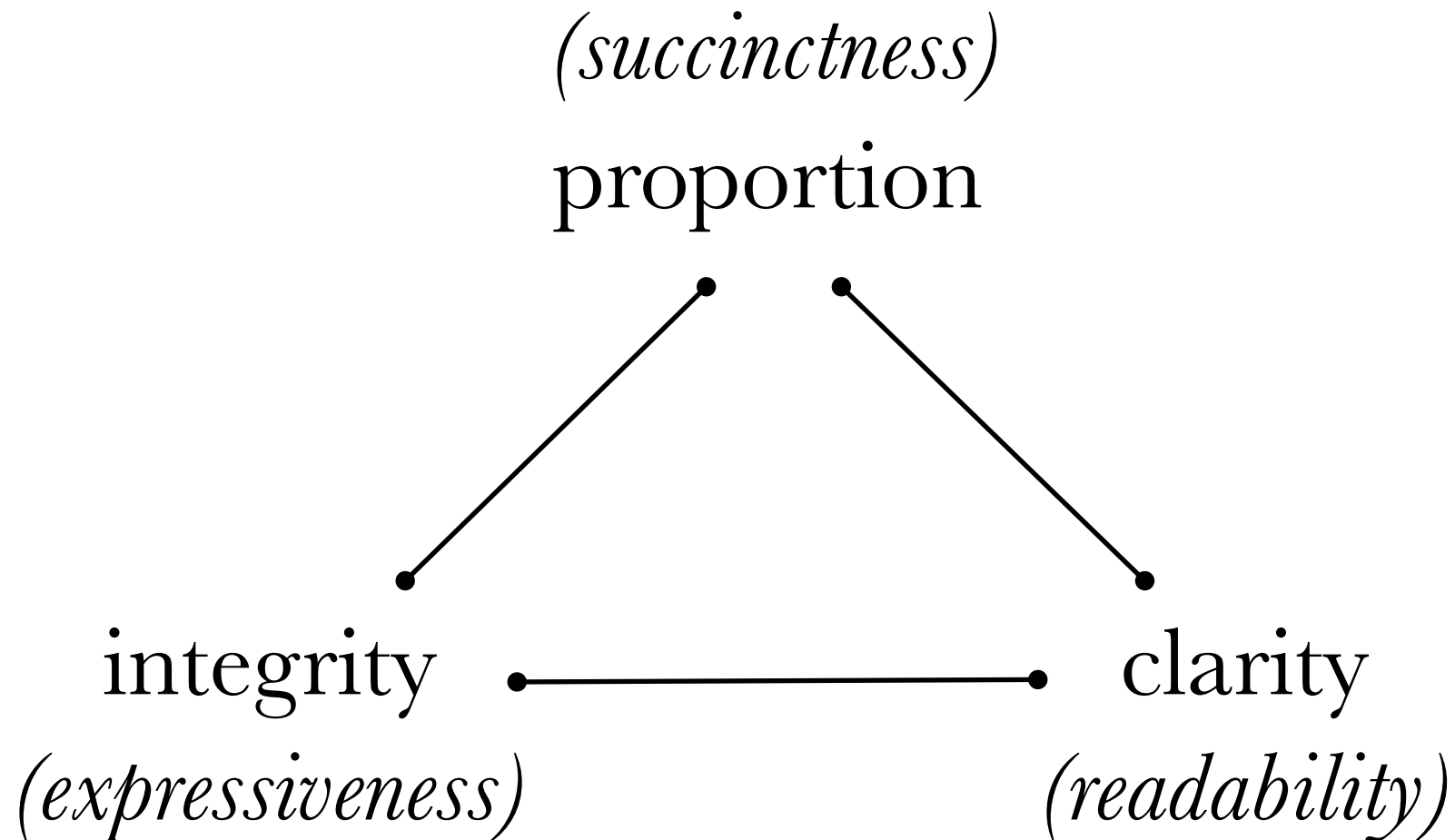
Thomas Aquinas



Thomas Aquinas: *definition of beauty*



Thomas Aquinas: *definition of beauty*



/\A([\w\.\-\+]+)@((?:[-a-z0-9]+\.)+[a-z]{2,})\z/i

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

MULTIPLY B BY B GIVING B-SQUARED.

MULTIPLY 4 BY A GIVING FOUR-A.

MULTIPLY FOUR-A BY C GIVING FOUR-A-C.

SUBTRACT FOUR-A-C FROM B-SQUARED GIVING RESULT-1.

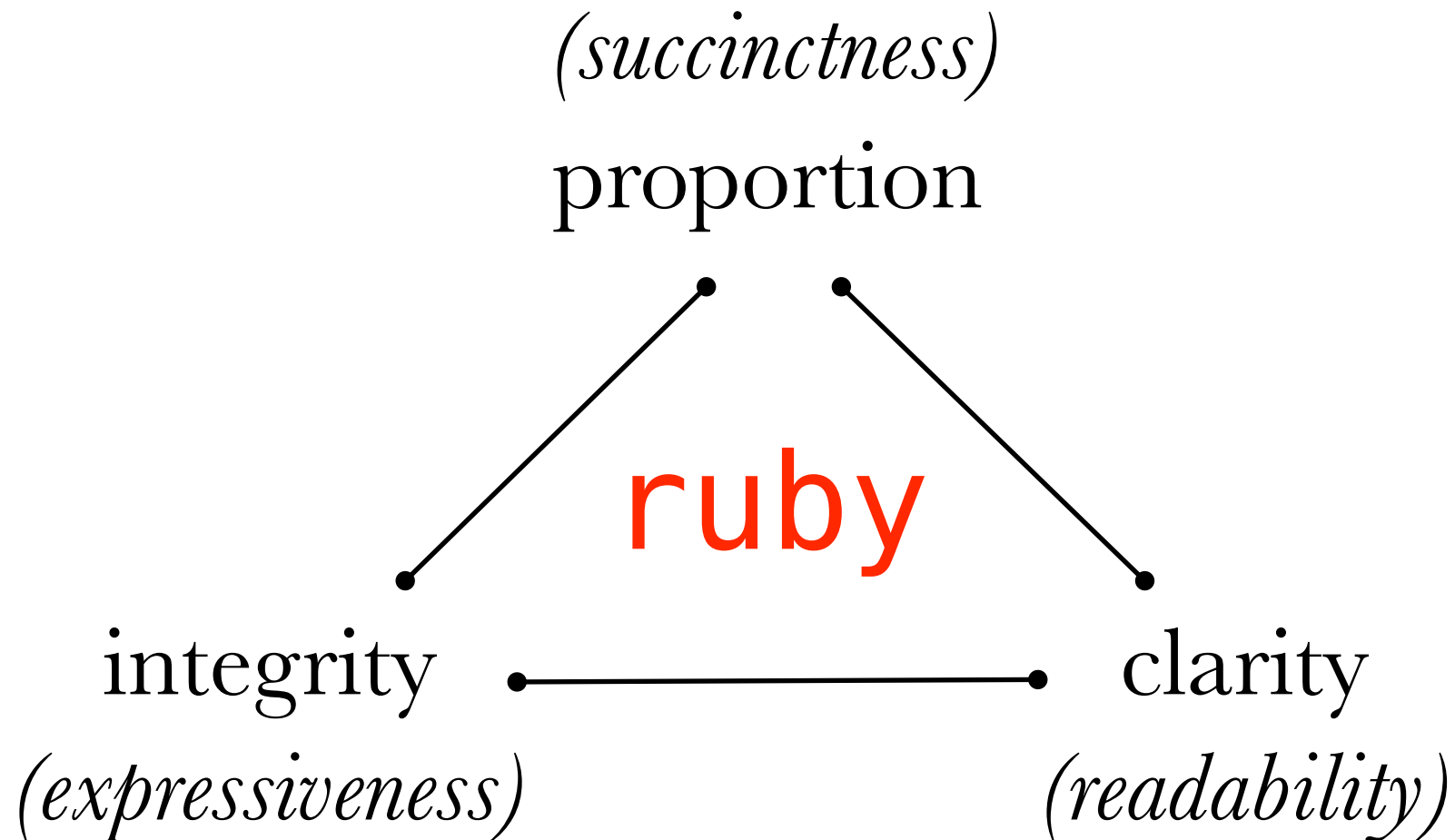
COMPUTE RESULT-2 = RESULT-1 ** .5.

SUBTRACT B FROM RESULT-2 GIVING NUMERATOR.

MULTIPLY 2 BY A GIVING DENOMINATOR.

DIVIDE NUMERATOR BY DENOMINATOR GIVING X.

Thomas Aquinas: *definition of beauty*



expressiveness

poetry

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

```
def you are  
  false  
end
```

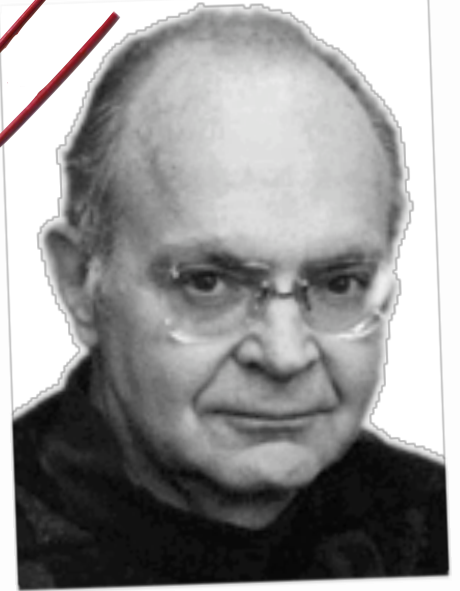
```
enjoy life while you /can/
```



```
"eyes".scan /the_darkness/  
catch( :in_the_wind ) { ?a.round; "breath" \  
    or "a".slice /of_moon/ }
```

“Treat a program as a piece of literature, addressed to human beings rather than to a computer”.


Donald Knuth



ORIGIN late 18th cent. (in the sense [relating to perception by the senses]): from Greek *aisthētikos*, from *aisthēta* '*perceptible things*,' from *aisthesthai* '*perceive*.' The sense [concerned with beauty] was coined in German in the mid 18th cent. and adopted into English in the early 19th cent., but its use was controversial until late in the century.

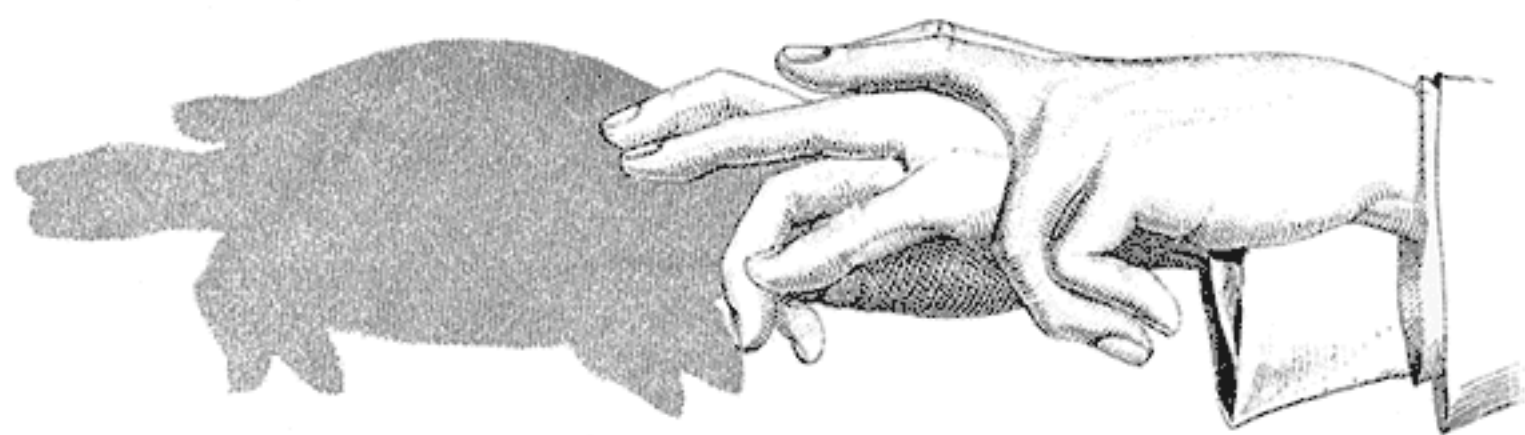
relating to perception by the senses

HAND
SHADOWS



HENRY 139 **BURSILL**

GRIFFITH & FARRAN
CORNER OF ST. PAUL'S CHURCH YARD



A TORTOISE.

W. B. Barvill Inc. & Co.



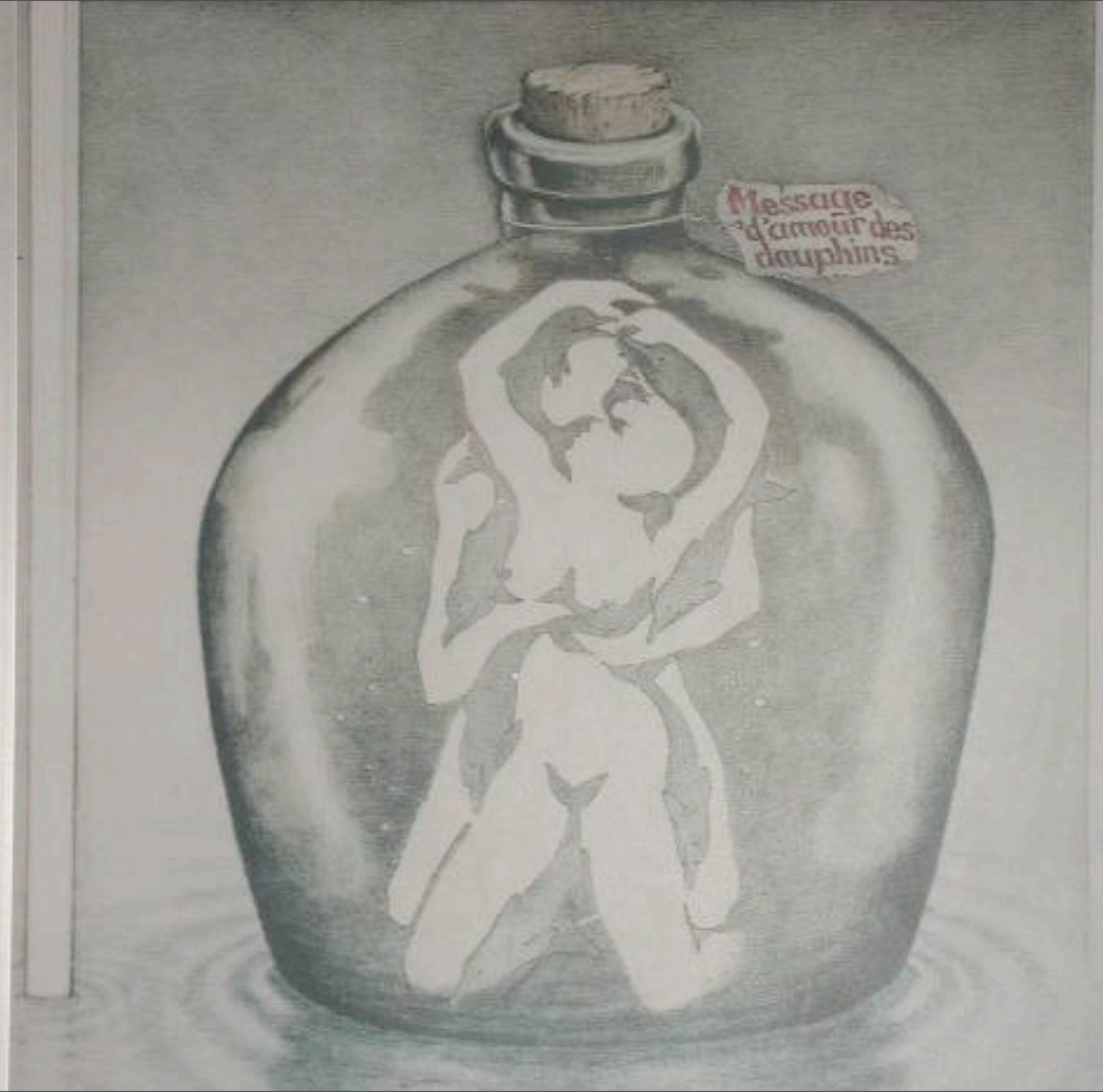
BOY.

W. Bursill Invt. & Engr.



HEAD OF A CANE.

H. Burdill Int. & Co. Del.



perception = thought(language, context)

perception = thought(language, self)

perception = you.think(language)

```
perception      = you.think(language)  
my_perception  = sam.think(language)
```


audiences

programmers



audiences

programmers

audiences

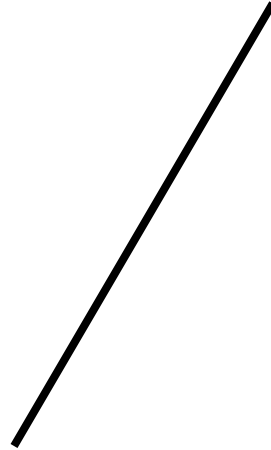
users

maintainers

programmers

audiences

users



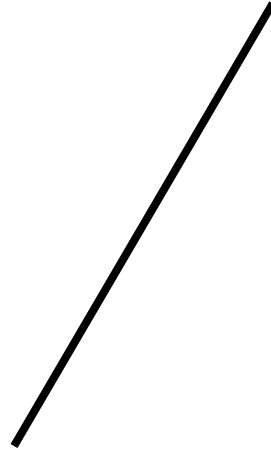
maintainers

programmers

tests

audiences

users



pair-programmers

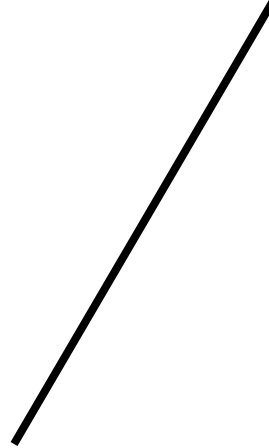
programmers

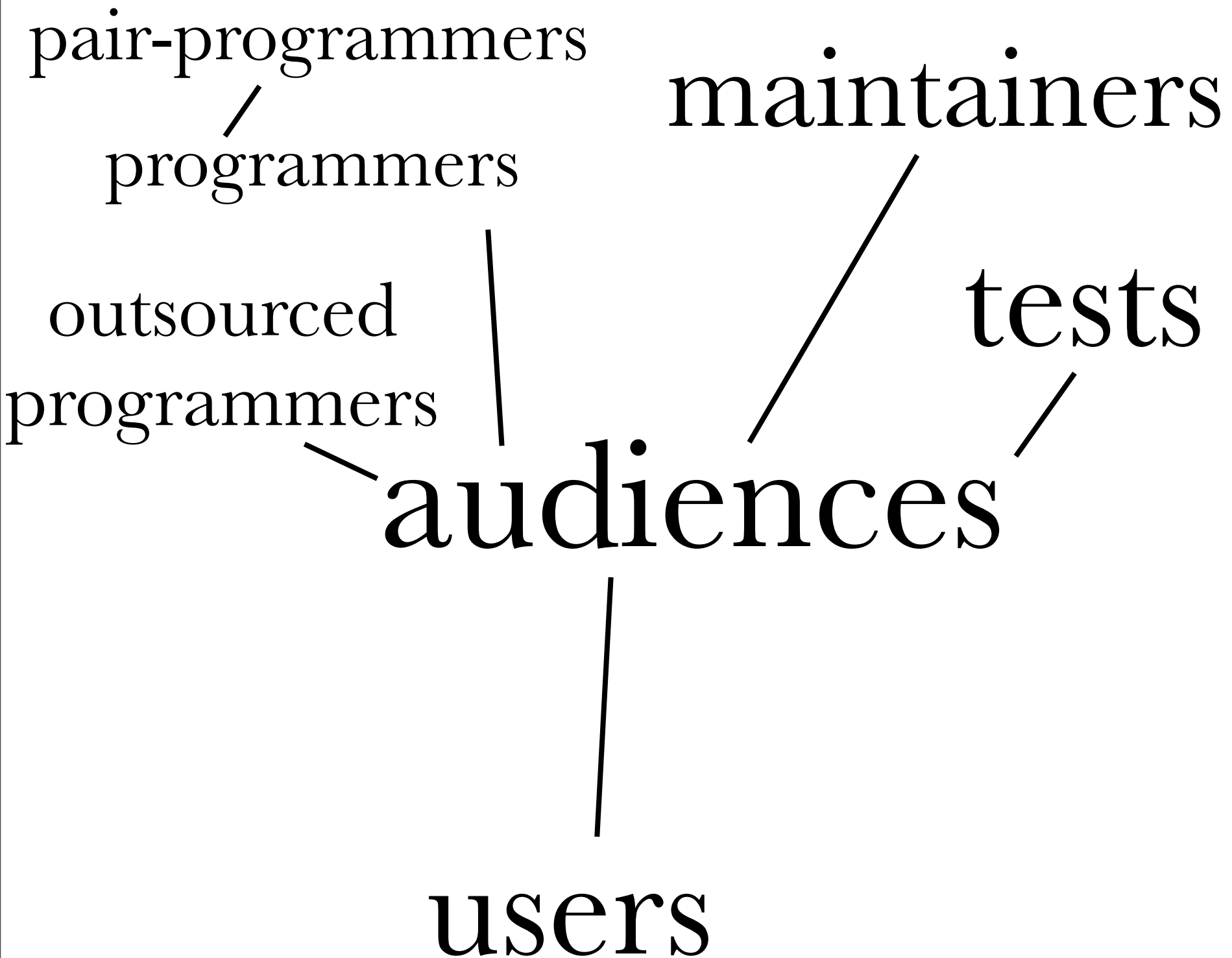
maintainers

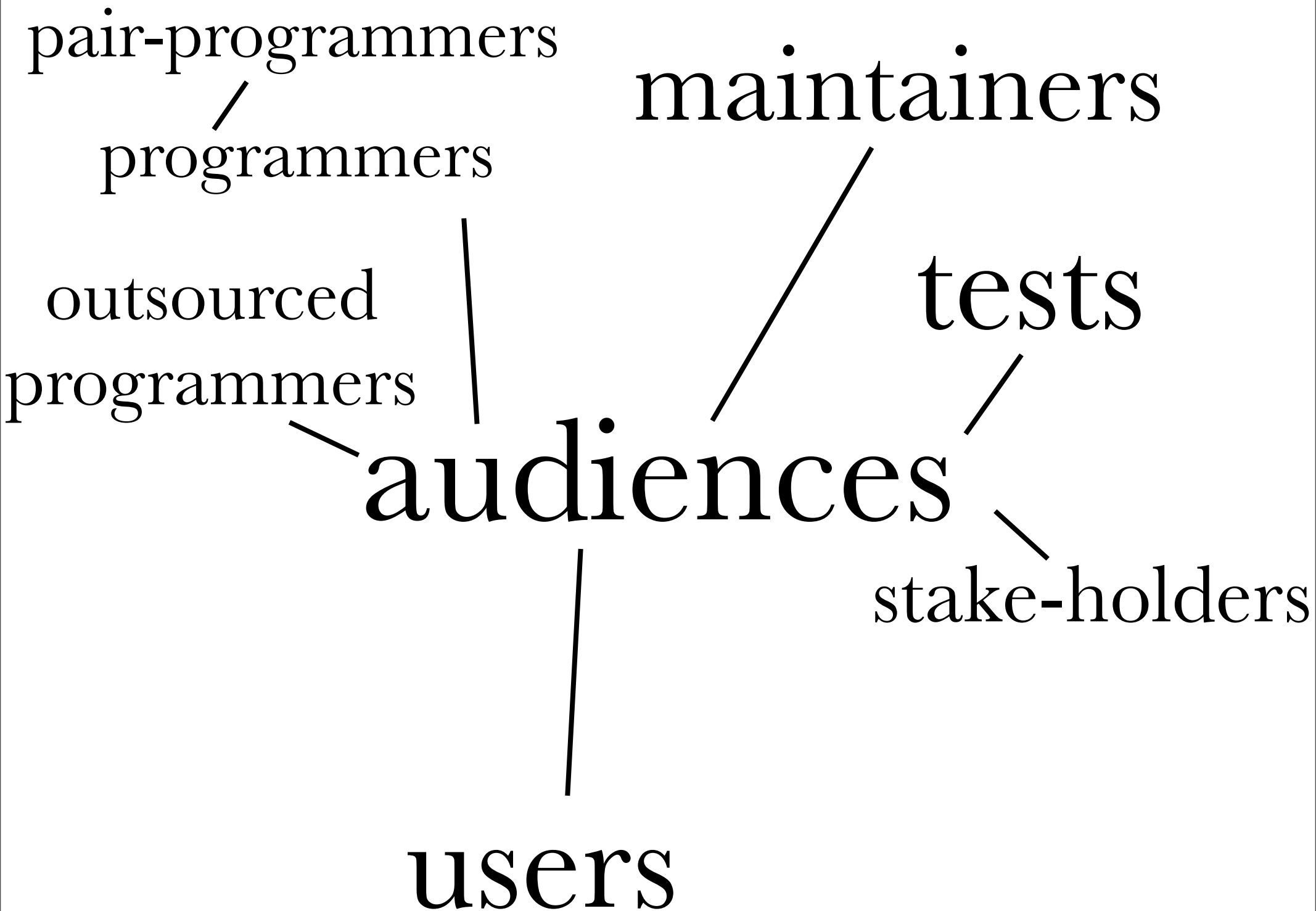
tests

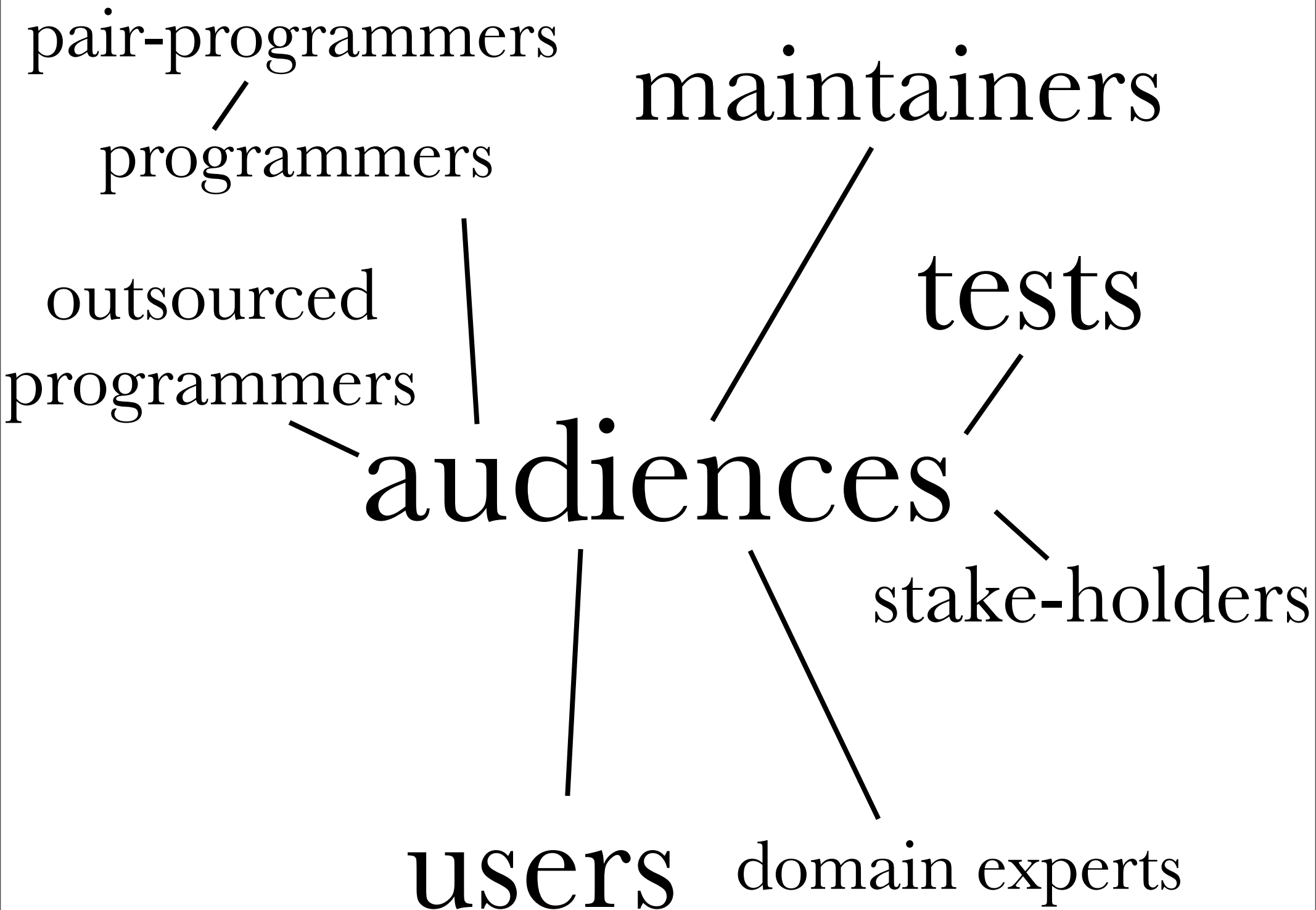
audiences

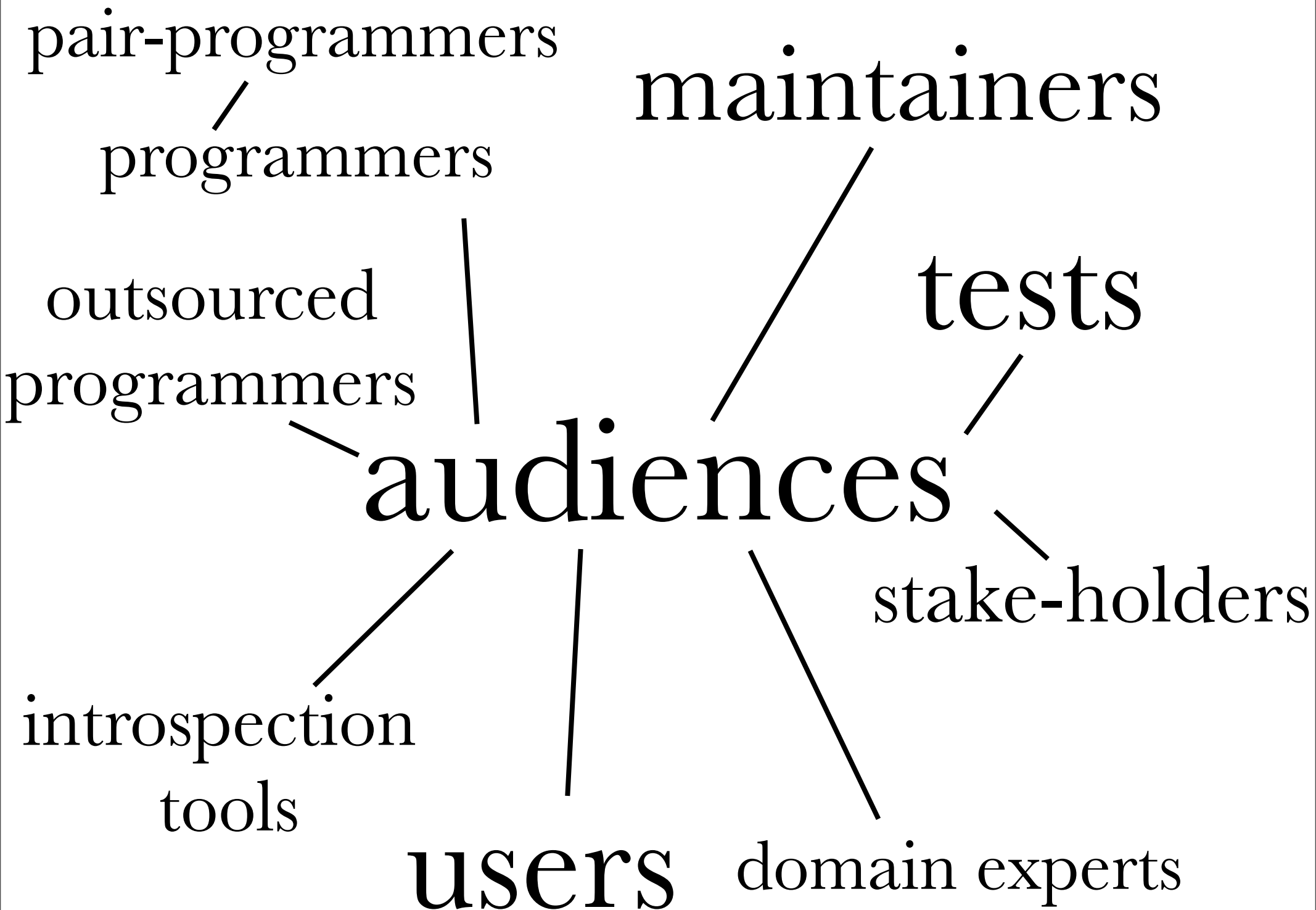
users

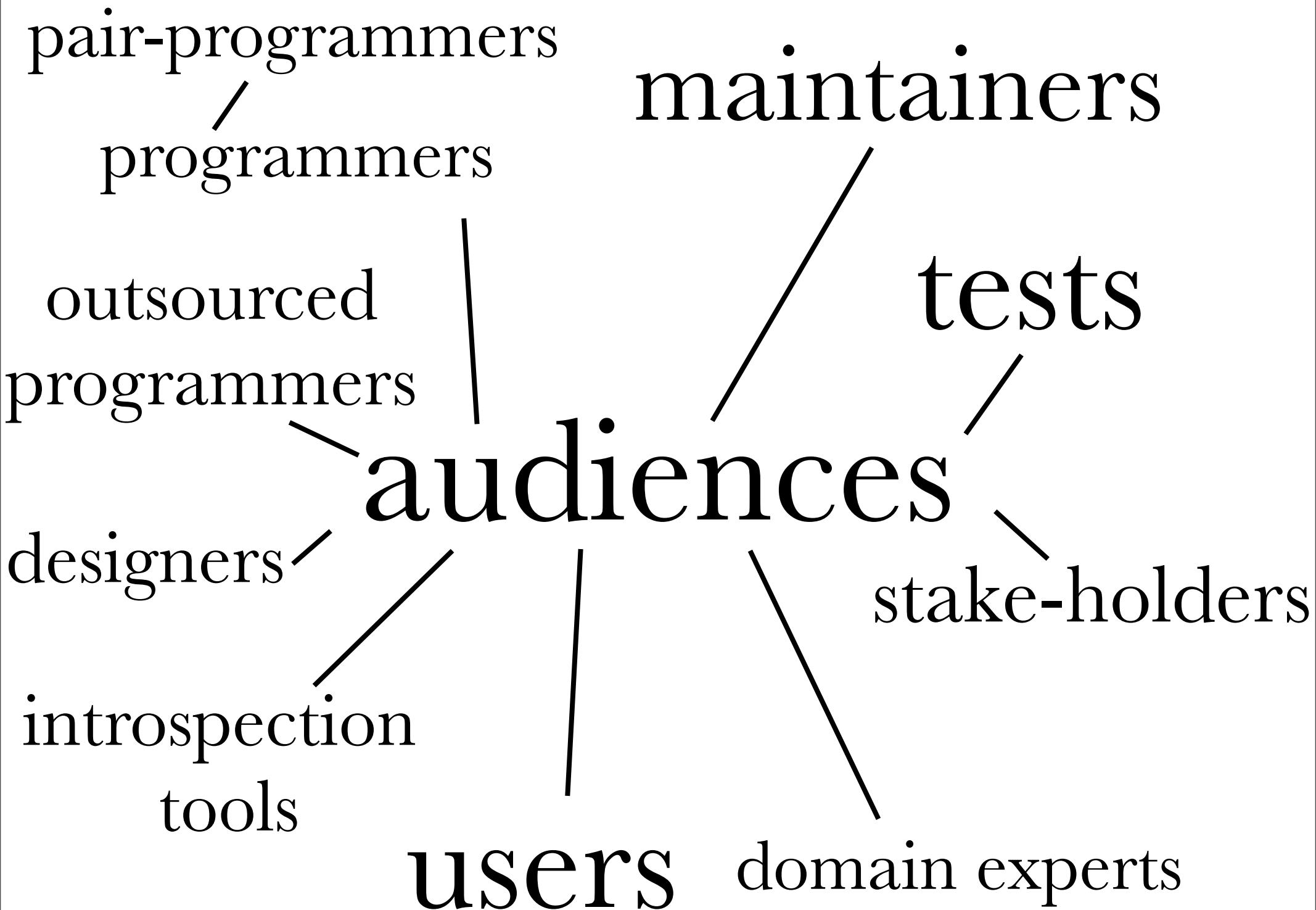


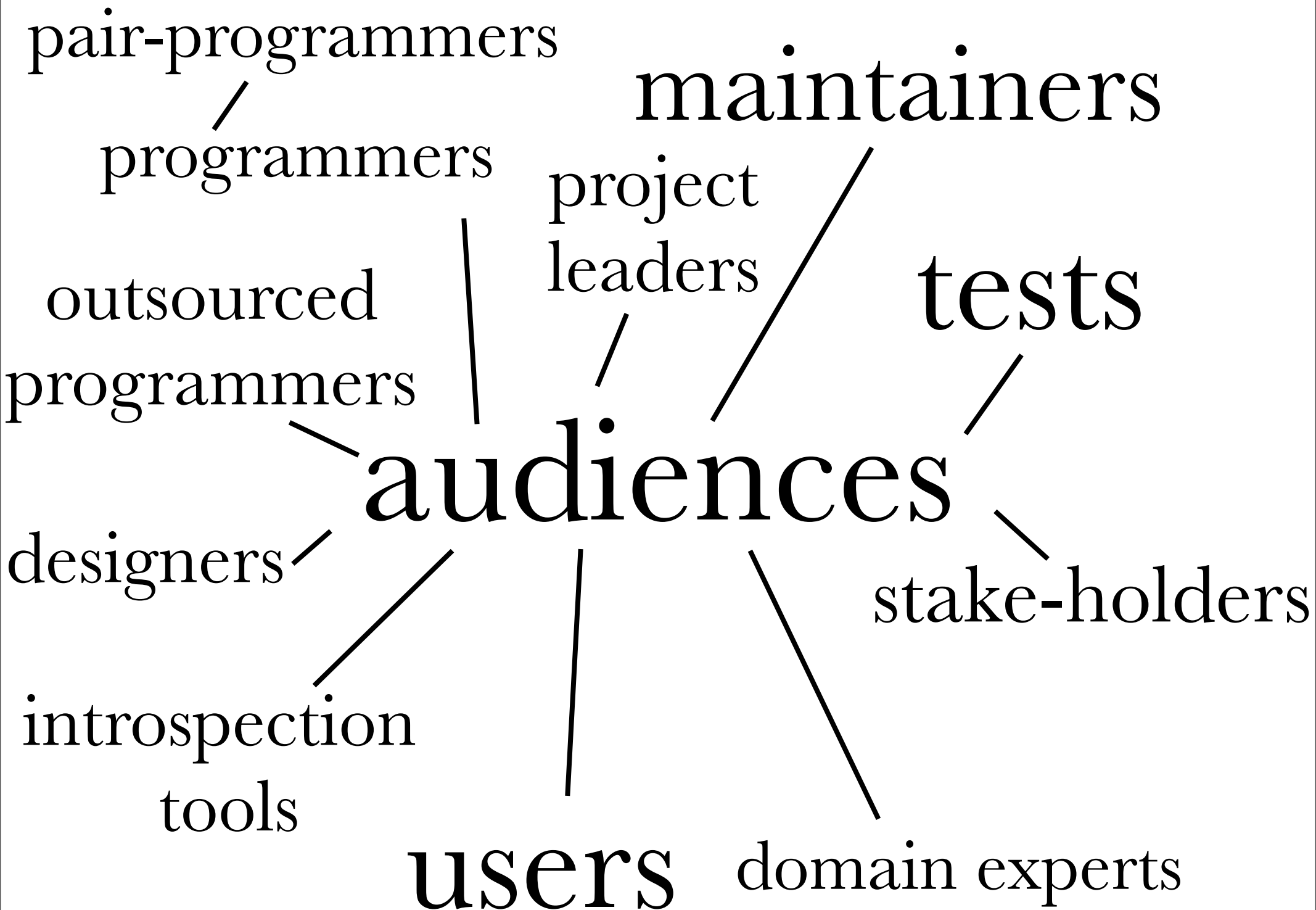










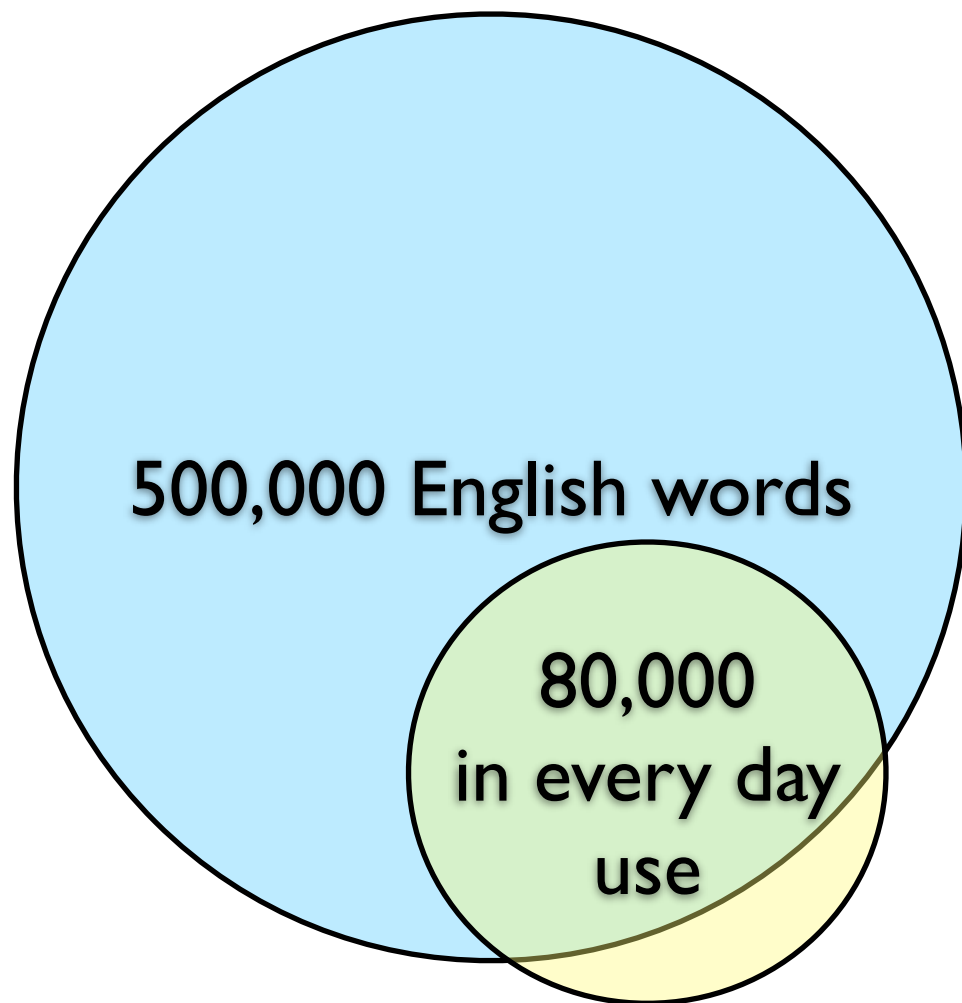


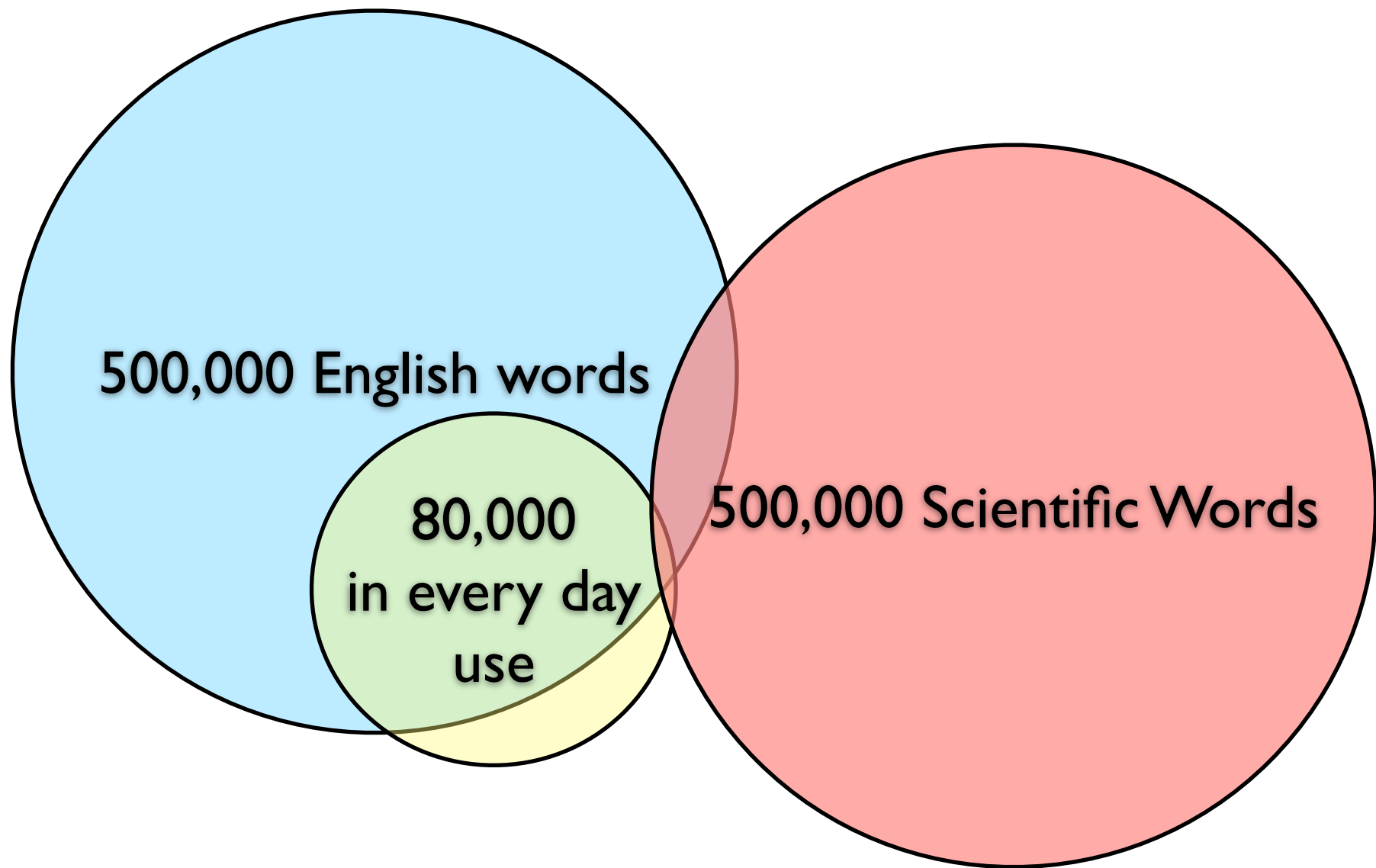
language

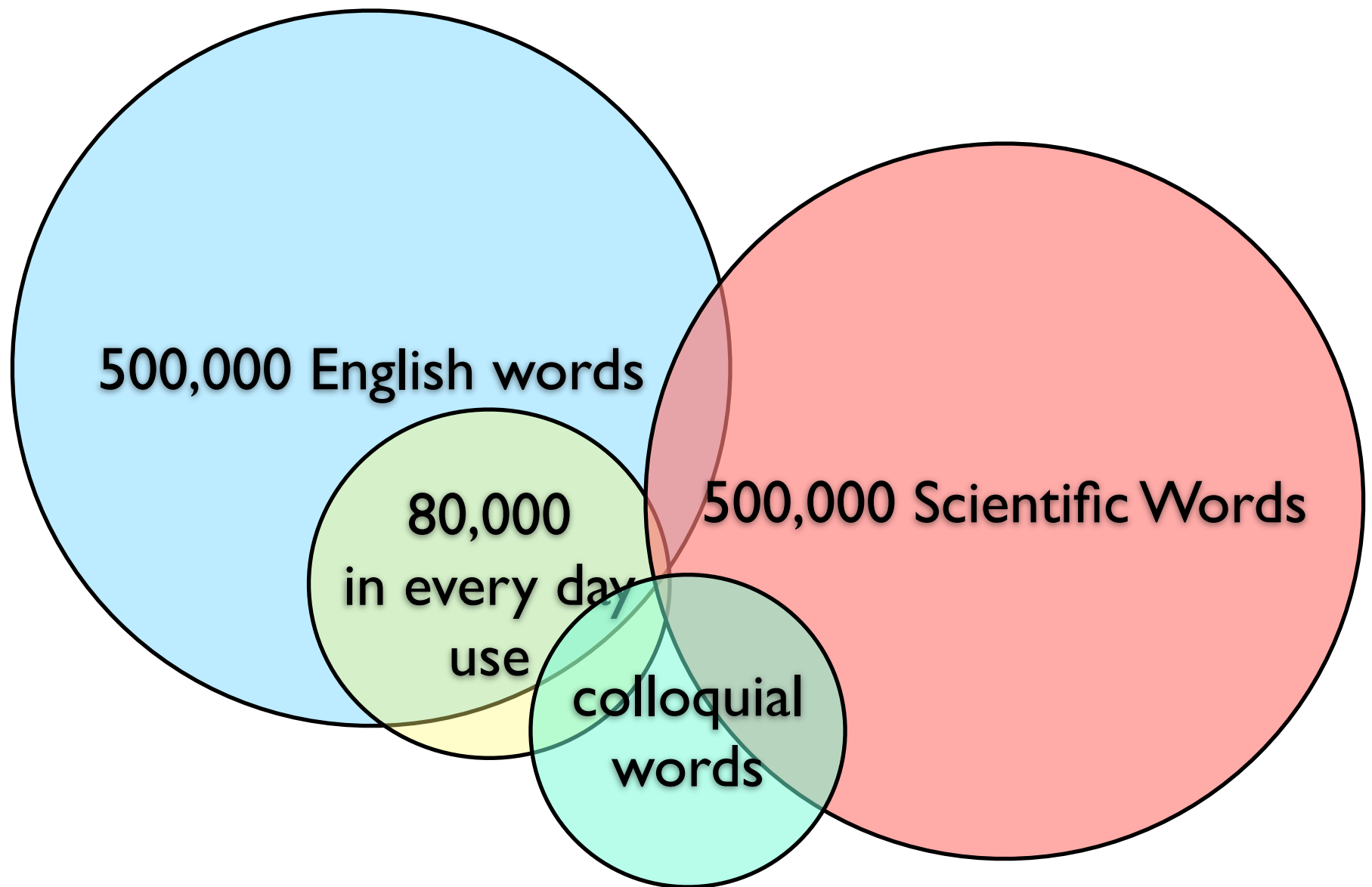
literacy



500,000 English words

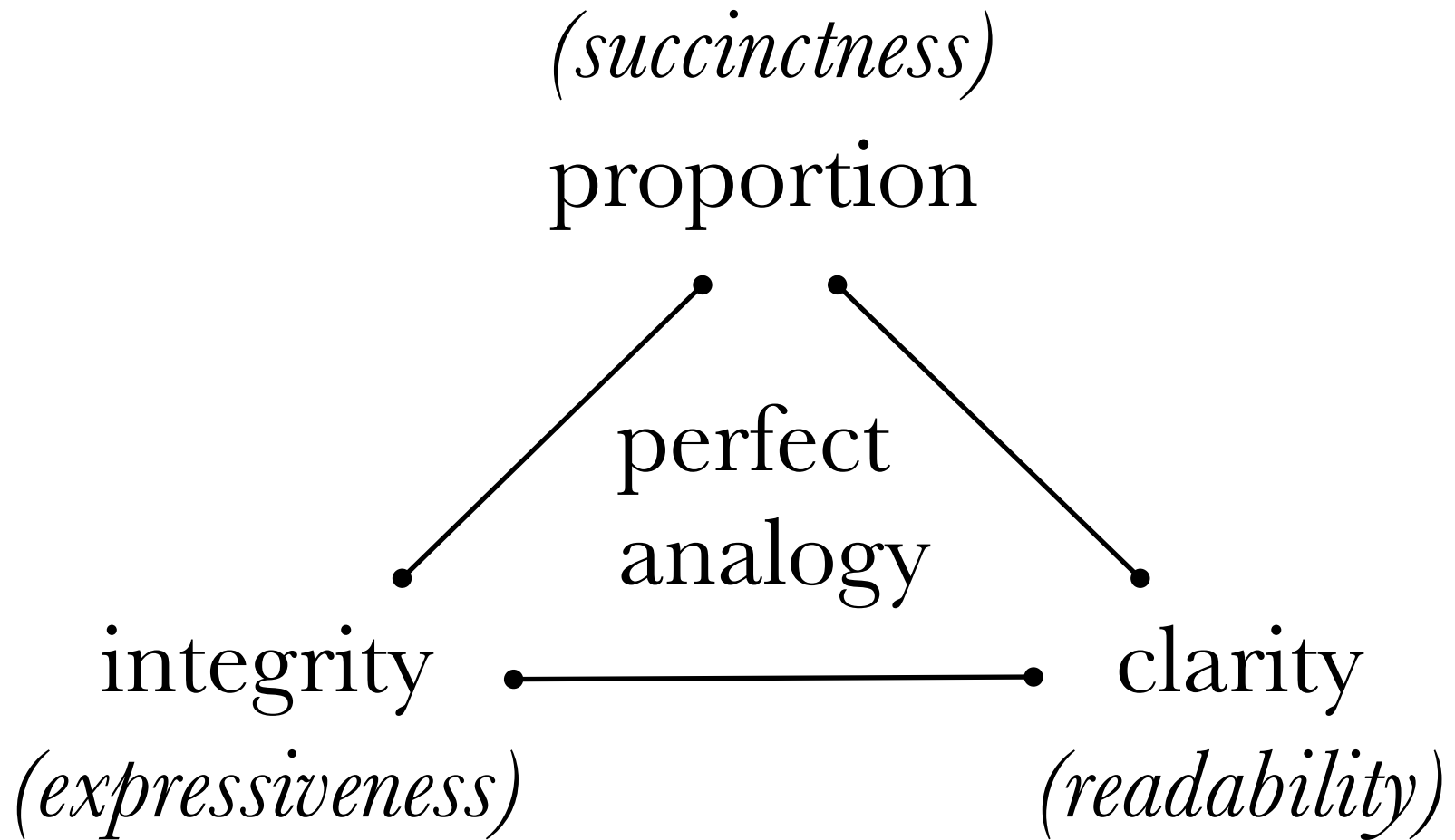








analogy



isomorphisms

The pq-System

p q -

Axiom

$$xp - qx -$$

$x p - q x -$

$-p - q - -$

$x \rightarrow -$

$--p - q - - -$

$x \rightarrow - -$

$---p - q - - - -$

$x \rightarrow - - -$

Rule

$$xpyqz \Rightarrow xpy-qz-$$

$$xpyqz \Rightarrow xpy-qz-$$

$$-p-q-- \quad \text{Axiom 1}$$

$$-p---q----$$

$$-p----q-----$$

$$xpyqz \Rightarrow xpy-qz-$$

$$---p-q----- \quad \text{Axiom 3}$$

$$---p--q-----$$

$$---p---q-----$$

-p-q--

--p-q---

---p-q----

---p--q-----

-p---q----

---p---q-----

-p----q-----

isomorphisms
induce
meaning

code

```

require 'open-uri'; require 'rubygems'; require 'hpricot'
url, save_as = *ARGV
KEEPVID = URI(Hpricot(URI("http://keepvid.com/").read).
               at("form")['action'])

```

```

Net::HTTP.start(KEEPVID.host, KEEPVID.port) do |http|
  doc = Hpricot(http.post(KEEPVID.path, "url=#{url}&site=aa").body)
  url = URI((doc/:%a).detect{|x| x.next_node.to_s.index(".flv - Flash")}['href'])
end

```

```

Net::HTTP.start(url.host, url.port) do |http|
  http.request_get(URI.request_uri, {'User-Agent' => 'ruby', 'Host' => url.host}) do
    |r|
    File.open(save_as, 'wb') do |f|
      len = 0
      r.read_body do |chunk|
        f.write(chunk)
        len += chunk.length
        print "%30s / %d of %d / %0.1f%%\r" %
          [save_as, len, r.content_length, ((len * 1.0) / r.content_length) * 100]
      end
    end
  end
end
end

```

```

%w[tempfile uri].map{|l|require l};class Object;def meta_def m,&b;(class<<self
self end).send(:define_method,m,&b end end;module Camping;C=Self
S=IO.read(____FILE____)rescue nil;P=<h1>Cam\ping Problem!</h1><h2>4s</h2>
class H<Flash
def method_missing m,*a;m.to_s==~/$/?self['$']=a[0]:a==[]?self[m.to_s]:super end
alias u merge!;undef id,type;end;module Helpers;def R c,*g
p,h=/(.+?)/,g.grep(Hash);g->h;raise"bad route"unless u=c.urls.find{|x|
break x if x.scan(p).size==g.size&&~/#{x}/7$/||(x-g.inject(x){|x,a|
x.sub p,C.escape([a[a.class.primary_key]rescue a])})}
h.any?? u+"?"*h[0].map{|x|x.map{|z|C.escape z}=="*"}*C":u and;def / p
p[/^\/?/?@root+p:p end;def URL c="/",*a;c=R(c,*a) if c.respond_to?:urls
c=Self/c;c=~/^/*@env.HTTP_HOST+c if c[/^\/?/?@URI c end end;module Base
attr_accessor:input,:cookies,:env,:headers,:body,:status,:root;Z="\r\n"
def method_missing *a,&b;a.shift if a[0]==:render;a=Mab.new({},self)
s=m.capture(send(*a,&b));s=m.capture(send(:layout){s})if/^/!-a[0].to_s and
m.respond_to?:layout;s end;def r s,b,h={};@status=s;headers.u(h);@body=b
end;def redirect *a;r 302,"","Location"=>URL(*a)end;def r404 p=env.PATH
r 404,P+"#{p} not found"end;def r500 k,m,x
r 500,P+"#{k}.#{m}"+<h3>#{x.class} #{x.message}: <ul>#{x.
backtrace.map{|b|<li>#{b}</li>}</ul></h3>"end;def r501 m=@method
r 501,P+"#{m.upcase} not implemented"end;def to a
[status,body,headers]end;def initialize r,e,m;@status,@method,@env,@headers,
@root=200,m,e,H['Content-Type','text/html'],e.SCRIPT_NAME.sub(/\/$/,'')
@k=C.kp e.HTTP_COOKIE;q=C.qsp e.QUERY_STRING;@in=r;case e.CONTENT_TYPE
when/\r\nmultipart/form-.boundary=~^7([^\";,])+n
b=/(?:\r?\n|\A)#{Regexp.quote"--#1"}(?:--)?\r$/;until@in.eof?;fh=H[]
for l in@in;case l;when Z;break;when/^Content-D.+?: form-data;/
fh.u H["$".scan(/(?:\s(\w+)=("[^"]+"))/).flatten]
when/^Content-Type: (.+?)(\r?\n)/m: fh.type = $1 end end;fn=fh.name
o=if fh.filename;o=fh.tempfile=Tempfile.new(:C):o.binmode;else;fh="";end;s=6192
k="";l=@in.read(s*2);while l;if(k<<l)=-b;o<<$'.chomp
@in.seek(-$'.size,IO::SEEK_CUR);break end;o<<k.slice(0...s);l=@in.read(s) end
C.qsp(fn,'&','fh,q)if fn;fh.tempfile.rewind if fh.is_a?H end;when
"application/x-www-form-urlencoded": q.u(C.qsp(@in.read))end
@cookies,@input=@k.dup,q.dup end;def service *a;@body=send @method,*a
headers['Set-Cookie']=cookies.map{|k,v|*k}+#{C.escape(v)}; path=#{self/
"/"}*if v!=@k[k]-[nil];self end;def to_s;"Status: #{@status}#{Z}#{headers.inject({
}){|a,o|[*o[1]].map{|v|a<<[o[0],v]}:" if v&&v.to_s.any?}:a)*Z)+Z+Z)*@body"end
end;X=module Controllers;@r=[];class<<self;def r;@r end;def R *u;r=@r
Class.new(meta_def(:urls){u};meta_def(:inherited){|x|r<<x})end
def D p,m;r.map{|k|k.urls.map{|x|return(k.instance_method(m)rescue nil)?
[k,m,"$-[1..-1]":[I,'r501',m]if p~/^#{x}/7$/};[I,'r404',p]
end;def M;def M;end;constants.map{|c|k=const_get(c)
k.send(:include,C.Base,Helpers,Models;@r=[k]+r if r-[k]==r
k.meta_def(:urls){[/#{c.downcase}]/}if !k.respond_to?:urls}end end;class I<R()
end;self end;class<<self;def goes m
eval S.gsub(/Camping/,m.to_s),TOPLEVEL_BINDING end;def escape s
s.to_s.gsub(/[\^ \w.-]+/n){'%'+'$&unpack('H2'%$&.size)''*%').upcase}.tr' ','+'
end;def un s;s.tr(' ','').gsub(/%{[\da-f]{2}}/in){[$1].pack'H2'}end
def qsp q,d='&','y=nil,z=R[];m=proc{|_,o,n|o.u(n,&m)rescue(/%<n)}
(q.to_s.split(/#{d}+/+<n)-[[]]).inject([b,z,H[]][0]){[h,p|k,v=un(p).
split='',2;h.u k.split(/[\^\/]/+).reverse.inject(y){|v|{x,i|H[i,x]},&m}end
def kp s;c=qsp s,"";end;def run r=$stdin,e=ENV;X.M=e.H[e.to_hash];k,m,*a=X.D e.
PATH_INFO=un("/#{@e.PATH_INFO}").gsub(/\/+/,'/'),
(e.REQUEST_METHOD||'get').downcase
k.new(r,e,m).Y.service(*a);rescue=>x;X::I.new(r,e,'r500').service k,m,x
end;def method_missing m,c,*a;X.M;k=X.const_get(c).new StringIO.new,
H['HTTP_HOST'],'','SCRIPT_NAME','','HTTP_COOKIE'],'),m.to_s
H[a.pop].each{|e,f|k.send"#{e}=",f}if Hash==a[-1];k.service(*a)end end
module Views;include X,Helpers end;module Models;autoload:Base,'camping/db'
def Y;self;end end;autoload:Mab,'camping/mab'end

```

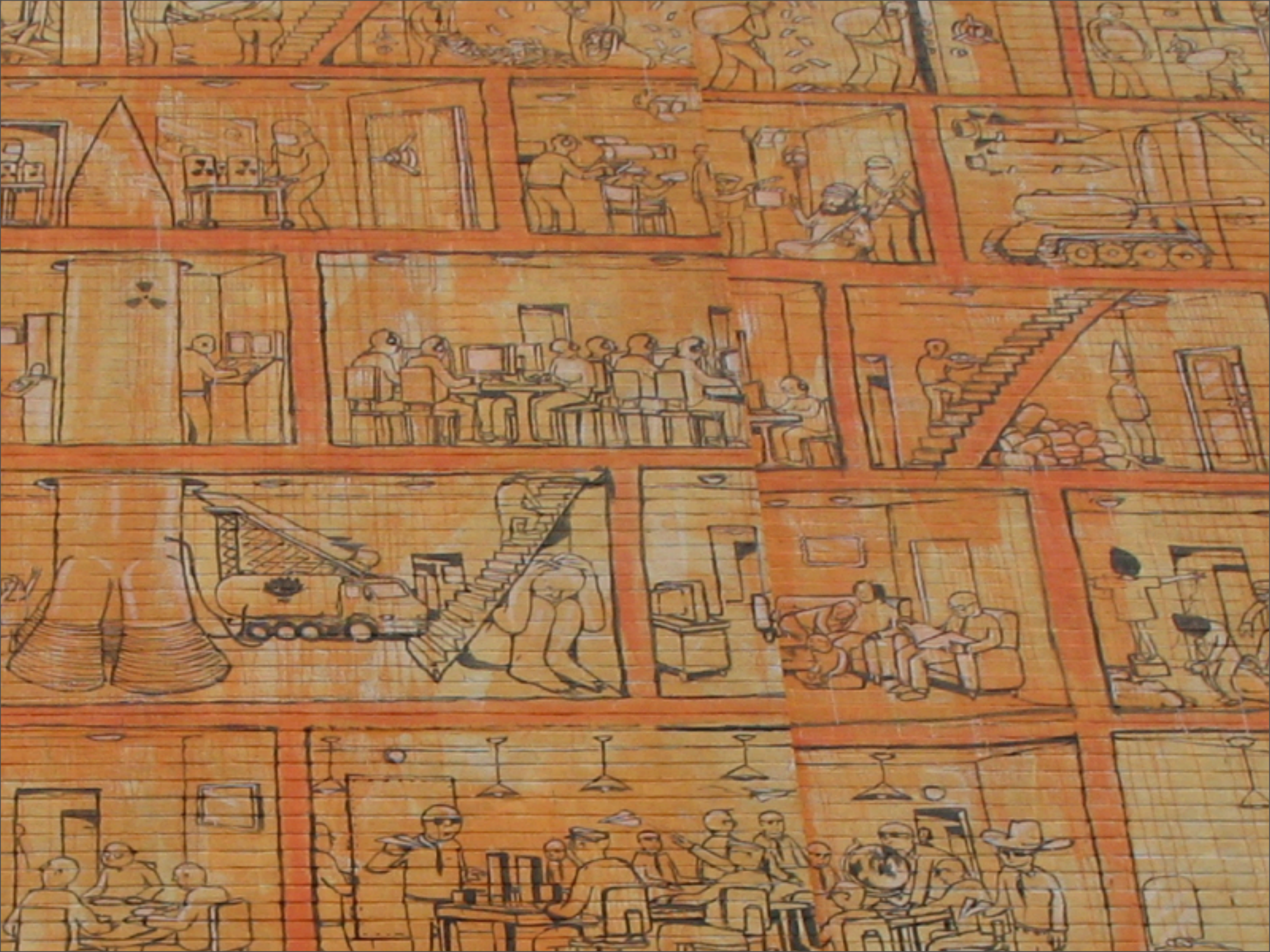


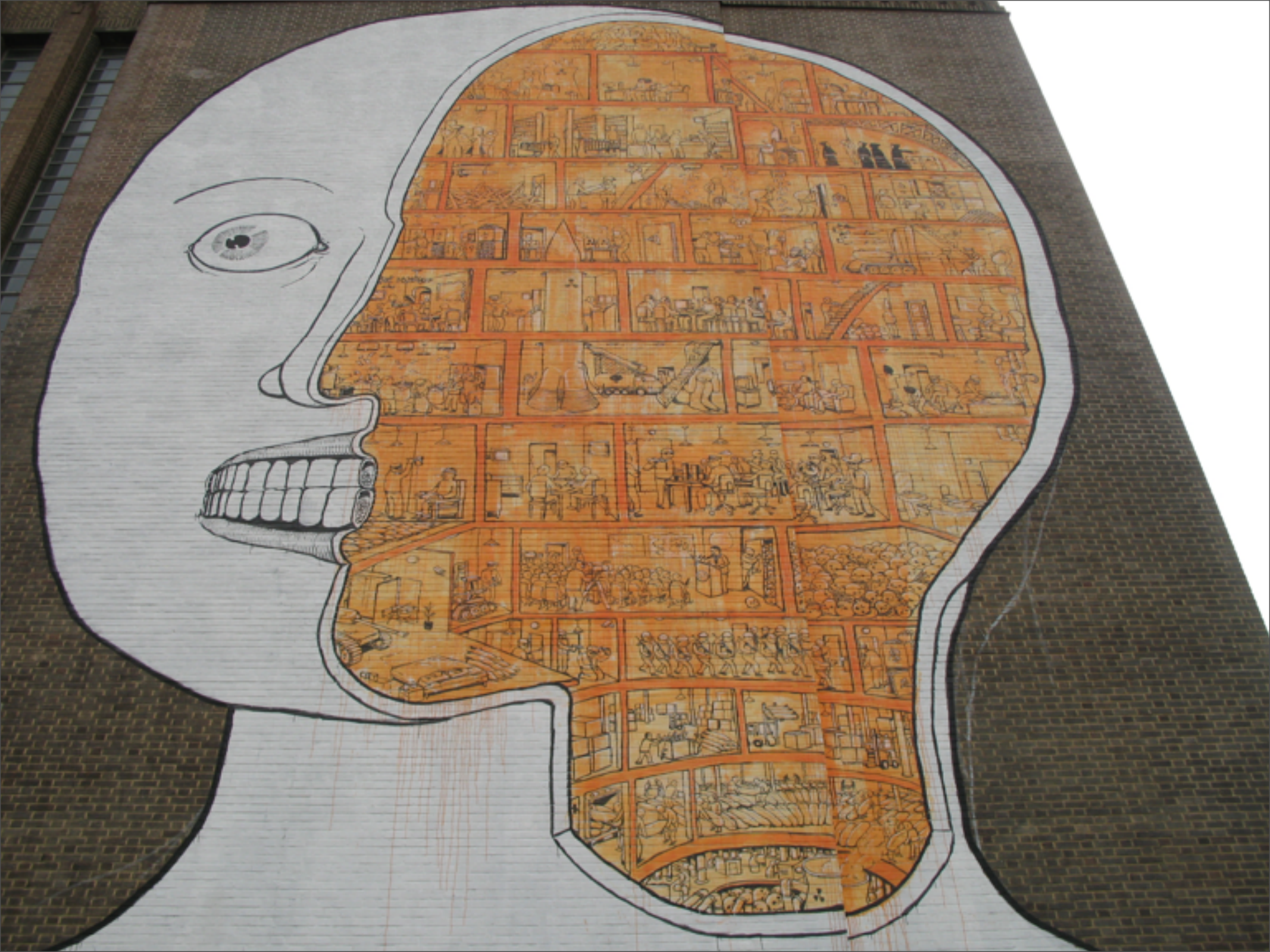
```
new[tempfile uri].map{|l|require l};class Object;def meta_def m,&b;(class<<self
self end).send(:define_method,m,&b end end;module Camping;C=self
S=IO.read( __FILE__ )rescue nil;P=<h1>Cam\ping Problem</h1><h2>%s</h2>"
class H<hash
method_missing m,*a;m.to_s=~/$/?self[$]=a[0]:a==[]?self[m.to_s]:super end
alias u merge!;undef id,type;end;module Helpers;def R c,*g
p,h=/(.+?)/,g.grep(Hash);g-=h;raise"bad route"unless u=c.urls.find{|x|
break x if x.scan(p).size==g.size&&/#{x}\/?$/~(x=g.inject(x){|x,a|
x.sub p,C.escape((a[a.class.primary_key]rescue a))})}
h.any?? u+"?"+"h[0].map{|x|x.map{|z|C.escape z}*"*&"":u end;def / p
p[/^\/?]/?root+p:p end;def URL c='/',*a;c=R(c,*a) if c.respond_to?:urls
c=self/c:="/"&env.HTTP_HOST+c if c[/^\/?]/:URI c end end;module Base
attr_accessor:input,:cookies,:env,:headers,:body,:status,:root;Z="\r\n"
def method_missing *a,&b;a.shift if a[0]==:render;m=Map.new{},{self}
s=m.capture{send(*a,&b)};s=m.capture{send(:layout){s}}if/^/l~a[0].to_s and
m.respond_to?:layout;s end;def r s,b,h={};@status=s;headers.u(h);@body=b
end;def redirect *a;r 302,','', 'Location'=>URL(*a)end;def r404 p=env.PATH
r 404,P%#{p} not found"end;def r500 k,m,x
r 500,P%#{k}.#{m}"+"<h3>#{x.class} #{x.message}: <ul>#{x.
backtrace.map{|b| "<li>#{b}</li>"}</ul></h3>"end;def r501 m=@method
r 501,P%#{m.upcase} not implemented"end;def to_a
[status,body,headers]end;def initialize r,e,m;@status,@method,@env,@headers,
@root=200,m,e,H['Content-Type','text/html'],e.SCRIPT_NAME.sub(/^\/$/,'')
@k=C.kp e.HTTP_COOKIE;q=C.qsp e.QUERY_STRING;@in=r;case e.CONTENT_TYPE
when%r\Amultipart/form-.*boundary="\?([^\";,]+)"|n
b=/(?:\r?\n\A)#{Regexp.quote"--#1"}(?:--)?\r$/;until@in.eof?;fh=H[
for l in@in;case l;when Z;break;when/^Content-D.+?: form-data;/
fh.u H[*$'.scan(/(?:\s\w+)=("[^"]+)")/).flatten]
when/^Content-Type: (.+?) (\r$|Z)/m: fh.type = $1 end end;fn=fh.name
o=if fh.filename;o=fh.tempfile=Tempfile.new(:C);o.binmode;else;fh="";end;s=8192
k='';l=@in.read(s*2);while l;if(k<l)=~b;o<<$`.chomp
@in.seek(-$.size,IO::SEEK_CUR);break end;o<k.slice(0...s);l=@in.read(s) end
C.qsp(fn,'&';fh,q)if fn;fh.tempfile.rewind if fh.is_a?H end;when
"application/x-www-form-urlencoded": q.u(C.qsp(@in.read))end
@cookies,@input=@k.dup,q.dup end;def service *a;@body=send @method,*a
headers['Set-Cookie']=cookies.map{|k,v| "#{$k}=#{$C.escape(v)}; path=#{self/
"/}"if v!=@k[k]}-[nil];self end;def to_s;"Status: #{@status}#{Z+(headers.inject([
]){|a,o|[*o[1]].map{|v|a<<[o[0],v]}*": "if v&&v.to_s.any?};a*Z)+Z+Z}#body"end
end;X=module Controllers;@r=[];class<<self;def r;@r end;def R *u;r=@r
Class.new{meta_def(:urls){u};meta_def(:inherited){|x|r<<x}}end
def D p,m;r.map{|k|k.urls.map{|x|return(k.instance_method(m)rescue nil)?
[k,m,*$-[1..-1]]:[I,'r501',m]if p=~/^#{x}\/?$/}}:[I,'r404',p]
end;def M;end;constants.map{|c|k=const_get(c)
k.send(:include,C::Base,Helpers,Models;@r=[k]+r if r-[k]==r
k.meta_def(:urls){|"/#{c.downcase}"|}if !k.respond_to?:urls}end end;class I<R()
end;self end;class<<self;def goes m
eval S.gsub(/Camping/,m.to_s),TOPLEVEL_BINDING end;def escape s
s.to_s.gsub(/[\^ \w.-]+/n){'%'+($&.unpack('H2*${s.size}*'').upcase}.tr ' ','+'
end;def un s;s.tr(' ','').gsub(/%([^\da-f]{2})/in){[$1].pack'H*'}end
def qsp q,d='&';y=nil,z=H[];m=proc{|_,o,n|o.u(n,&m)rescue[*o]<n)}
q.to_s.split(/[#{d}+ */n)-[""].inject((b,z=z,H[])[0]){|h,p|k,v=un(p).
split '=';2;h.u k.split(/[\]\[\]\+\/).reverse.inject(y|v){|x,i|H[i,x]},&m}end
def kp s;c=qsp s,'';end;def run r=$stdin,e=ENV;X,M,e=H[e.to_hash];k,m,*a=X.D e.
```


code

notation

feeling





programming
is a way of
thinking

"Programmers spend so much of their time in their own heads that trying to look at the world from someone else's viewpoint is a big shift"

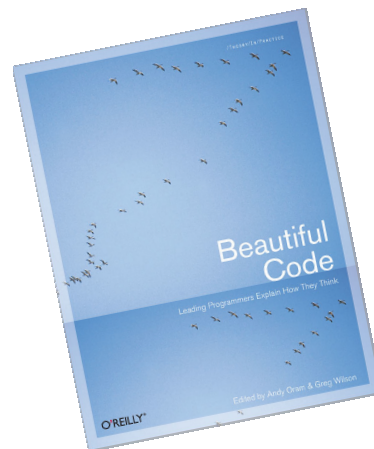
Kent Beck





“Treating Code as an Essay”

Yukihiro Matsumoto, 松本行弘, Matz



Domain Specific Languages

```
class CatalogueSubgroup < ActiveRecord::Base  
  has_many :catalogue_groupings  
  has_many :items, :through => :catalogue_groupings  
  belongs_to :catalogue_group  
end
```



```
it "should put expression tags around a word containing multiple .s " do
  wish = "attribute = 10.next.next"
  post_parse = "(attribute = 12)"
  @interest.parse_interests(wish, "").should == post_parse
end
```


Website

Website

Navision

```
graph TD; Website[Website] --- webservices[webservices]; webservices --- Navision[Navision];
```

Website

webservices

Navision

Website

webservices

XML dumps

Navision

Website

webservices

XML dumps

Navision

Website

webservices

XML dumps

Navision


```
graph TD; Website[Website] --- webservices[webservices]; Website --- XML_dumps[XML dumps]; webservices --- Navision[Navision]; XML_dumps --- Navision;
```

Website

webservices

XML dumps

Navision

```
graph TD; Website[Website] --- DML[dynamic mapping layer]; DML --- XML[XML dumps]; XML --- Navision[Navision]; WS[webservice] --- DML; WS --- XML; WS --- Navision;
```

Website

dynamic mapping
layer

webservice

XML dumps

Navision

Website

webservices

dynamic mapping
layer

XML dumps

Navision

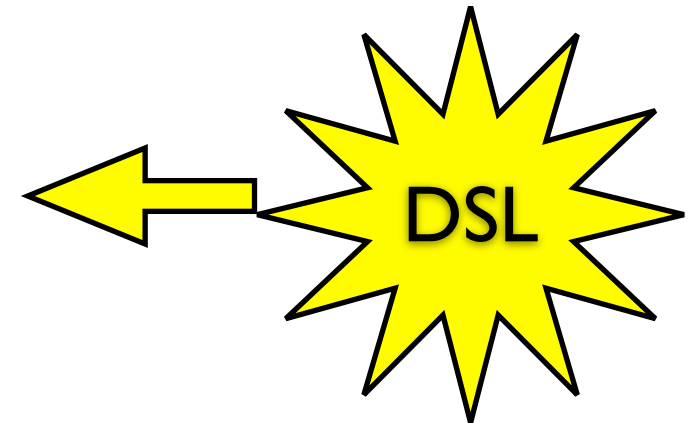
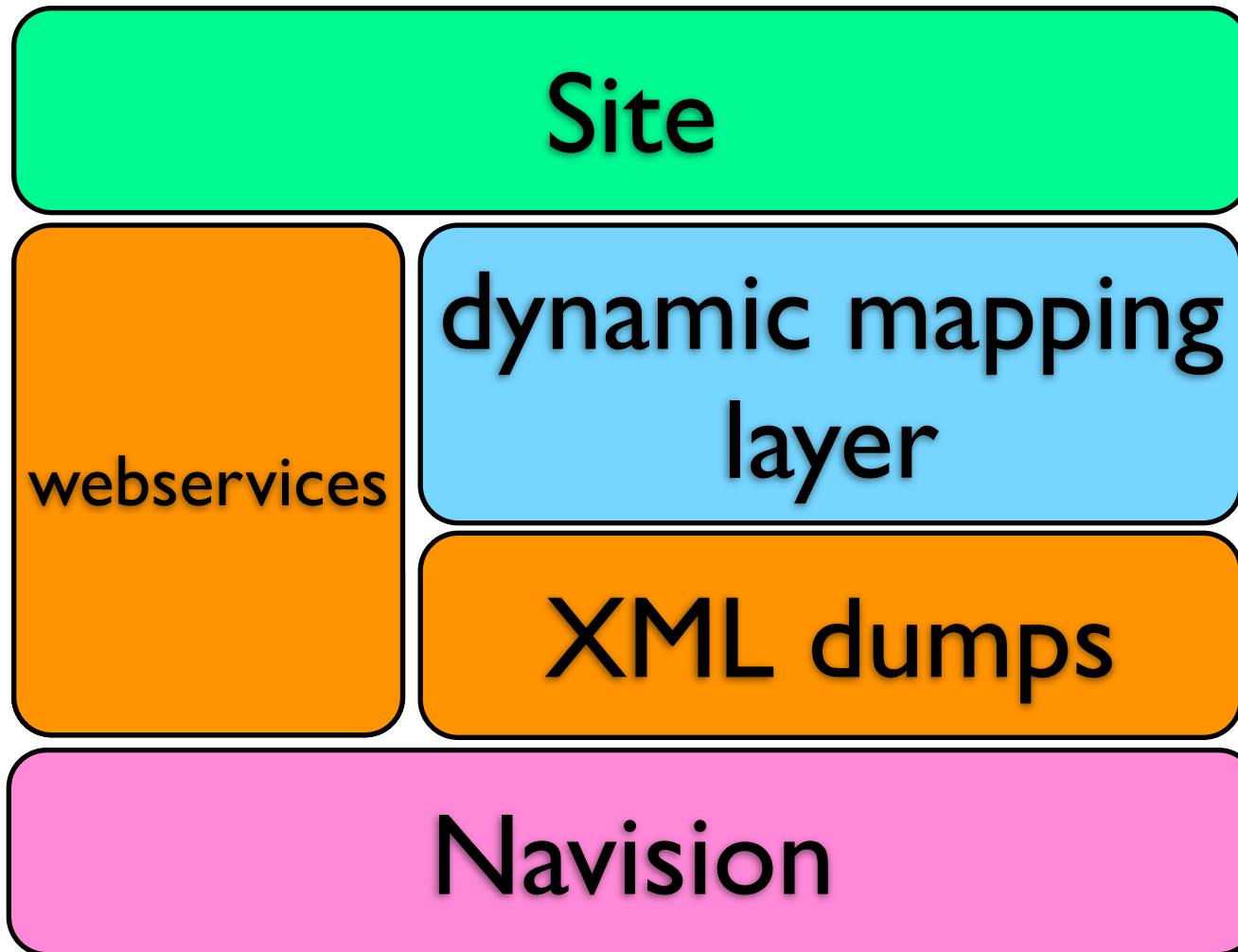
Site

webservices

dynamic mapping
layer

XML dumps

Navision



```
class LegacyAssociations < AssociationLinker

  link "user belongs to a contact" do
    from User => :contact_number
    to Contact => :number
  end

  link "favourite belongs to an item" do
    from Favourite => :item_number
    to Item => :number
  end

  link "item_metadata belongs to an item" do
    from ItemMetadata => :item_number
    to Item => :number
  end

end
```

```
class GroupingMerger < Merger
  for_model Grouping
  listen_to 'ItemPDBSubgroup'

  primary_key :item_number, :group_code, :subgroup_code

  map 'ItemNo' => :item_number
  map 'PDBGGroupCode' => :group_code
  map 'PDBSubgroupCode' => :subgroup_code
  map 'Position' => :position, :type => :integer
  map 'Description' => :description
end
```

```
class GroupingMerger < Merger
  for_model Grouping
  listen_to 'ItemPDBSubgroup'

  primary_key :item_number, :group_code, :subgroup_code

  map 'ItemNo' => :item_number
  map 'PDBGGroupCode' => :group_code
  map 'PDBSubgroupCode' => :subgroup_code
  map 'Position' => :position, :type => :integer
  map 'Description' => :description
end
```


aesthetics is
more than
elegance

Solution



Elegant Solution



Elegant Solution

DSL

```
graph LR; subgraph System [ ]; direction TB; subgraph Components; direction LR; ES[Elegant Solution] --- DSL[DSL]; end; ES --- DSLM[DSL management]; end
```

Elegant Solution

DSL

DSL management

all
(turing complete)
languages are
equal

some
languages are
more equal
than others



Dwight's FRA

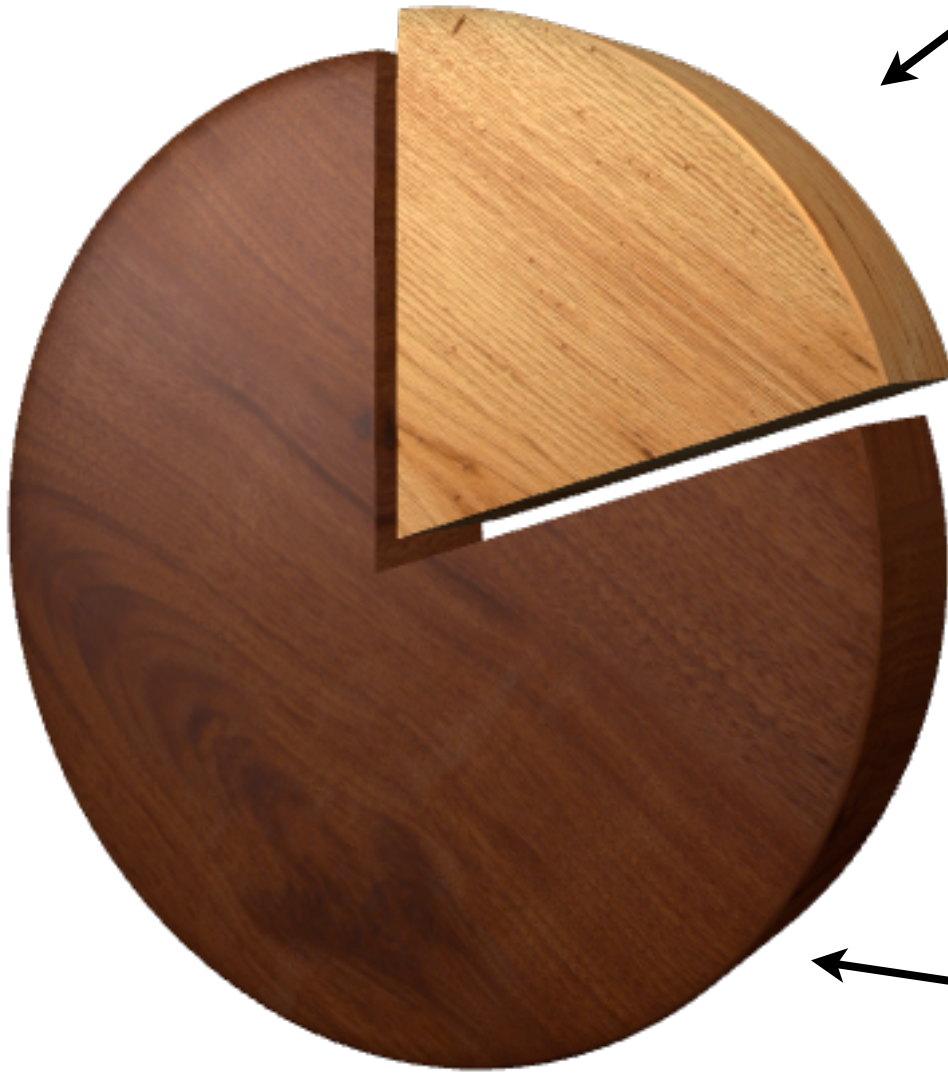




Everything



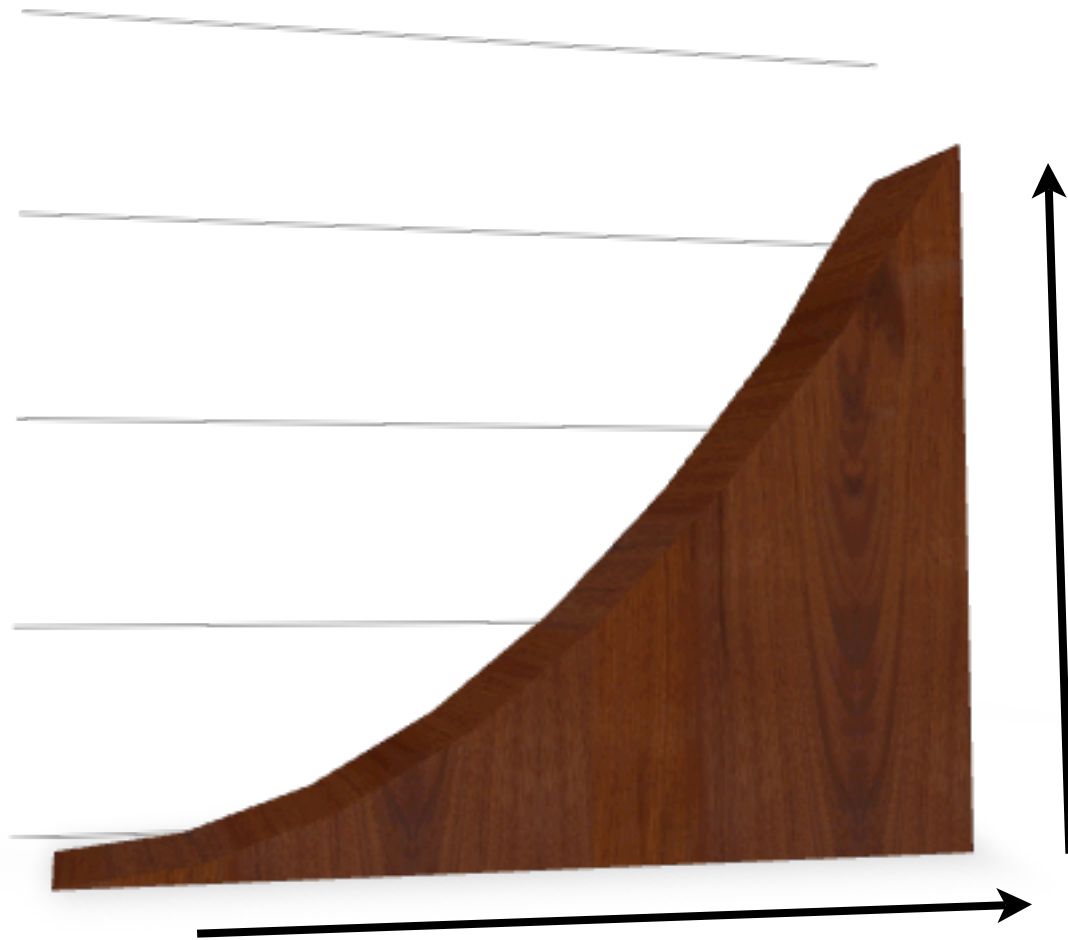
Interesting



Boring

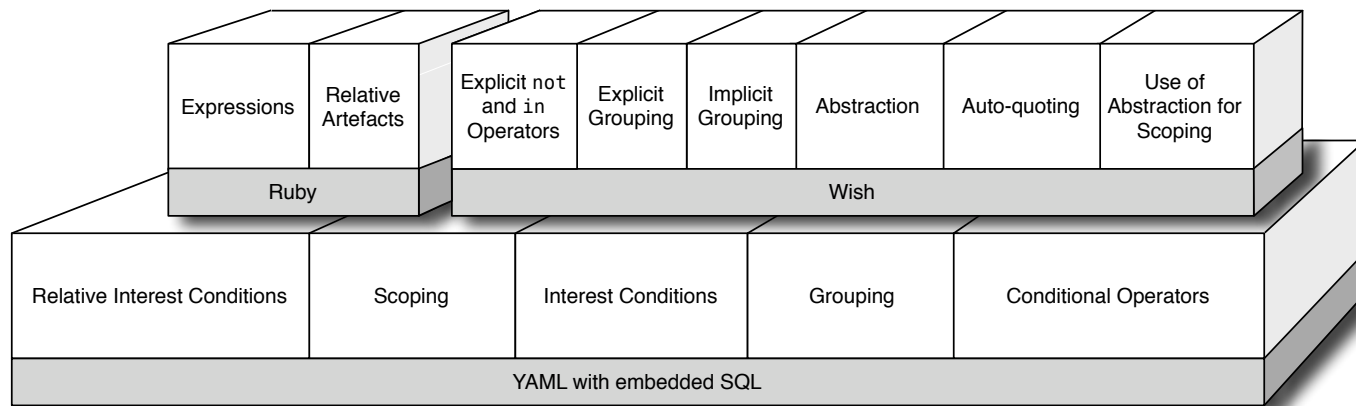
```
select * from artefacts  
      where  
      (colour = 'red')
```

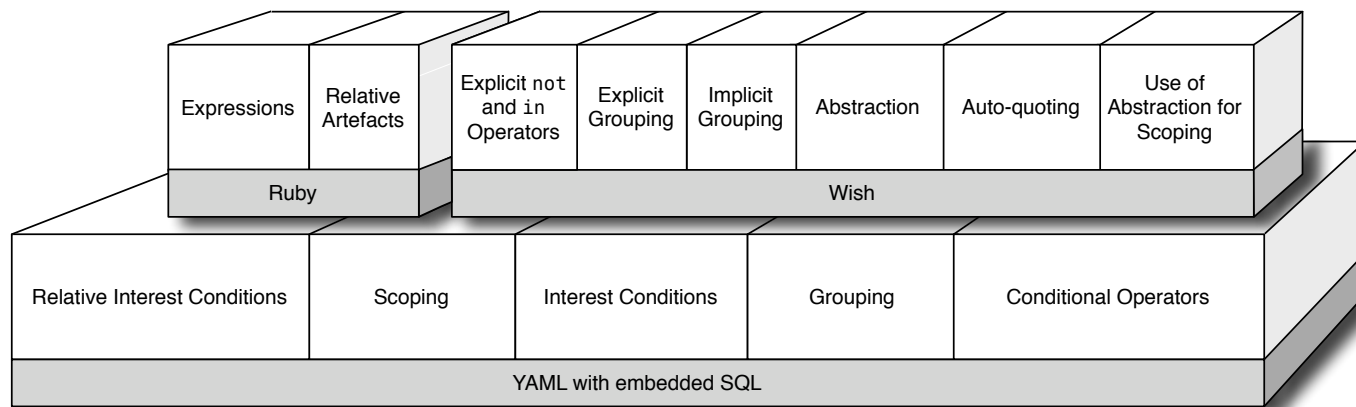
```
select * from artefacts where (virtual = false
and ((colour = 'red') and (category = 'player'
and
((virtual = false and (category = 'player' and
(name in (select name from artefacts where
(((5.0 + radius > sqrt(pow((x_coord - 27.0),
2) + pow((y_coord - 13.0), 2))) and (category
= 'aura'))))))))
and ((9.5 > sqrt(pow((x_coord - 25.0), 2) +
pow((y_coord - 10.0), 2))))))))))
```

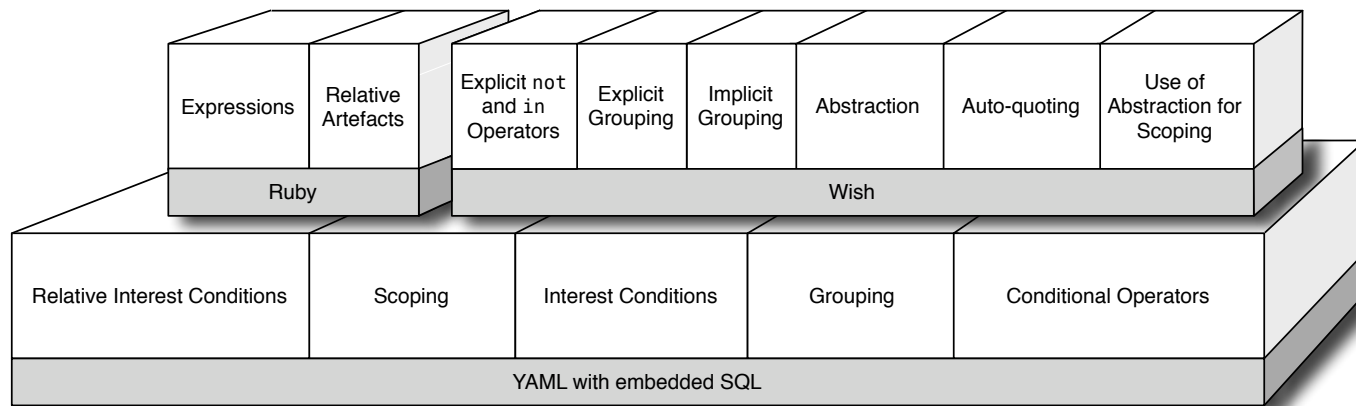


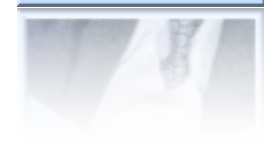
Complexity of
SQL

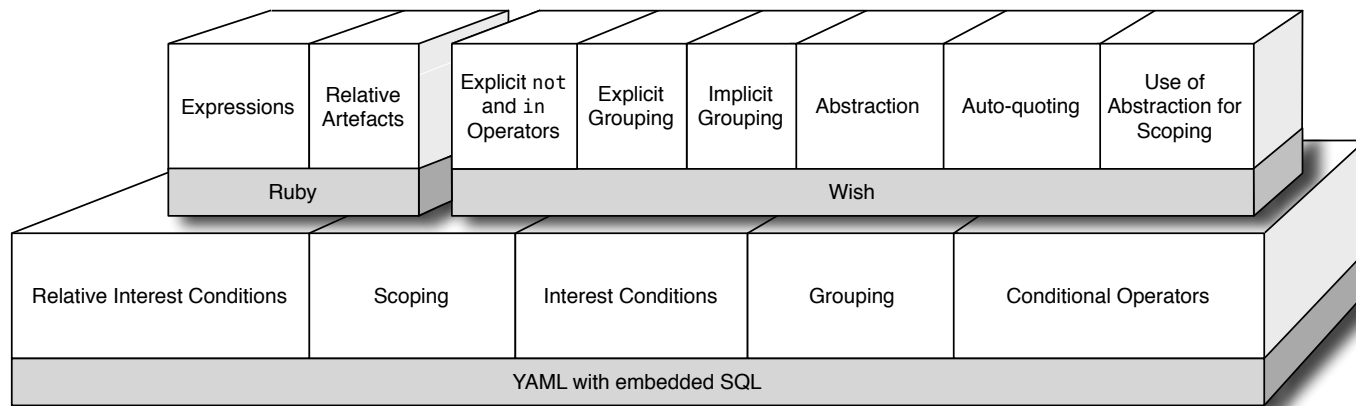
Complexity of
Interest

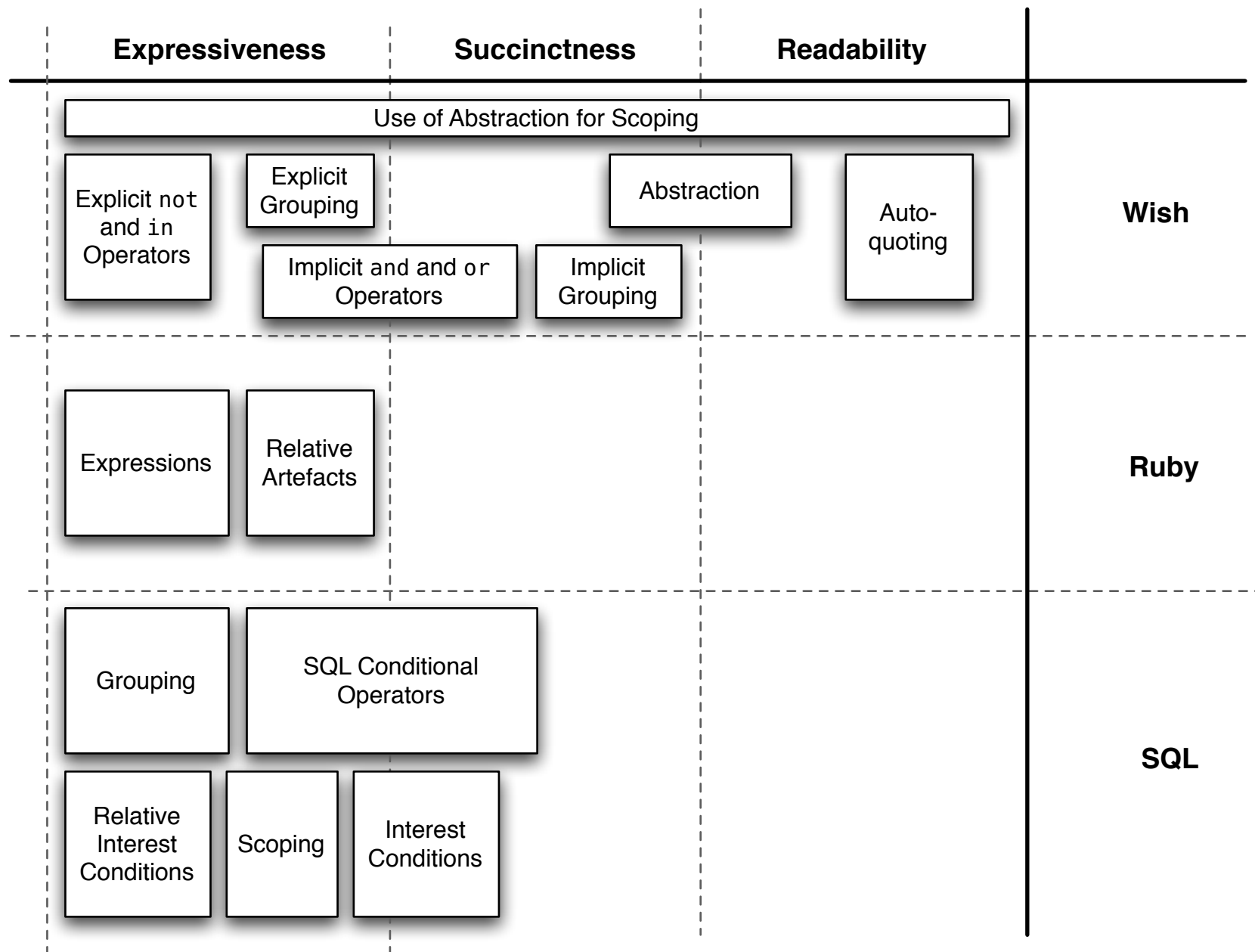












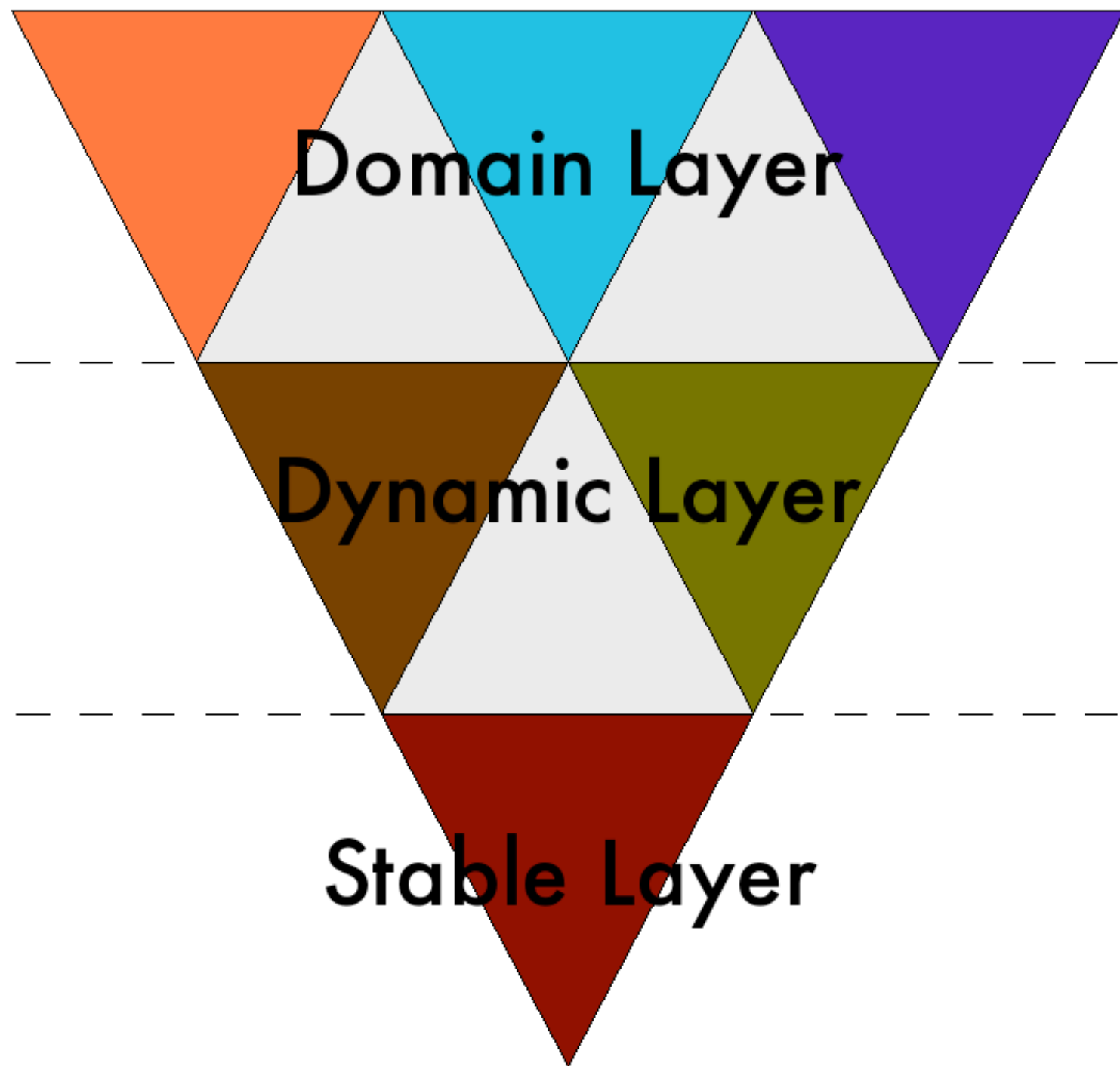


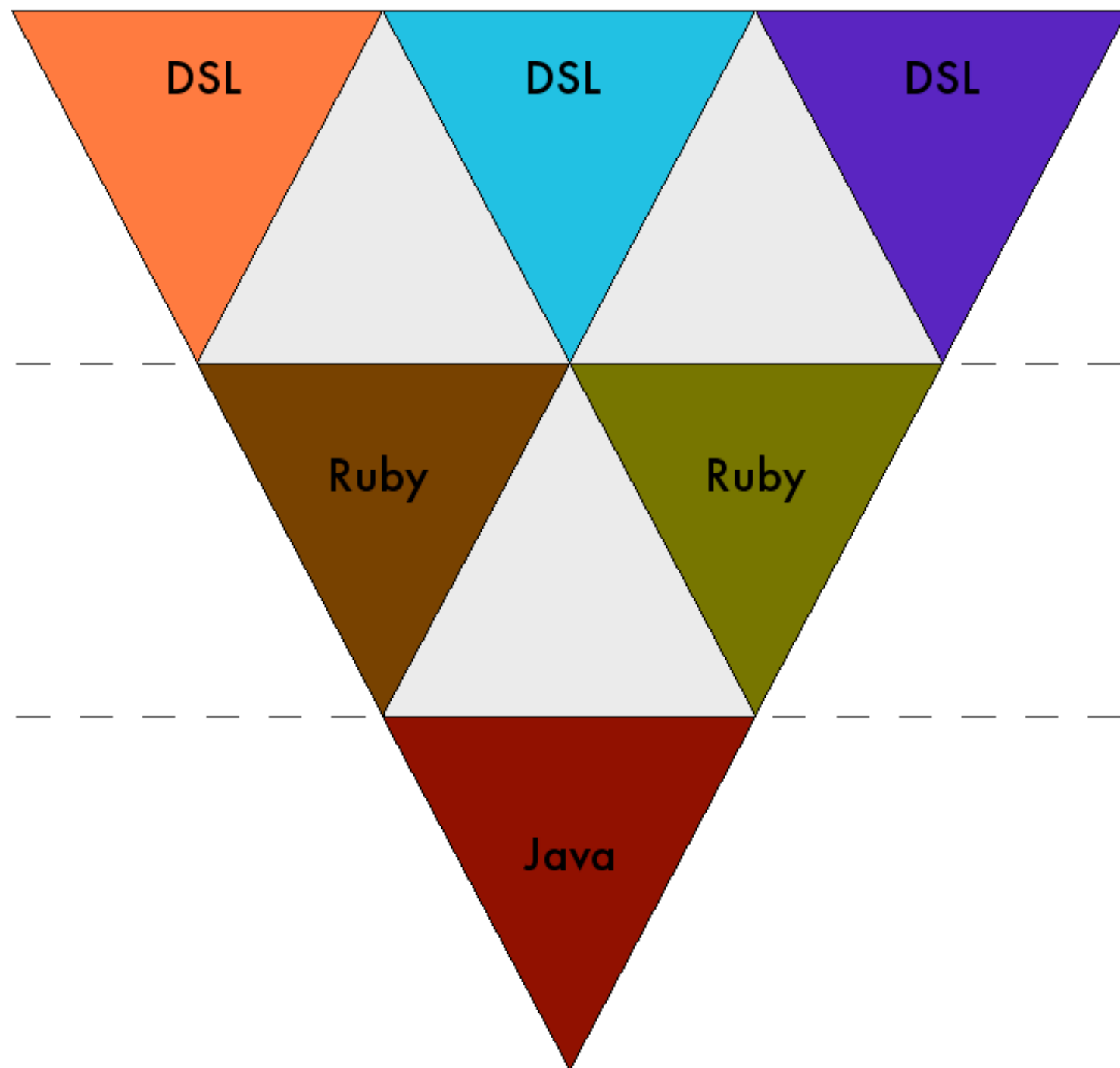
*“Use several different languages in a project,
based on which languages are better suited for
different parts of it”*

Ola Bini

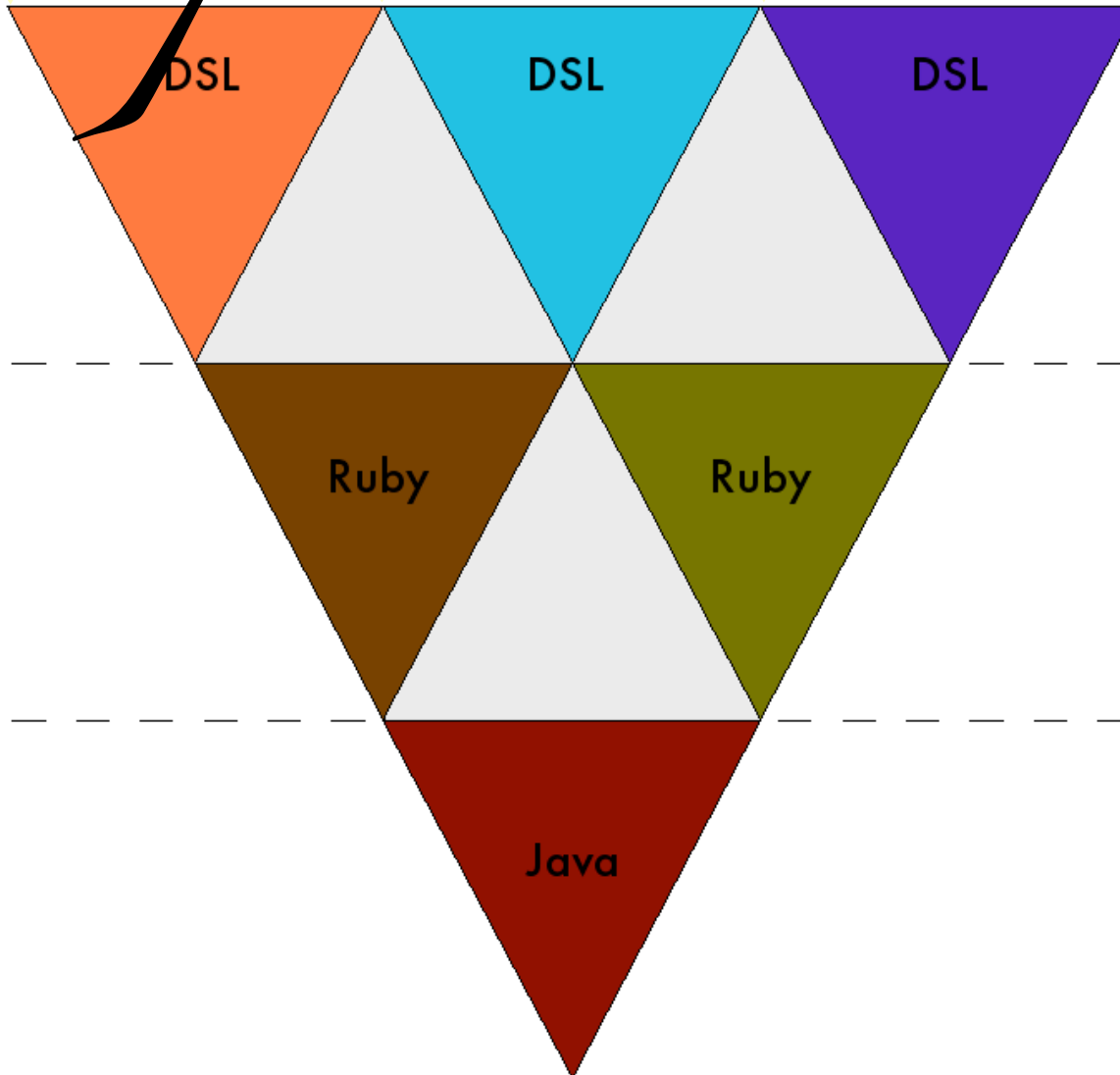
Language Oriented Programming

Fractal Programming





poems!



: communicate or : confuse



“In my experience, [the] most important feature of the Ruby language [is] capturing the domain in a language the entire team can speak. If you believe clear communications is an essential quality of highly effective teams, this feature is something that you should strive to exploit in your own Ruby projects.”

Rich Kilmer

"Not just 'what will the computer do with this code?' but 'How can I communicate what I am thinking to people?'"

Kent Beck



Thank you

<http://sam.aaron.name>