

(re)thinking software design

Daniel Jackson

joint work with Santiago Perez De Rosso
Tel Aviv University · December 18, 2013

good apps & bad apps

Field Trip Permission Form

Dear Parents:

Ms. Frizzle will again be taking her second grade class on an exciting field trip. Please sign and return the permission slip below.

Thank you!

Yes, I give permission for my child to go on the second grade "Touch and Feel" trip on Friday February 13th to the NastyCo Nuclear Dump. I understood that my child may encounter the normal risks of childhood play, including grazed knees, hurt feelings and exposure to toxic waste.

Parents signature

Date

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Count Olaf

Parents signature

Date

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Count Olaf

February 11, 2013

Parents signature

Date

adobe acrobat to the rescue?

The image shows a screenshot of the Adobe Acrobat Reader application. The main window displays a document with the following text:

Parents:

Frizzle will again be taking her second grade
ting field trip. Please sign and return the pe
W.

Thank you!

I give permission for my child to go on the s
ch and Feel" trip on Friday February 13th to t
ear Dump. I understood that my child may encou
al risks of childhood play, including grazed l
ings and exposure to toxic waste.

Parents signature _____ Date _____

The top toolbar includes icons for Create, Save, Print, Email, Settings, Comments, Text, and other functions. The left sidebar shows icons for Document, Bookmarks, and Attachments. The right sidebar is open to the 'Pages' menu, which includes options like Rotate, Delete, Extract, Replace, Crop, Split Document, Insert Pages, Edit Page Design, Content, Forms, Action Wizard, Recognize Text, Protection, and Sign & Certify.

adobe acrobat to the rescue?

The image shows a screenshot of the Adobe Acrobat application interface. At the top, there is a toolbar with various icons for file operations and editing. Below the toolbar, a document is open, displaying the text "Parents: Frizzle will again be taking her second grade...". To the right of the document, a sidebar is visible, listing various page actions such as Rotate, Delete, Extract, Replace, Crop, and Split Document. In the foreground, a smaller window titled "acrobat-sig-paste.txt" is open, showing a list of instructions for adding a signature and date to a document. The instructions are as follows:

- 1 how to add a signature in acrobat
- 2 -- open document in acrobat
- 3 -- Tools—>Advanced Editing—>Touchup Object Tool
- 4 -- right click at desired point | Place Image...
- 5 then select jpg
- 6
- 7 how to add date
- 8 -- Tools—>Typewriter
- 9

i'm not alone

from <http://amplicate.com>

i'm not alone



Adobe Acrobat is a family of computer programs developed by Adobe Systems, designed to view, create, manipulate and manage files ... »

47% Love Acrobat



Tweet 1

+1

207 Positive Opinions out of 444



Adobe Acrobat is a family of computer programs developed by Adobe Systems, designed to view, create, manipulate and manage files ... »

53% Hate Acrobat



Tweet 15

+1

237 Negative Opinions out of 444

i'm not alone



Adobe Acrobat is a family of computer programs developed by Adobe Systems, designed to view, create, manipulate and manage files ... »

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Tweet 1



207 Positive Opinions out of 444



Adobe Acrobat is a family of computer programs developed by Adobe Systems, designed to view, create, manipulate and manage files ... »

53% Hate Acrobat



Tweet 15



237 Negative Opinions out of 444



Adobe Photoshop Lightroom is a photography software program developed by Adobe Systems for Mac OS X and Microsoft Windows, designed ... »

89% Love Lightroom



Tweet 3

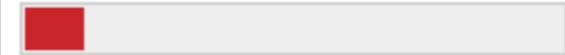


2,335 Positive Opinions out of 2,632



Adobe Photoshop Lightroom is a photography software program developed by Adobe Systems for Mac OS X and Microsoft Windows, designed ... »

11% Hate Lightroom



Tweet 5



297 Negative Opinions out of 2,632

i'm not alone



Adobe Acrobat is a family of computer programs developed by Adobe Systems, designed to view, create, manipulate and manage files ... »

47% Love Acrobat



Tweet 1



207 Positive Opinions out of 444



Adobe Photoshop is a graphics editing program developed and published by Adobe Systems Incorporated.

70% Love Photoshop



Tweet 87



30,305 Positive Opinions out of 43,283



Adobe Photoshop Lightroom is a photography software program developed by Adobe Systems for Mac OS X and Microsoft Windows, designed ... »

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Tweet 3



2,335 Positive Opinions out of 2,632



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Tweet 15

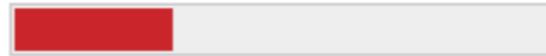


237 Negative Opinions out of 444



Adobe Photoshop is a graphics editing program developed and published by Adobe Systems Incorporated.

30% Hate Photoshop



Tweet 105

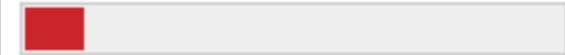


12,978 Negative Opinions out of 43,283



Adobe Photoshop Lightroom is a photography software program developed by Adobe Systems for Mac OS X and Microsoft Windows, designed ... »

11% Hate Lightroom



Tweet 5

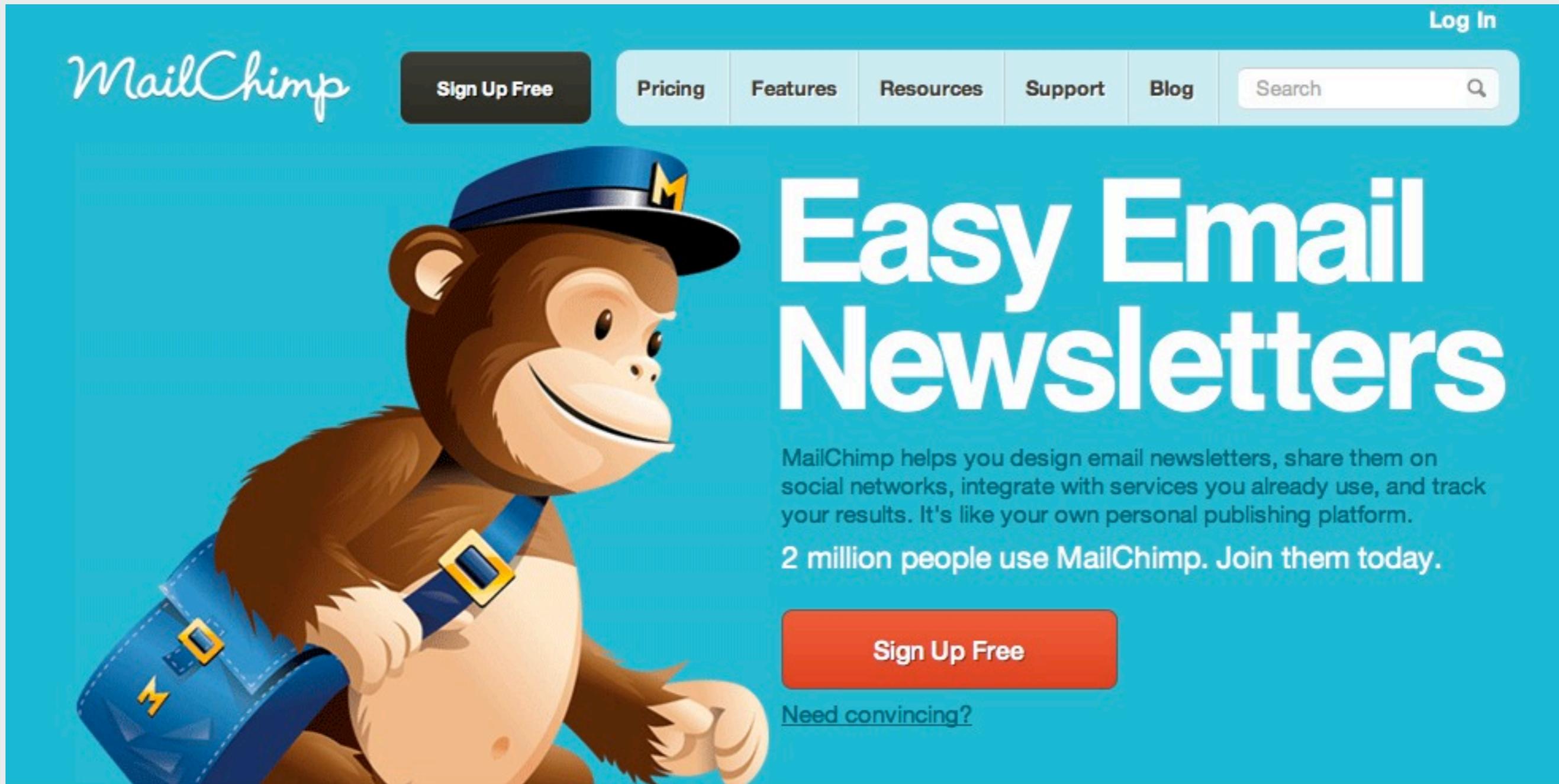


297 Negative Opinions out of 2,632

**how to make
an app usable?**

simplify and humanize?

simplify and humanize?



The image shows the top portion of the MailChimp website. On the left, the MailChimp logo is written in a white, cursive font. To its right is a dark blue button with the text "Sign Up Free" in white. Further right is a navigation menu with links for "Pricing", "Features", "Resources", "Support", and "Blog". To the right of the menu is a search bar with the placeholder text "Search" and a magnifying glass icon. In the top right corner, there is a "Log In" link. The main hero section features a large illustration of a brown monkey wearing a blue cap with a yellow "M" and a blue messenger bag with a yellow buckle. To the right of the monkey, the headline "Easy Email Newsletters" is written in large, bold, white sans-serif font. Below the headline, there is a paragraph of text: "MailChimp helps you design email newsletters, share them on social networks, integrate with services you already use, and track your results. It's like your own personal publishing platform." Below this paragraph is another line of text: "2 million people use MailChimp. Join them today." At the bottom of the hero section is a large orange button with the text "Sign Up Free" in white. Below the button is a link that says "Need convincing?" in a smaller, blue font.

MailChimp

Sign Up Free

Pricing Features Resources Support Blog

Search

Log In

Easy Email Newsletters

MailChimp helps you design email newsletters, share them on social networks, integrate with services you already use, and track your results. It's like your own personal publishing platform.

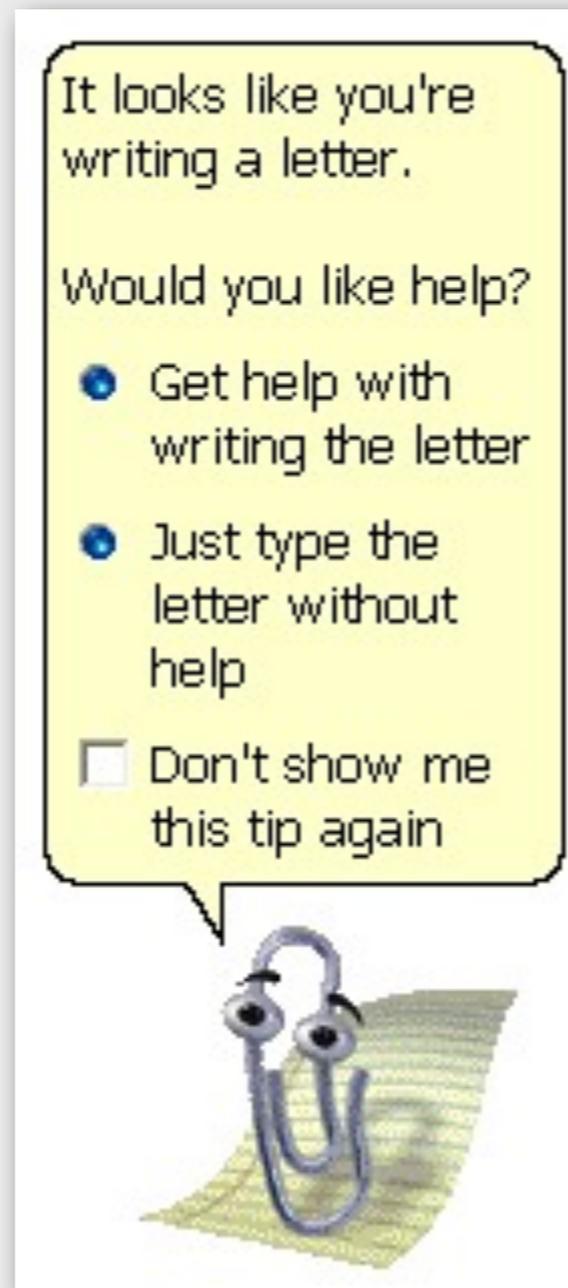
2 million people use MailChimp. Join them today.

Sign Up Free

[Need convincing?](#)

not always welcome

not always welcome



Clippy
2003-2008
RIP

affordances

James Gibson (1977): “action possibilities” latent in environment



affordances

James Gibson (1977): “action possibilities” latent in environment

Donald Norman (1988): action possibilities that are perceivable





Donald Norman

THE DESIGN OF EVERYDAY THINGS

previously published as
THE PSYCHOLOGY
OF EVERYDAY THINGS

D O N A L D A . N O R M A N

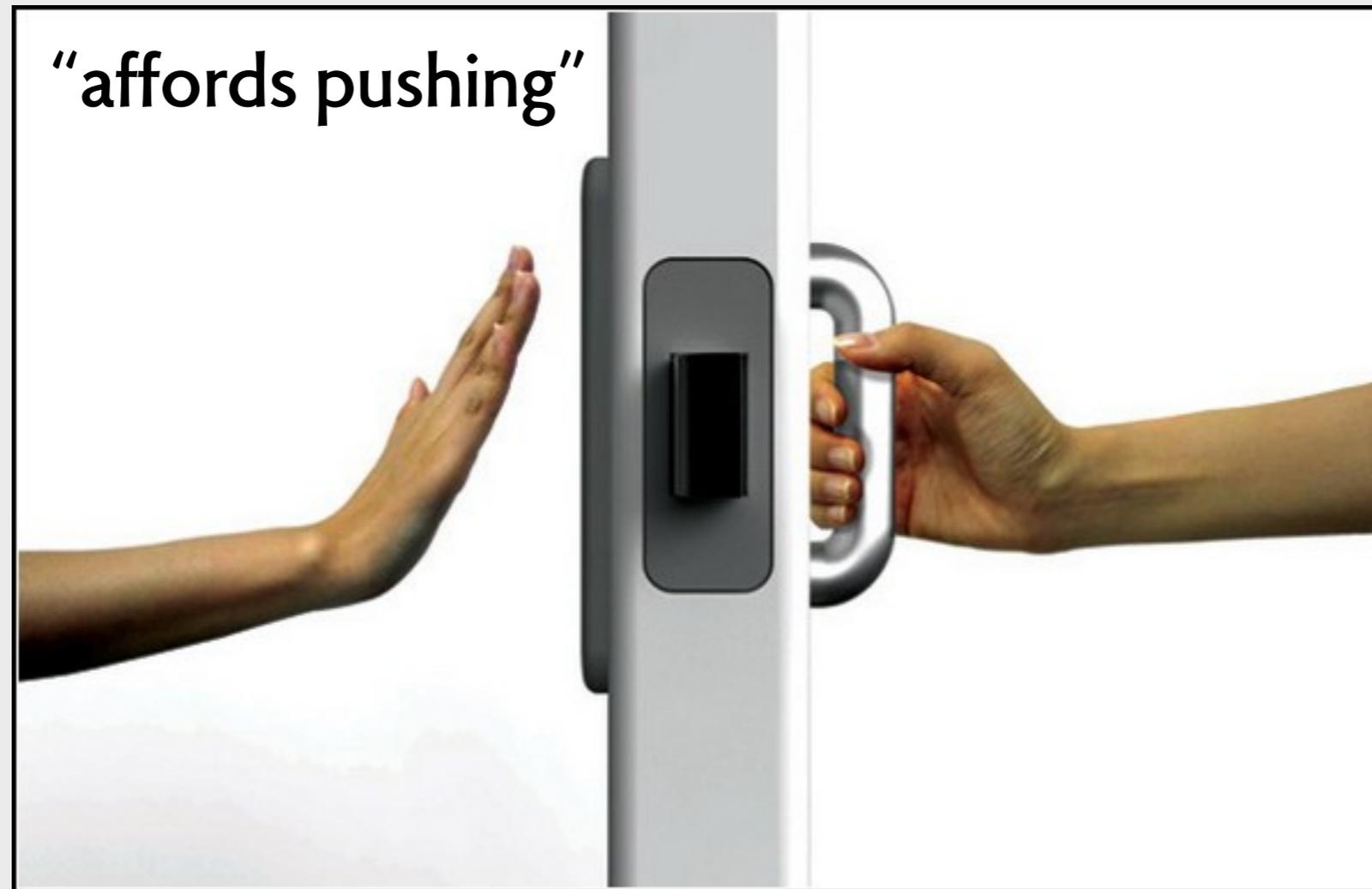


Donald Norman

a door with good affordances



a door with good affordances



a door with good affordances



unhappy doors

unhappy doors



push or pull?

unhappy doors



push or pull?



door with user manual

unhappy doors



push or pull?



door with user manual



unhappy doors



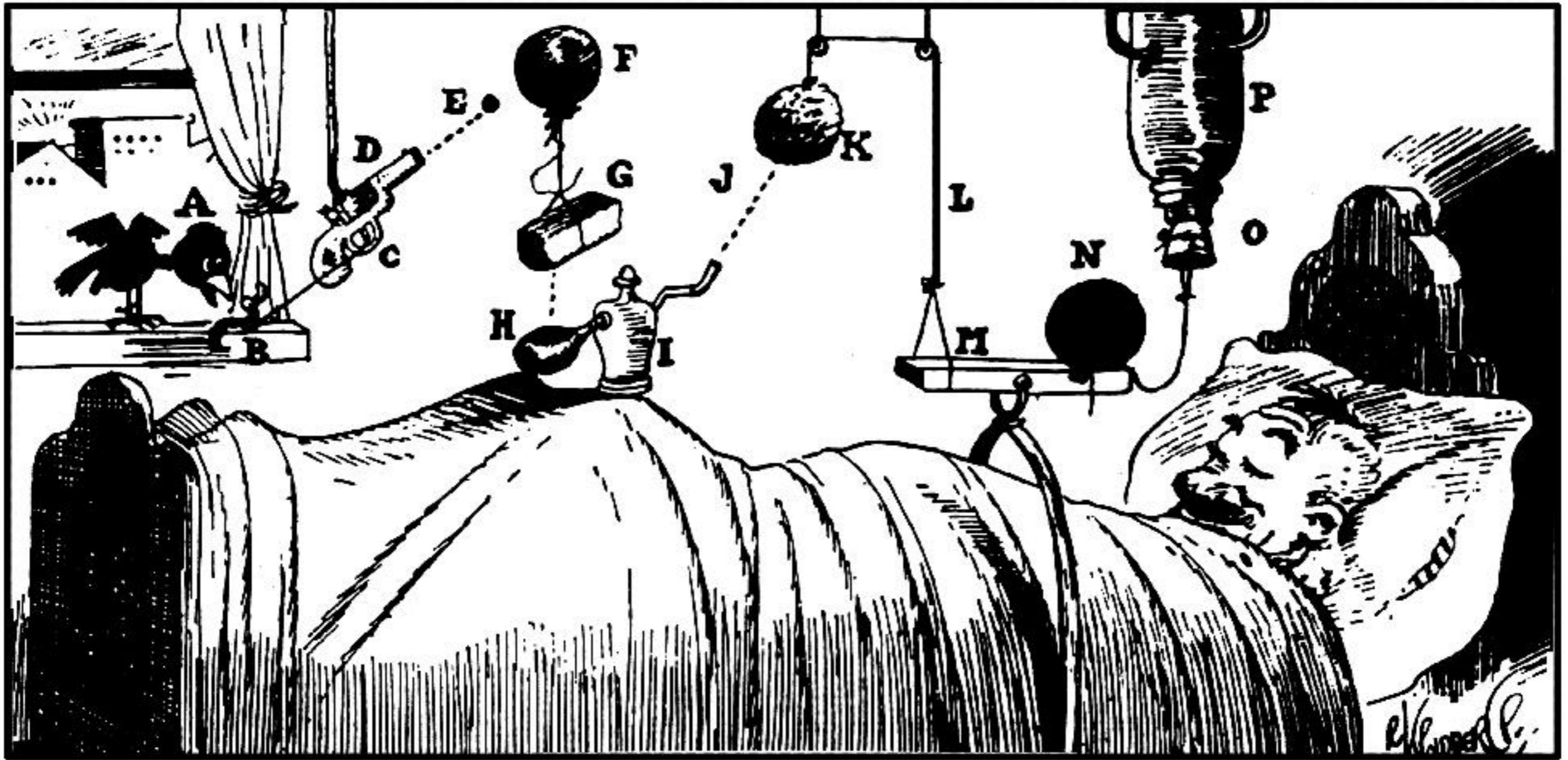
push or pull?



door with user manual



Simple Alarm Clock



The early bird (A) arrives and catches worm (B), pulling string (C) and shooting off pistol (D). Bullet (E) busts balloon (F), dropping brick (G) on bulb (H) of atomizer (I) and shooting perfume (J) on sponge (K)—As sponge gains in weight, it lowers itself and pulls string (L), raising end of board

(M)—Cannon ball (N) drops on nose of sleeping gentleman—String tied to cannon ball releases cork (O) of vacuum bottle (P) and ice water falls on sleeper's face to assist the cannon ball in its good work.

New Alarm

Time Alarm

Alarm Time:

6:00 AM



Alarm Date:

One time alarm

4/16/2013



Repeating alarm

Sun	Mon	Tue	Wed	Thu	Fri	Sat
-----	-----	-----	-----	-----	-----	-----

Enable Alarm

Delete

Cancel

OK

New Alarm



Invalid alarm time

Please select a date and time in the future.

Alarm Time: 6:00 AM

OK

Alarm Date:

One time alarm

4/16/2013

Repeating alarm

Sun

Mon

Tue

Wed

Thu

Fri

Sat

Enable Alarm

Delete

Cancel

OK

New Alarm

Time Alarm

Alarm Time:

6:00 AM



Alarm Date:

One time alarm

4/17/2013



Repeating alarm

Sun	Mon	Tue	Wed	Thu	Fri	Sat
-----	-----	-----	-----	-----	-----	-----

Enable Alarm

Delete

Cancel

OK

New Alarm

Time Alarm

Alarm Time: 6:00 AM 

Alarm Date:

One time alarm

4/17/2013 

Repeating alarm

Sun Mon Tue Wed Thu Fri Sat

Enable Alarm

Delete

Cancel

OK

✓ 06:00 AM Tomorrow

New Alarm...

New Timer...

New Stopwatch...

About Alarm Clock 2

Check for updates...

Preferences...

Quit

conceptual models

conceptual models

to use a complex application

we imagine what's inside

we form structures in our mind

we connect actions to structural changes

conceptual models

to use a complex application

we imagine what's inside

we form structures in our mind

we connect actions to structural changes

"abstract
affordances"

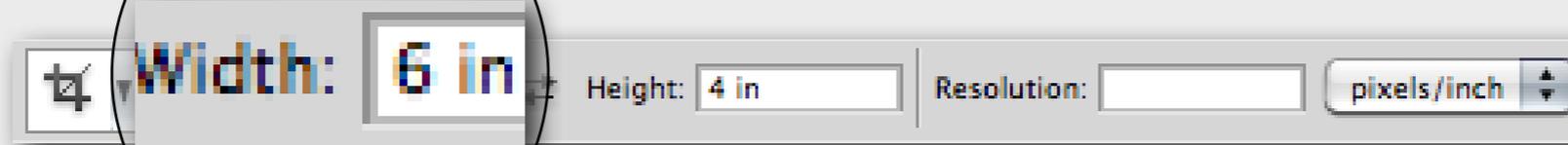
an example

cropping in adobe photoshop

cropping in adobe photoshop



cropping in adobe photoshop



(demo)

look at image size

crop entire image without aspect ratio

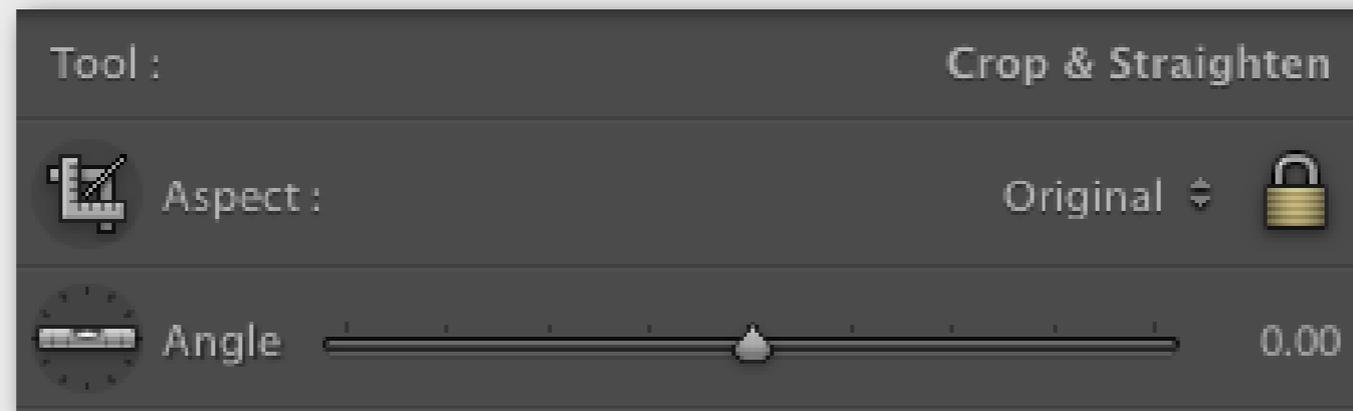
note effect on image size

repeat with aspect ratio

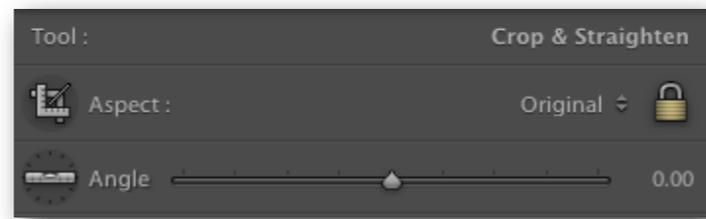
now enter resolution

cropping in adobe lightroom

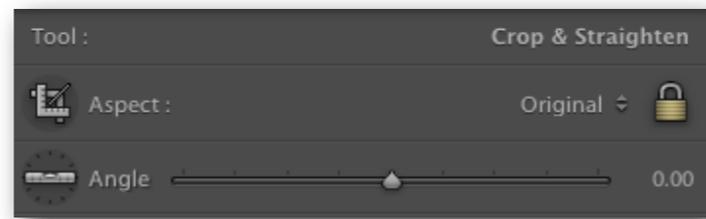
cropping in adobe lightroom



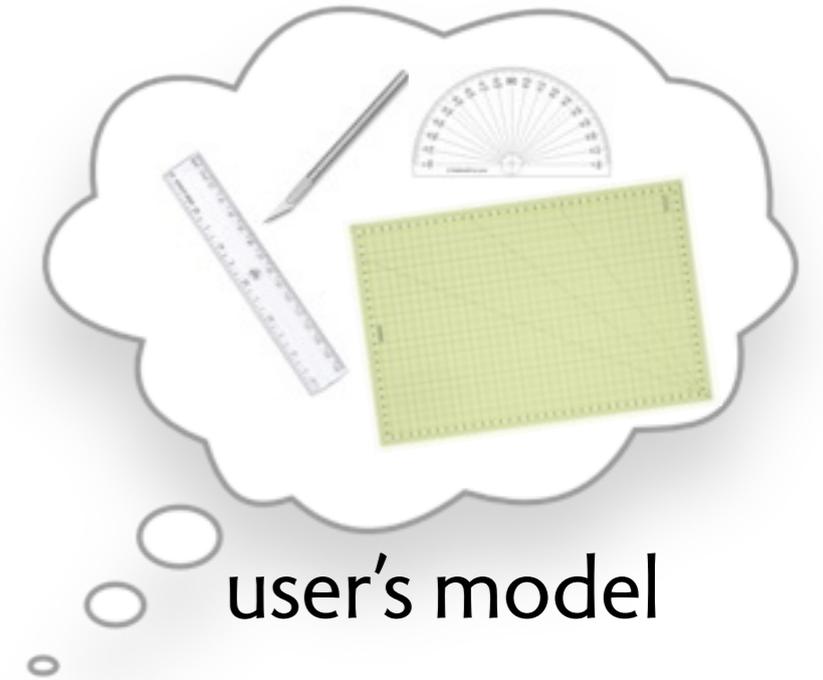
concepts



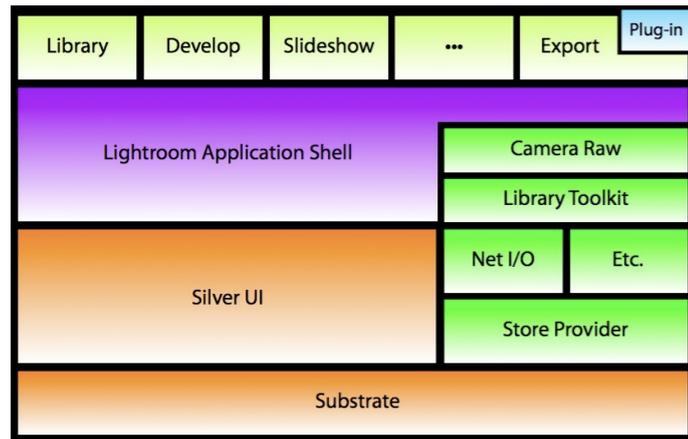
interface



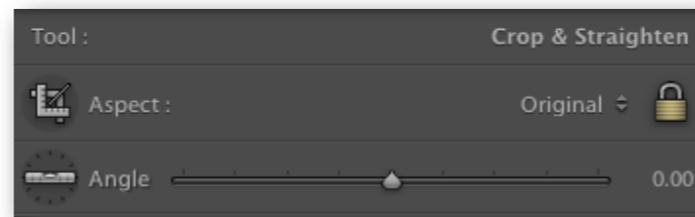
interface



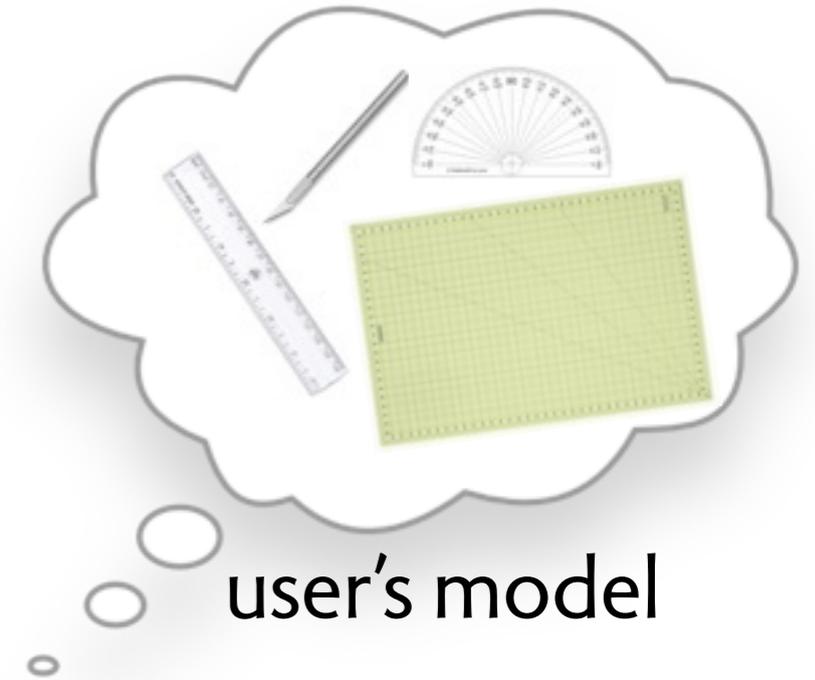
user's model

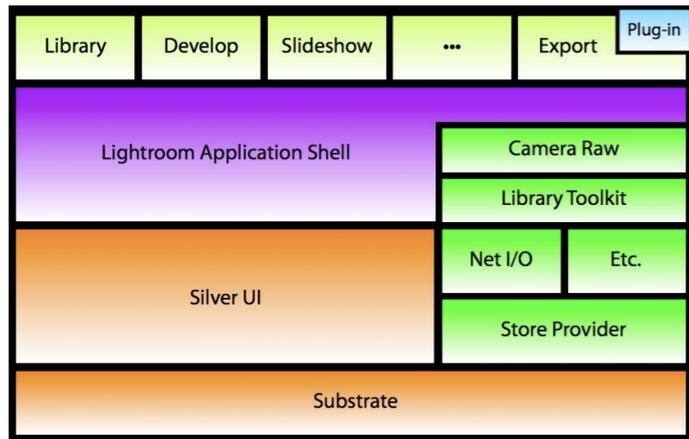


code

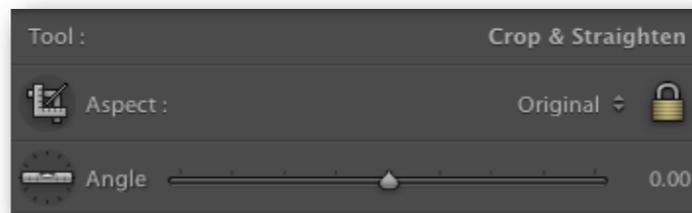


interface





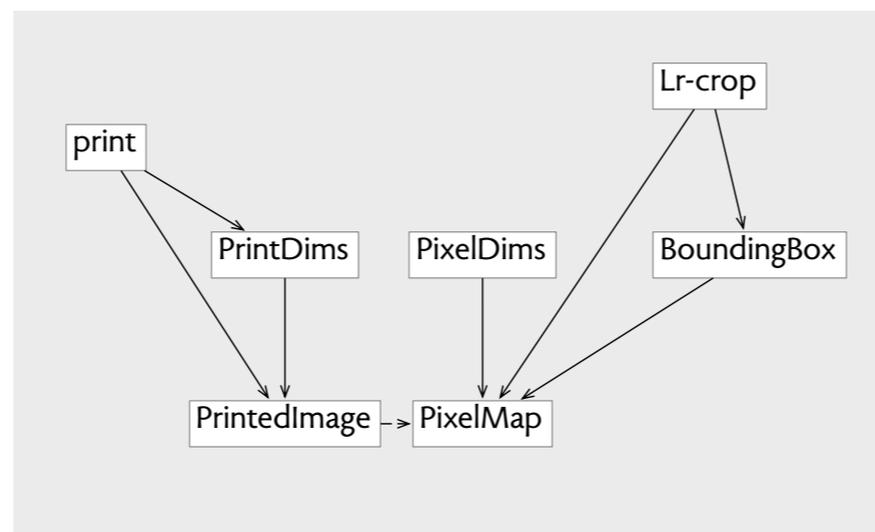
code



interface



user's model



conceptual model

hypothesis

hypothesis

the quality of the conceptual model
is the key factor that determines
how usable the app will be
how easy it is to build and maintain
how reliable it will be

fred brooks



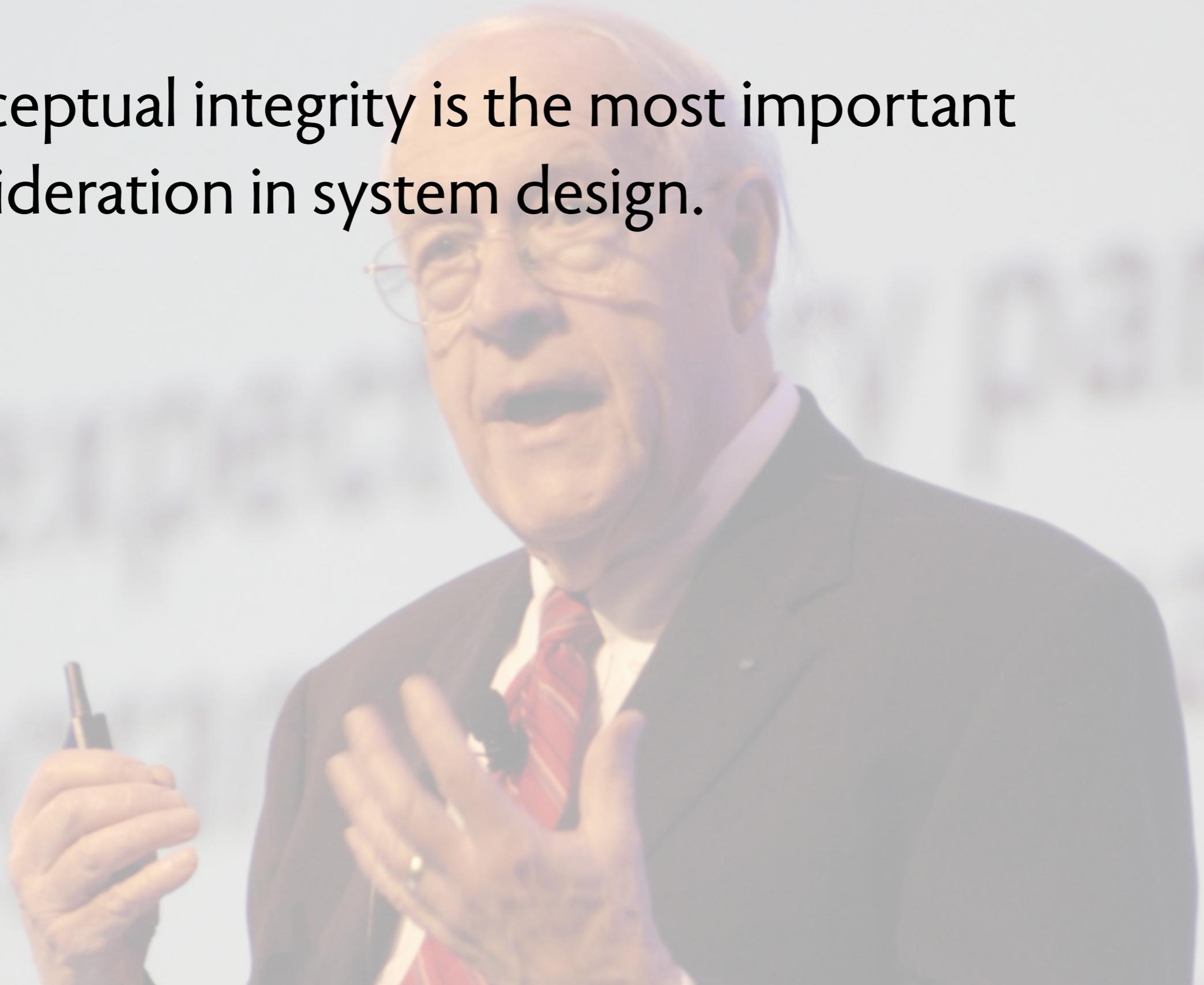
fred brooks



fred brooks

Conceptual integrity is the most important consideration in system design.

—1975



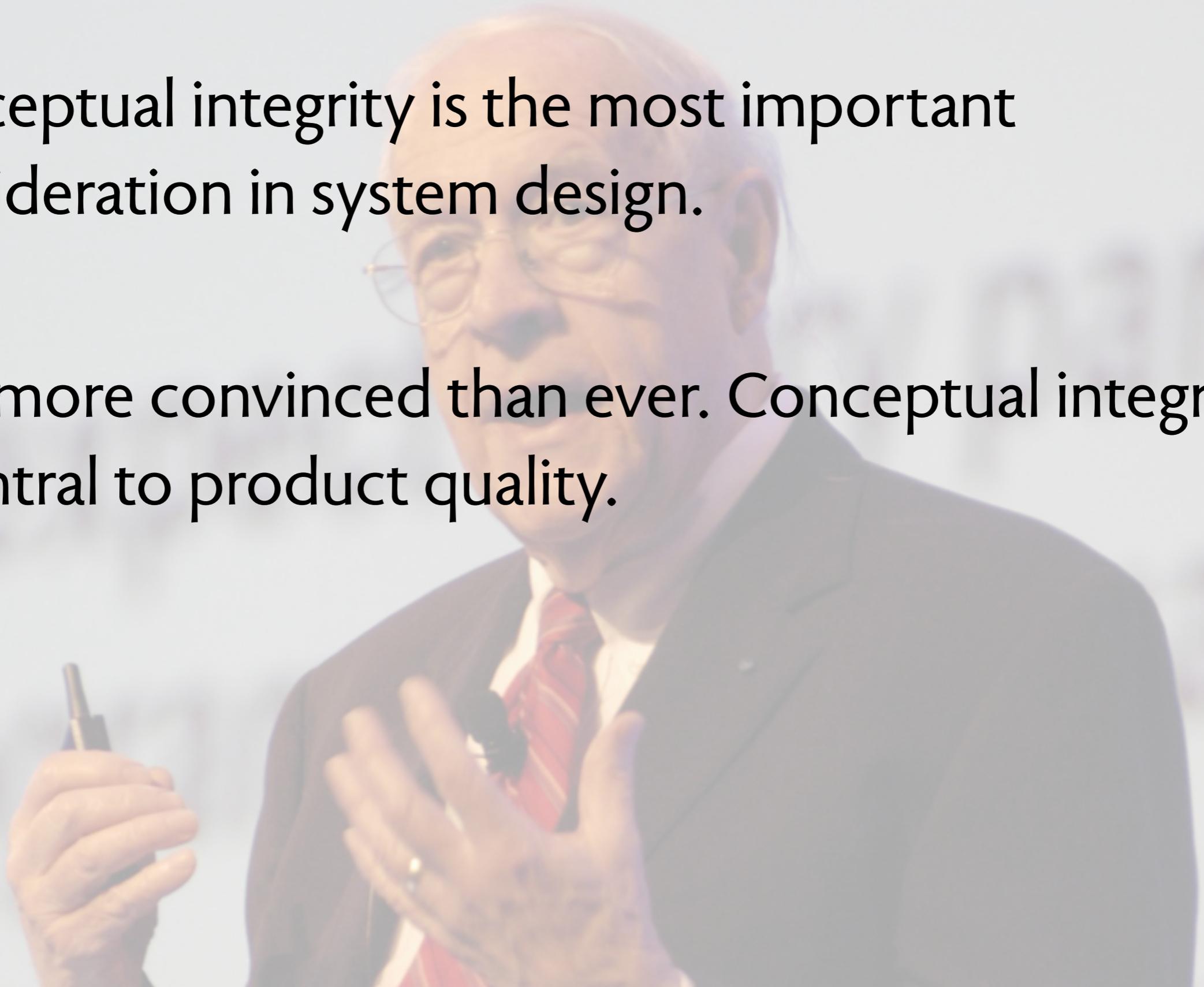
fred brooks

Conceptual integrity is the most important consideration in system design.

—1975

I am more convinced than ever. Conceptual integrity is central to product quality.

—1995



what's a concept?

what's a concept?

a set or primitive representations

what's a concept?

a set or primitive representations

Char

what's a concept?

a set or primitive representations

Char Date

what's a concept?

a set or primitive representations

Char Date Keyword

what's a concept?

a set or primitive representations

Char Date Keyword Tweet

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord URL

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord URL

names referring to real world objects

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Char Date Keyword Tweet GPSCoord URL

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SSN

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Char Date Keyword Tweet GPSCoord URL

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SSN ISBN

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord URL

names referring to real world objects

SSN ISBN CallNo

what's a concept?

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Char Date Keyword Tweet GPSCoord URL

names referring to real world objects

SSN ISBN CallNo Address

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Char Date Keyword Tweet GPSCoord URL

names referring to real world objects

SSN ISBN CallNo Address

a set of structures

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord URL

names referring to real world objects

SSN ISBN CallNo Address

a set of structures

Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord URL

names referring to real world objects

SSN ISBN CallNo Address

a set of structures

Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

Member <MEMBER, ssn: MEMBER -> SSN, address: MEMBER -> Address>

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SSN ISBN CallNo Address

a set of structures

Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

Member <MEMBER, ssn: MEMBER -> SSN, address: MEMBER -> Address>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>

what's a concept?

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SSN ISBN CallNo Address

a set of structures

Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

Member <MEMBER, ssn: MEMBER -> SSN, address: MEMBER -> Address>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>

a set of events

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord URL

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SSN ISBN CallNo Address

a set of structures

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Member <MEMBER, ssn: MEMBER -> SSN, address: MEMBER -> Address>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>

a set of events

join <JOIN, ssn: JOIN -> SSN, addr: JOIN -> Address>

what's a concept?

a set or primitive representations

Char Date Keyword Tweet GPSCoord URL

names referring to real world objects

SSN ISBN CallNo Address

a set of structures

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Member <MEMBER, ssn: MEMBER -> SSN, address: MEMBER -> Address>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>

a set of events

join <JOIN, ssn: JOIN -> SSN, addr: JOIN -> Address>

lend <LEND, isbn: LEND -> ISBN, ssn: LEND -> SSN>

subconcepts

C' is a *subconcept* of C iff

$\text{fields}(C') \supseteq \text{fields}(C)$ and explanation of C' involves C

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Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

ShortLoanBook <..., SHORT: set BOOK, maxloan: SHORT -> Period>

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C' is a subconcept of C iff

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Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

ShortLoanBook <..., SHORT: set BOOK, maxloan: SHORT -> Period>

Book ←----- **ShortLoanBook**

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$\text{fields}(C') \supseteq \text{fields}(C)$ and explanation of C' involves C

Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

ShortLoanBook <..., SHORT: set BOOK, maxloan: SHORT -> Period>

Book ←----- **ShortLoanBook**

may have no extra fields

Book ←----- **NonCirculatingBook**

dependency

C' *depends on* C iff

C' cannot exist without C and explanation of C' involves C

dependency

C' *depends on* C iff

C' cannot exist without C and explanation of C' involves C

may arise because:

elements of C' refer to elements of C

dependency

C' depends on C iff

C' cannot exist without C and explanation of C' involves C

may arise because:

elements of *C'* refer to elements of *C*

Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

Member <MEMBER, ssn: MEMBER -> SSN, address: MEMBER -> Address>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>

dependency

C' depends on C iff

C' cannot exist without C and explanation of C' involves C

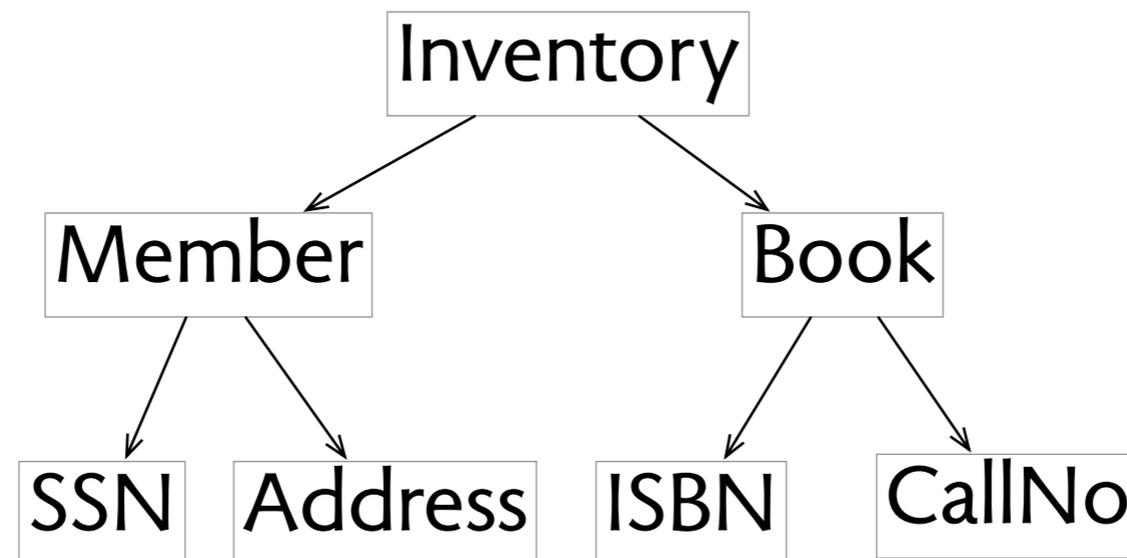
may arise because:

elements of *C'* refer to elements of *C*

Book <BOOK, isbn: BOOK -> ISBN, callno: BOOK -> CallNo>

Member <MEMBER, ssn: MEMBER -> SSN, address: MEMBER -> Address>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>



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C' *depends on* C iff

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lend <LEND, isbn: LEND -> ISBN, ssn: LEND -> SSN>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>

dependency

C' depends on C iff

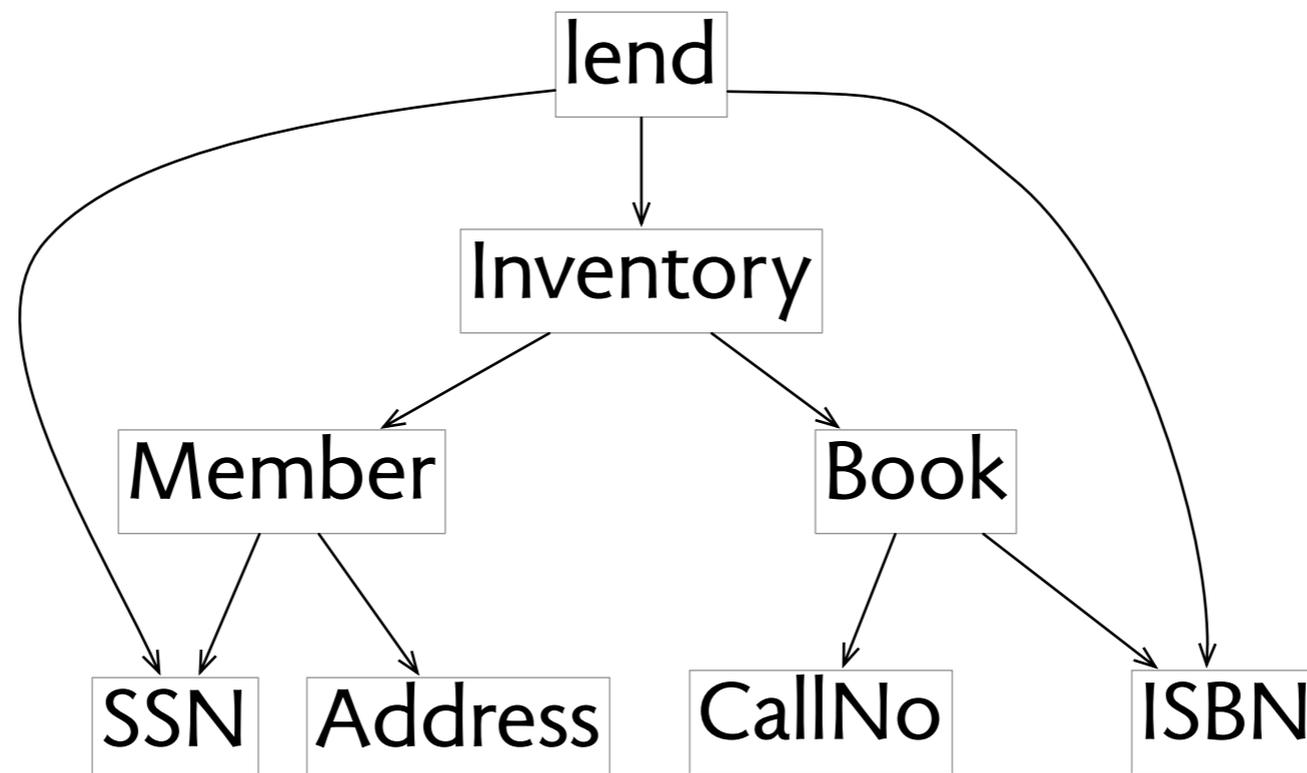
C' cannot exist without C and explanation of C' involves C

may arise because:

occurrence of event in C' affects or affected by state in C

lend <LEND, isbn: LEND -> ISBN, ssn: LEND -> SSN>

Inventory <shelved: set BOOK, lent: MEMBER -> BOOK>

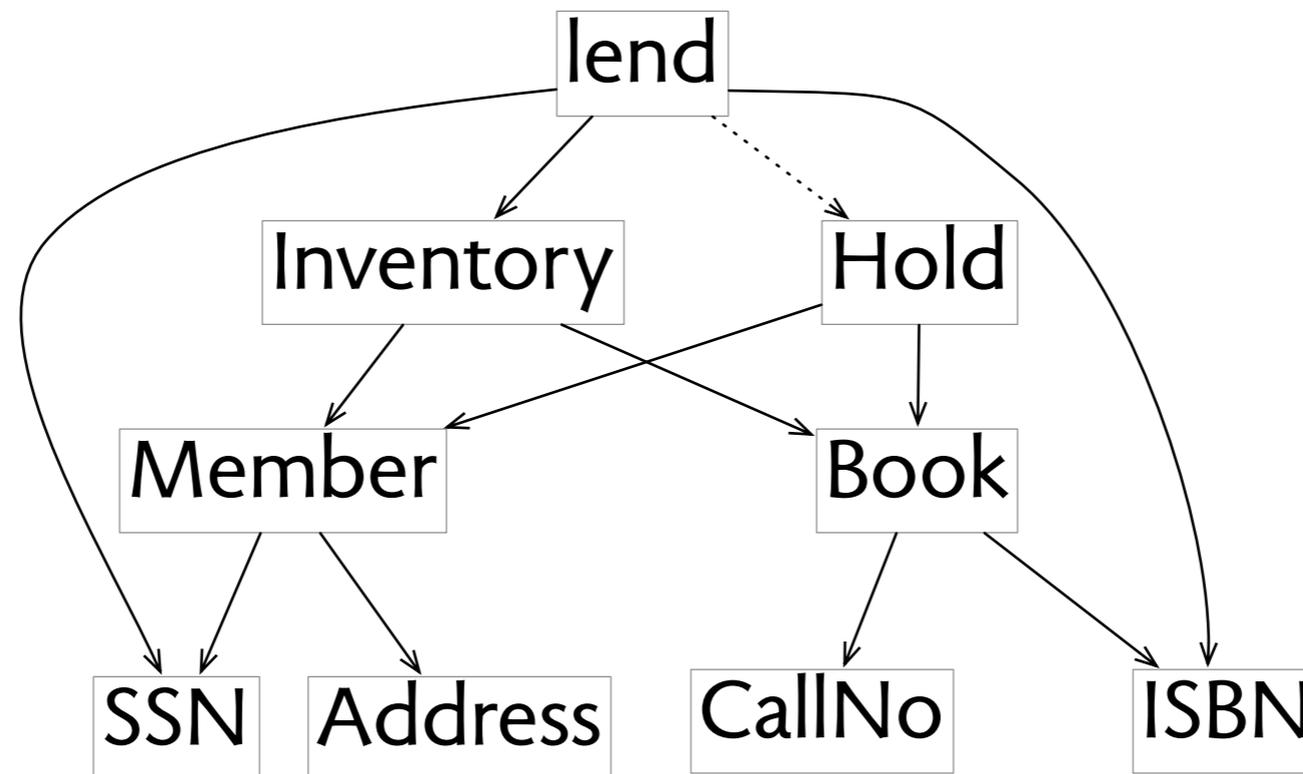


weak dependency

C' weakly depends on C iff
explanation of C' involves C but C' can exist without C

weak dependency

C' weakly depends on C iff
explanation of C' involves C but C' can exist without C



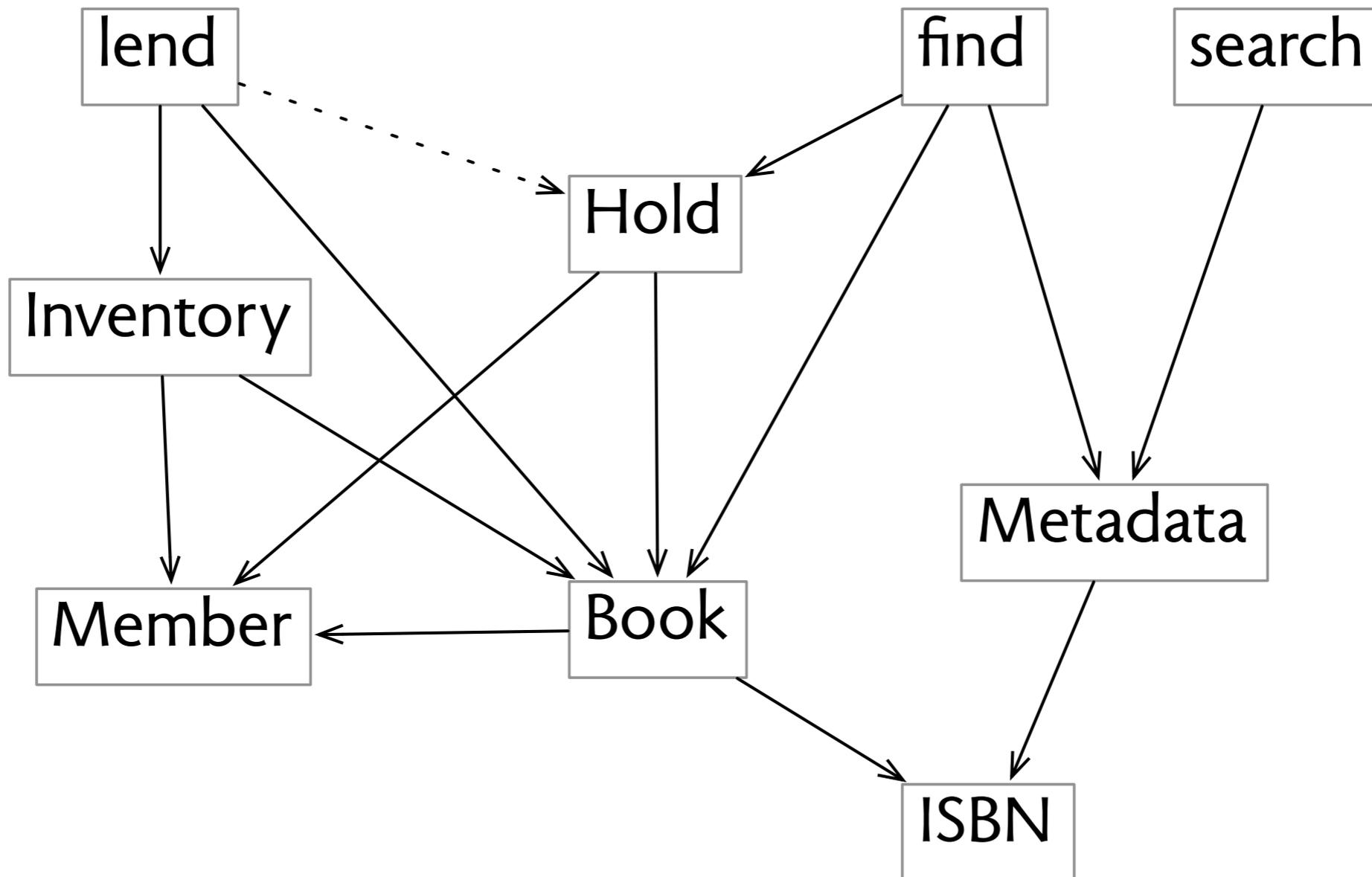
features

a *feature* is a set of concepts that

- (a) has useful function
- (b) is closed under dependence

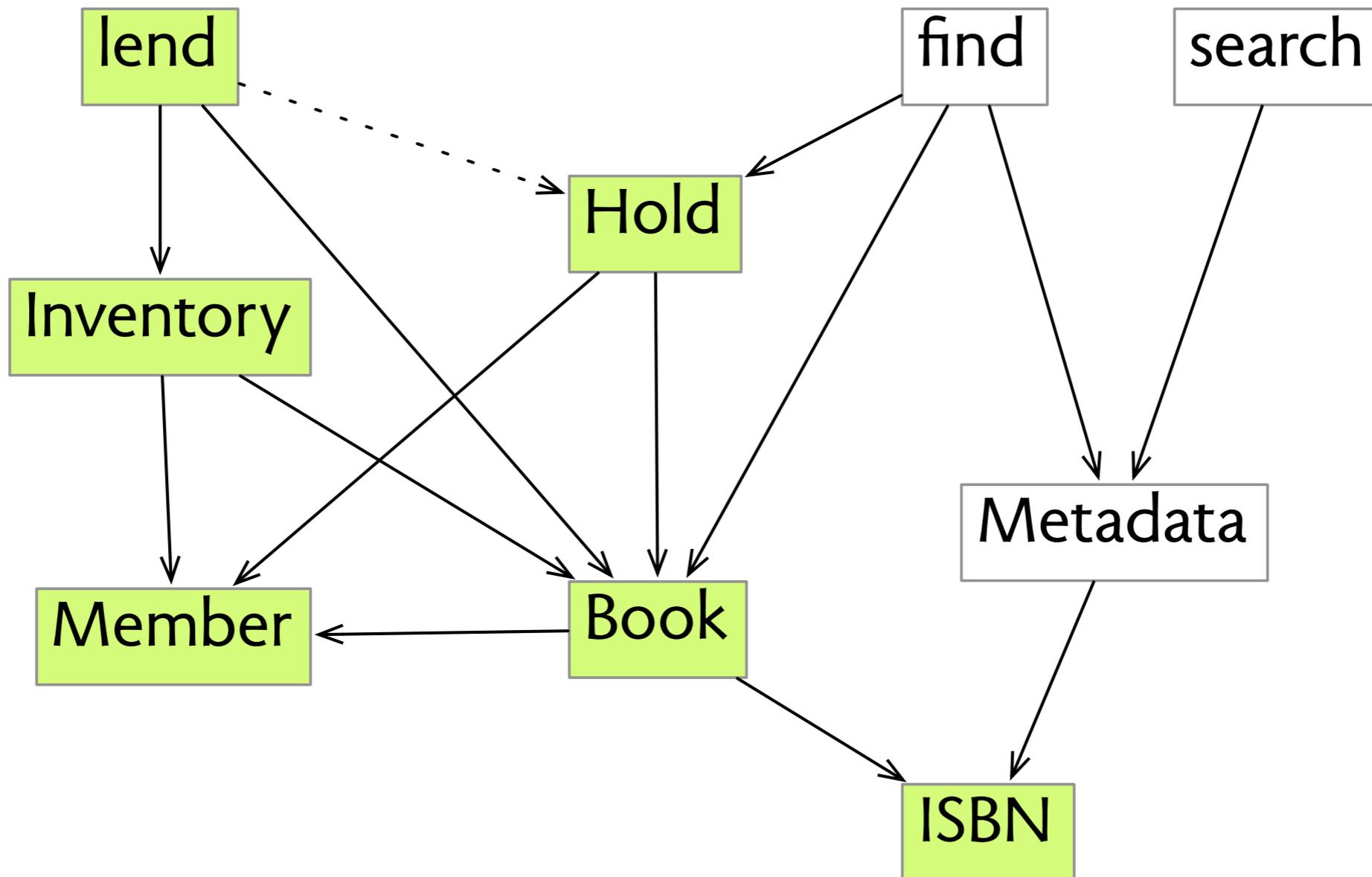
features

a *feature* is a set of concepts that
(a) has useful function
(b) is closed under dependence



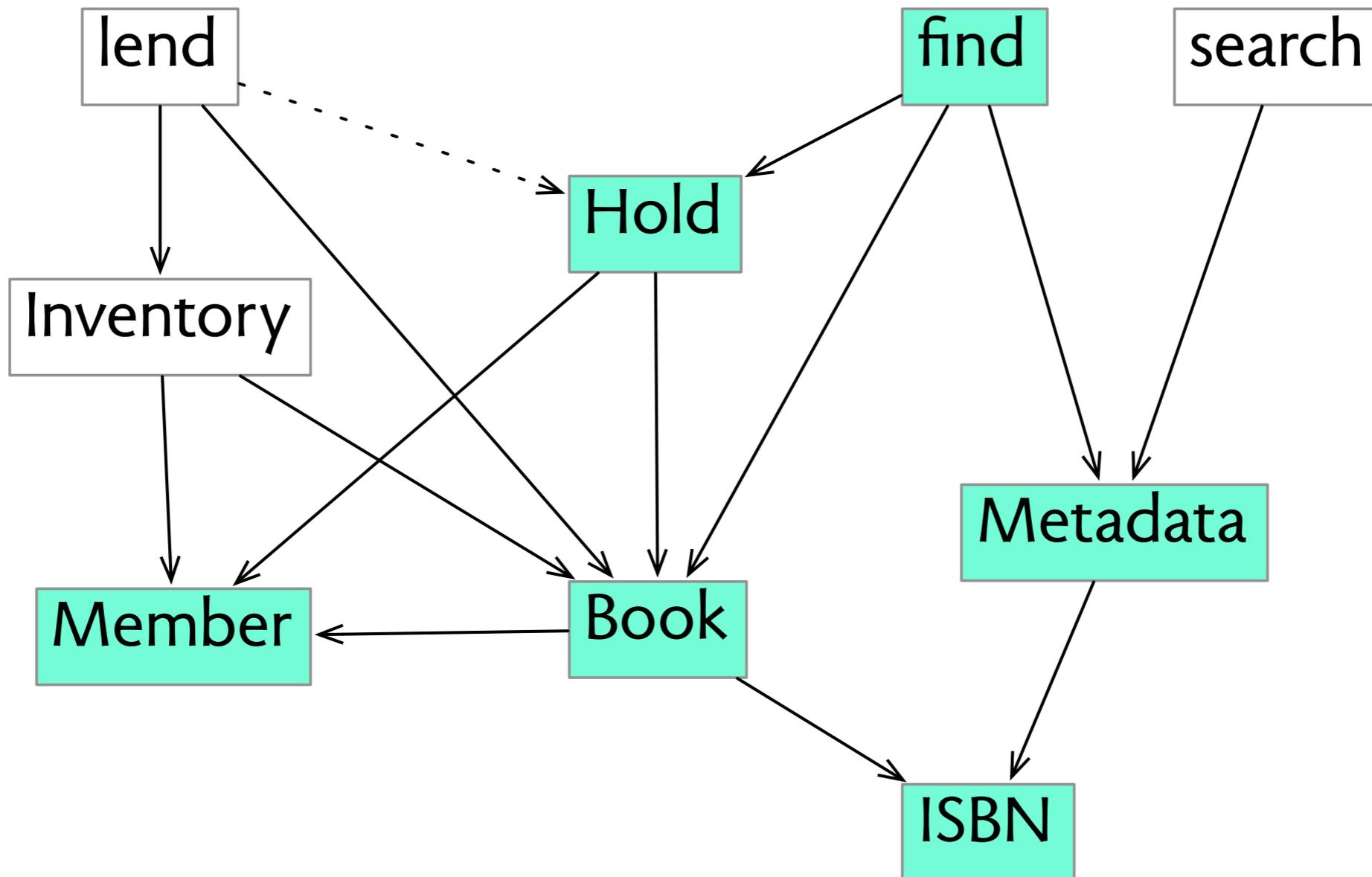
features

a *feature* is a set of concepts that
(a) has useful function
(b) is closed under dependence



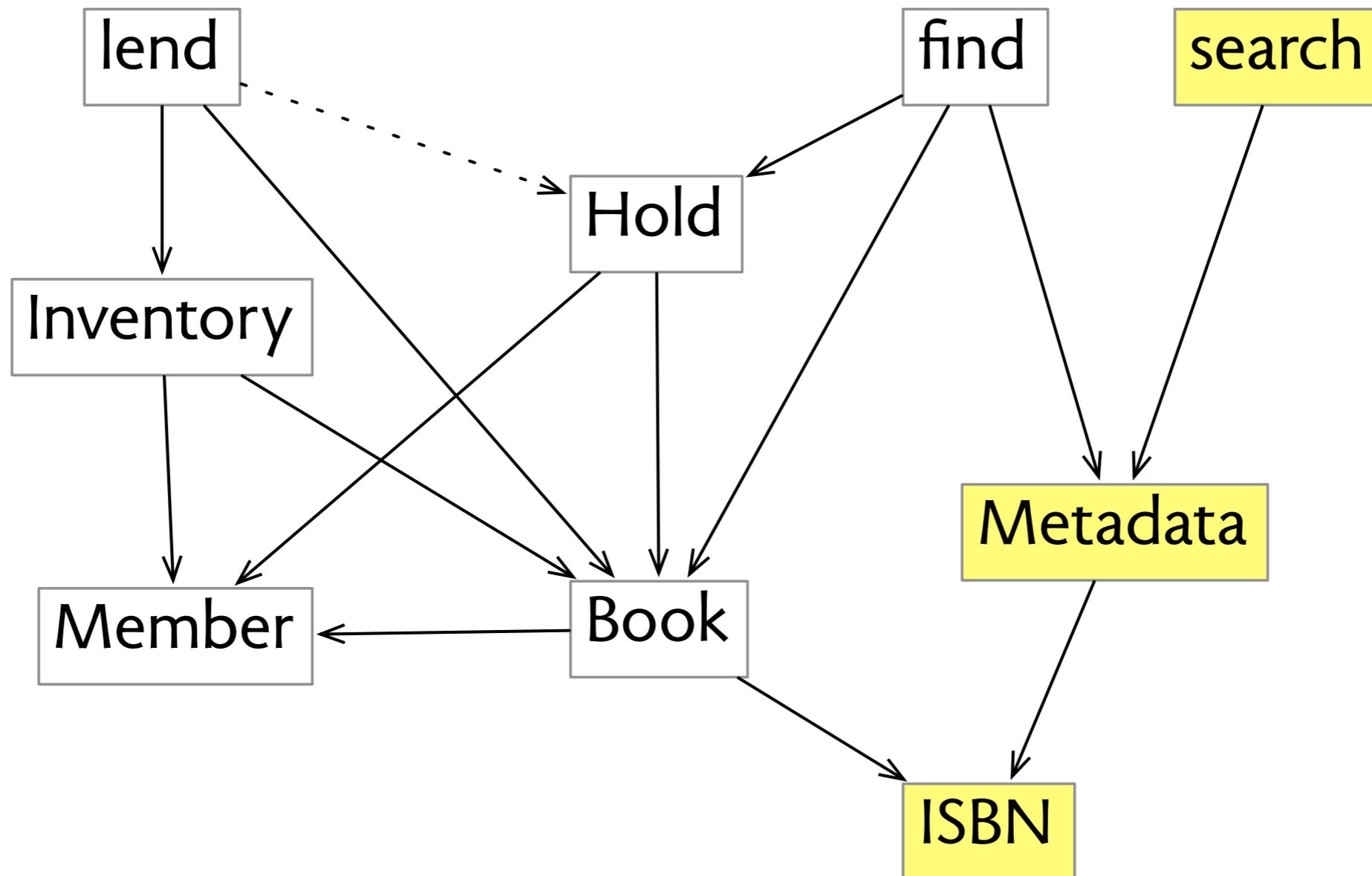
features

a *feature* is a set of concepts that
(a) has useful function
(b) is closed under dependence



features

a *feature* is a set of concepts that
(a) has useful function
(b) is closed under dependence



where do concepts come from?

where do concepts come from?

**domain concepts:
exist in problem domain**

photo, movie, song

direct flight, code share

401k, CDO, commission

typeface, ligature

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photo, movie, song

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401k, CDO, commission

typeface, ligature

**analogic concepts:
based on known notions**

blog post, email, tweet

desktop, folder, file

layer, mask, stacking

cart, order, item

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**domain concepts:
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**analogic concepts:
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desktop, folder, file

layer, mask, stacking

cart, order, item

**synthetic concepts:
invented for software**

relative reference

hypertext link

tag, keyword

select, cut buffer

where do concepts come from?

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confused concepts: a big problem!
direct flights, CSS pixel dimensions

where do concepts come from?

**domain concepts:
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select, cut buffer

confused concepts: a big problem!
direct flights, CSS pixel dimensions

some concepts are key enablers
relative references, paragraph styles

design criteria

orthogonality

- › concepts are independent
- › concepts are coupled in overlapping features

orthogonality

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- › concepts are coupled in overlapping features

generality

- › concepts are rich enough to support distinct features
- › extra concepts added instead of generalizing existing ones

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consistency

- › subconcepts are treated uniformly
- › subconcepts have unexpectedly different features

orthogonality apple keynote

orthogonality apple keynote

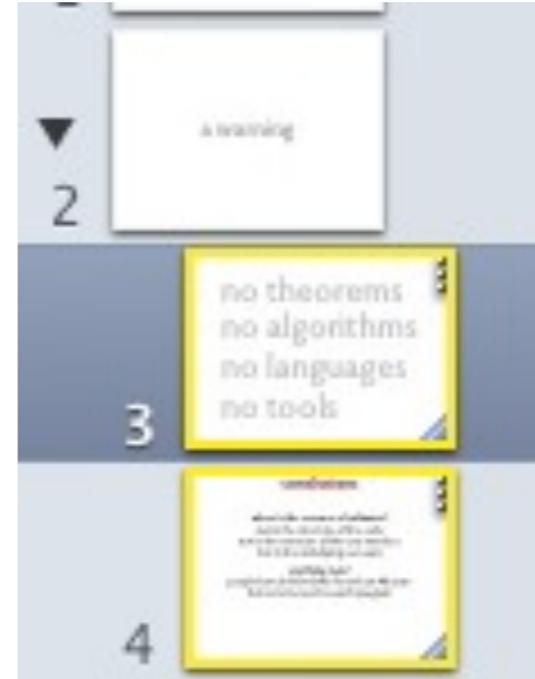


skip slide

orthogonality apple keynote



skip slide

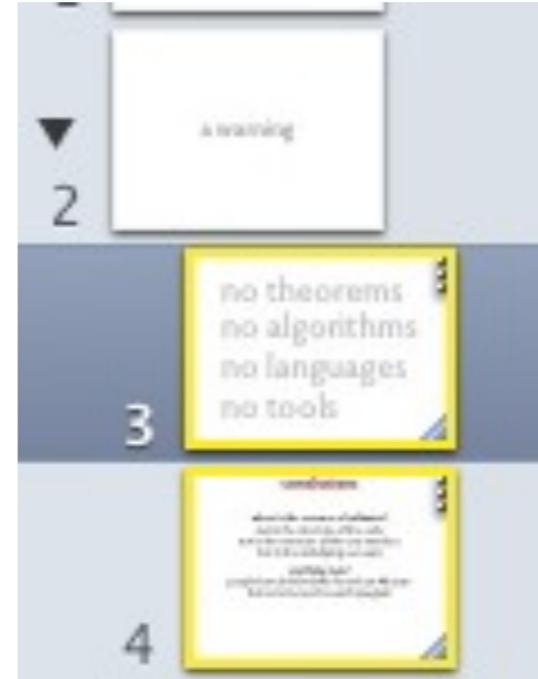


make parent

orthogonality apple keynote



skip slide



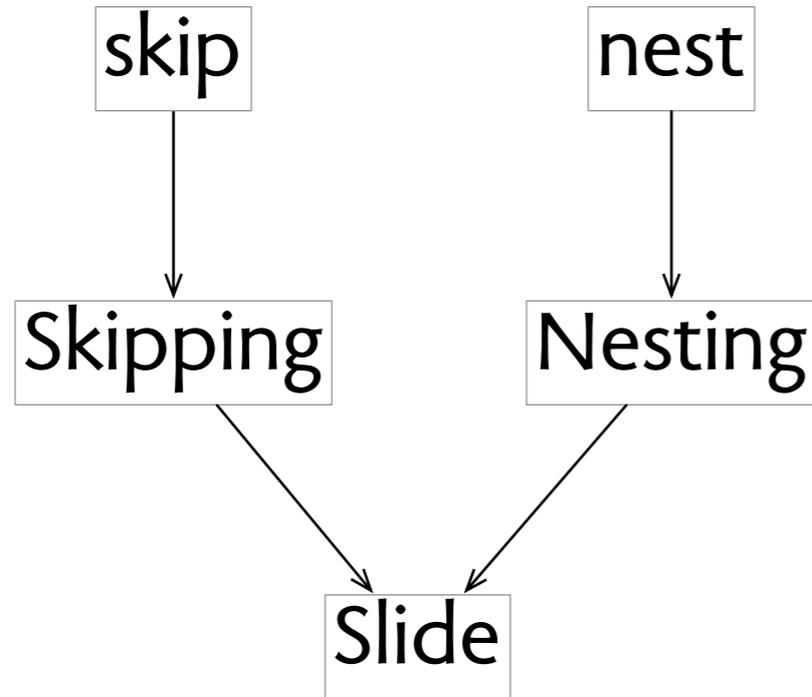
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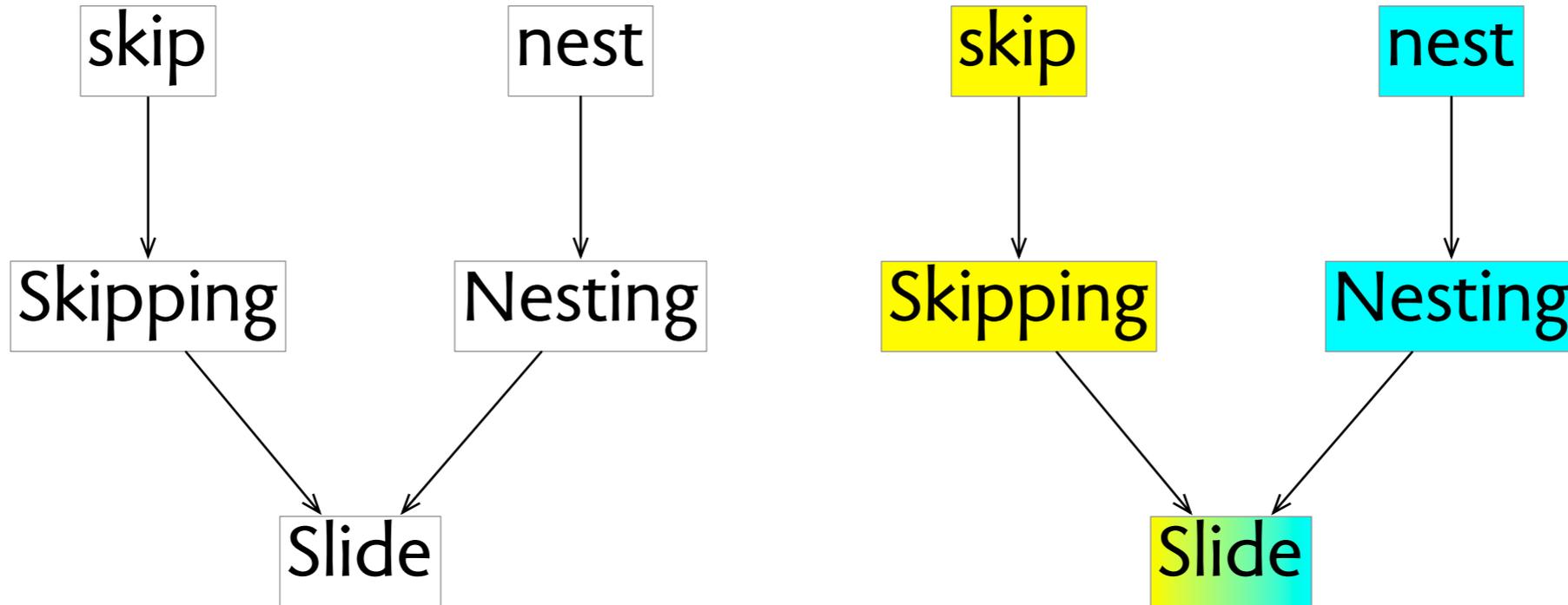
make parent
and skip

orthogonality apple keynote

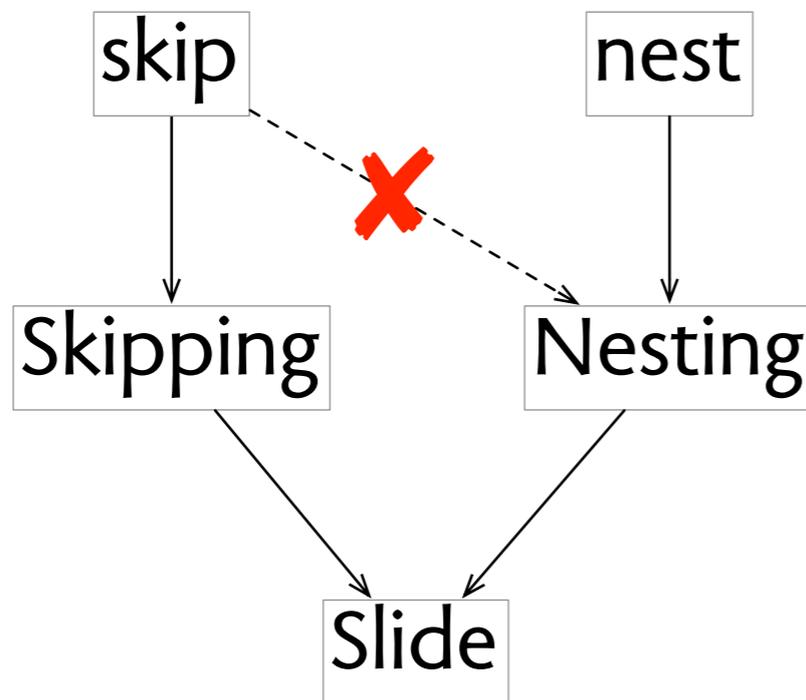
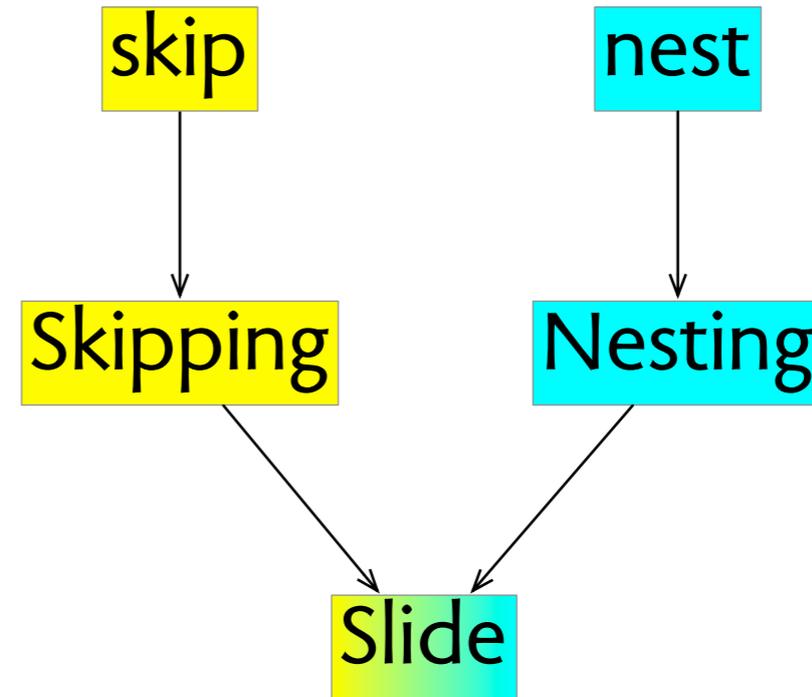
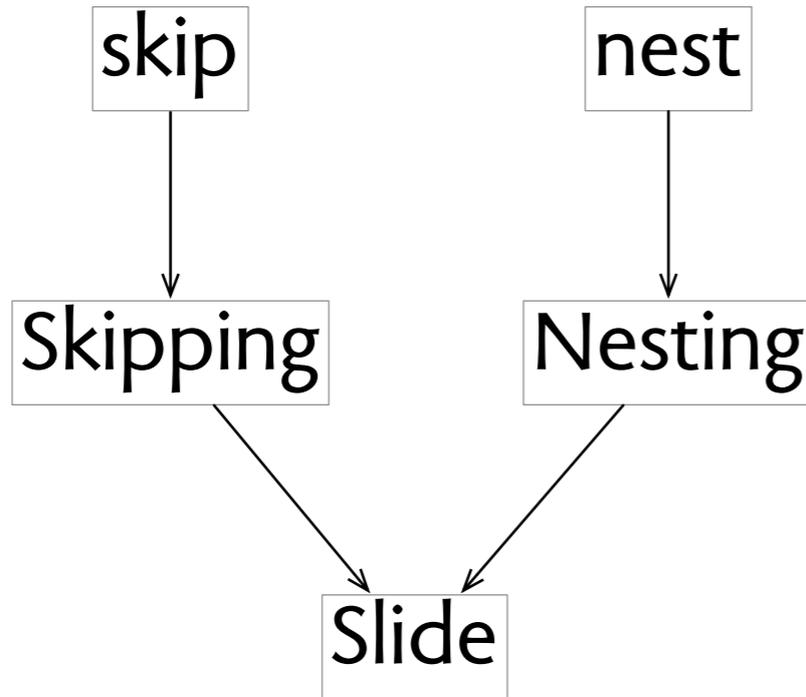
orthogonality apple keynote



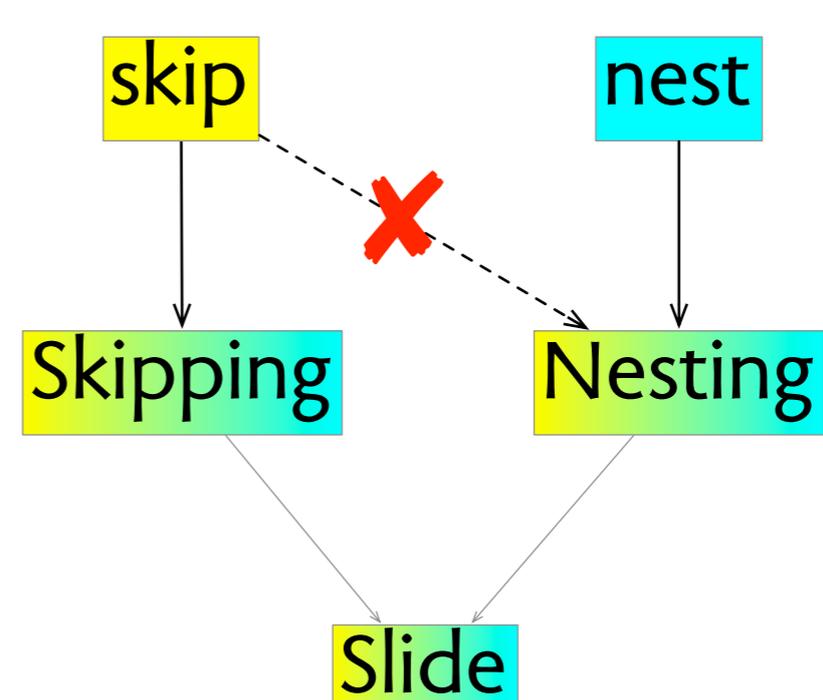
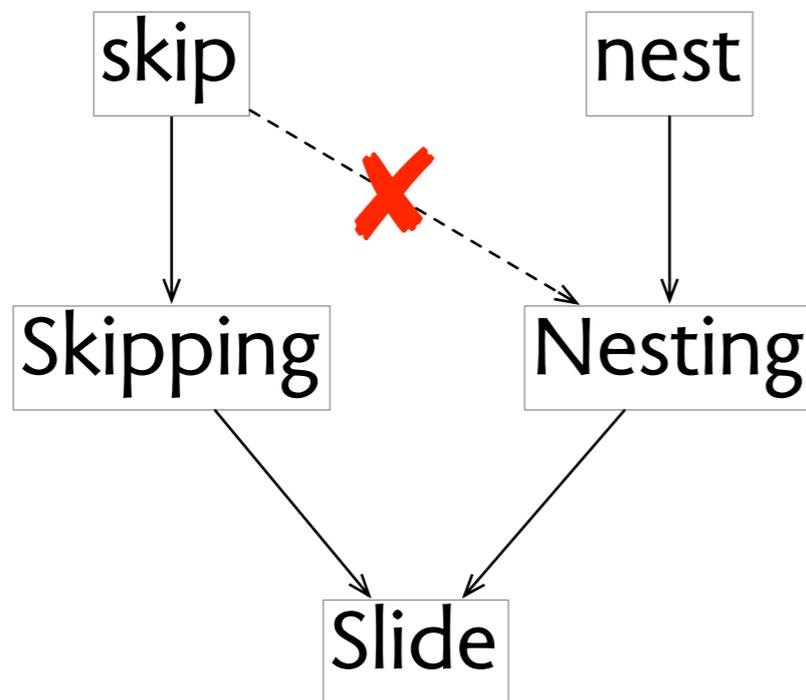
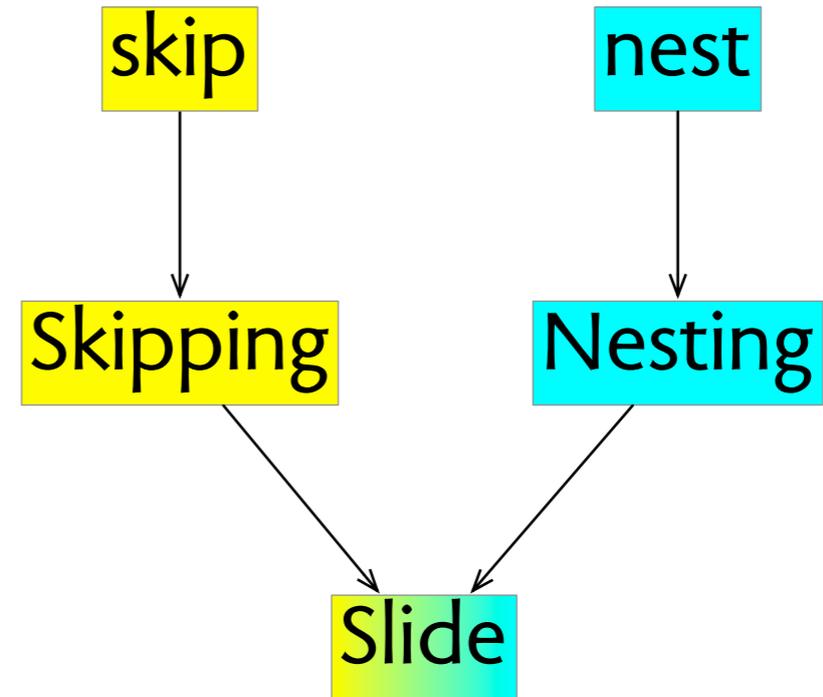
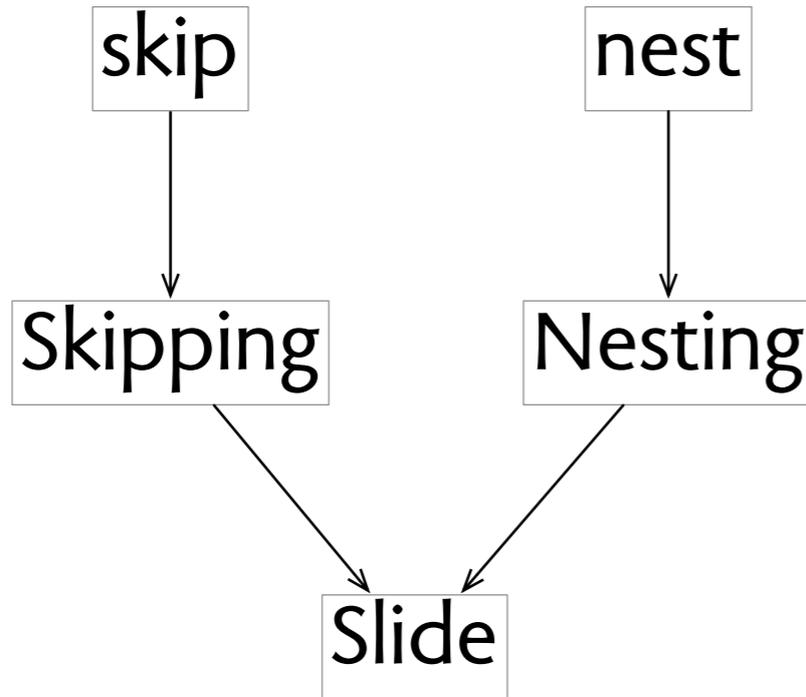
orthogonality apple keynote



orthogonality apple keynote



orthogonality apple keynote



orthogonality faucets

orthogonality faucets



coupled

orthogonality faucets



coupled



uncoupled

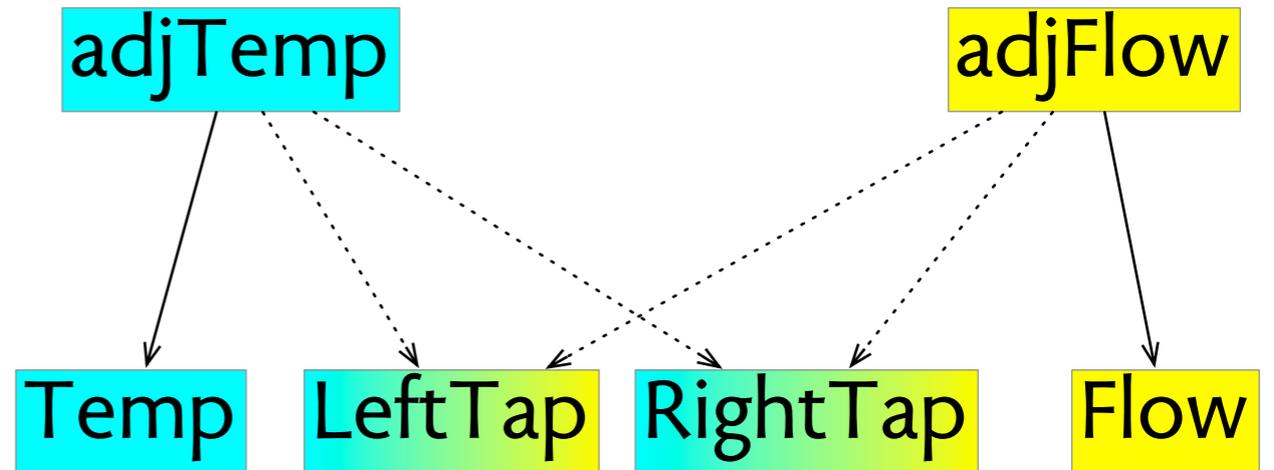
orthogonality faucets



coupled



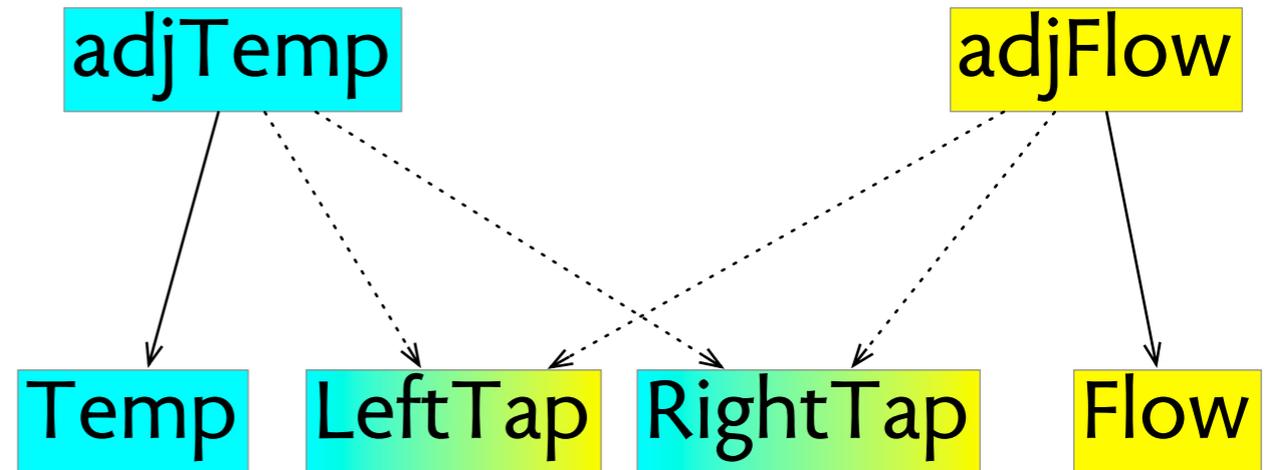
uncoupled



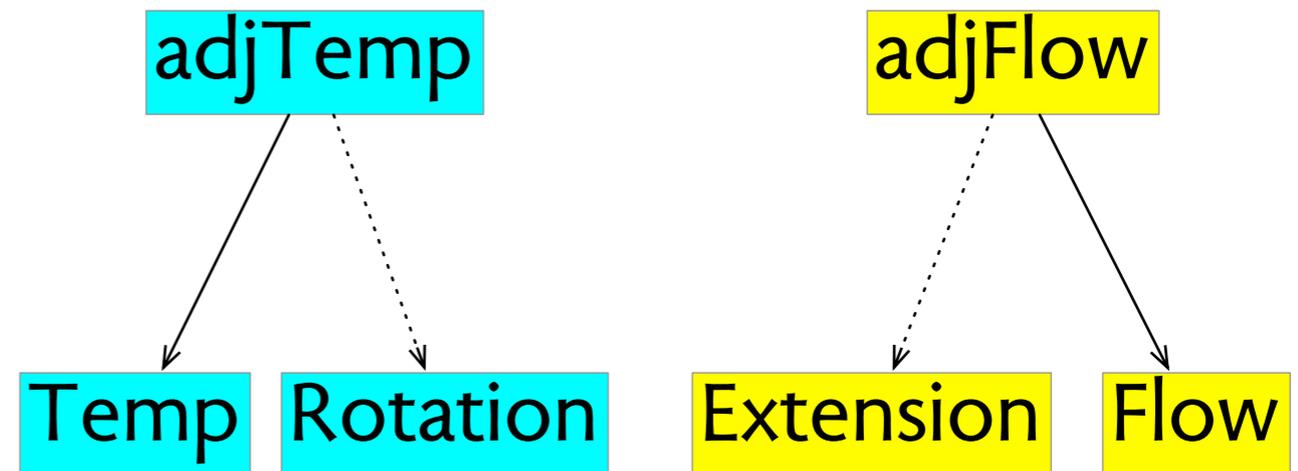
orthogonality faucets



coupled



uncoupled



orthogonality apple mail

Sort by Date ▾		
↳ Santiago Perez De Rosso	12/11/13	32 KB 2 ▶
designations and dependences		
↳ Santiago Perez De Rosso	10/31/13	7 KB 1 ▶
Fwd: Software Carpentry and Git		
Jonathan Edwards	10/30/13	12 KB 1 ▶
Fwd: Re: 500 lines or less		
↳ Michael Jackson	10/25/13	3 KB 1 ▶
Conceptual Models		
Daniel Jackson	10/11/13	46 KB 2 ▶
Analysing git with Alloy		
↳ Leonid Grinberg	10/11/13	5 KB 1 ▶
some initial "bad design" examples		
↳ Kelly Zhang	10/10/13	13 KB 1 ▶
Re: SuperUROP		
↳ Santiago Perez De Rosso 	9/13/13	376 KB 1 ▶
SuperUROP project - Re-designing Gmail		
William G. Griswold	9/9/13	197 KB 16 ▶
memo on research agenda		
Daniel Jackson	8/18/13	42 KB 2 ▶
Conceptual Design of Software: A Research Agenda		
Daniel Jackson	7/26/13	72 KB 3 ▶
Shepherding Note 2		
↳ Santiago Perez De Rosso	7/12/13	17 KB 1 ▶
Re: memo		
↳ Santiago Perez De Rosso 	6/28/13	255 KB
Re-thinking software design kickoff kit		
↳ Michael Jackson	6/26/13	10 KB 1 ▶
Re: yippee!		
↳ Anthony Finkelstein	6/7/13	7 KB 1 ▶
Re: requirements diagrams with influences		
↳ Santiago Perez De Rosso 	5/16/13	253 KB 1 ▶
Re-thinking software design kickoff kit		

Daniel

[See More from William Griswold](#)

Daniel Jackson <dnj@mit.edu> September 1, 2013 5:38 PM
To: Shriram Krishnamurthi <sk@cs.brown.edu> [Hide Details](#)
Cc: Kevin Sullivan <sullivan.kevinj@gmail.com>, William Griswold <wgg@cs.ucsd.edu> Sent - csail imap
Re: memo on research agenda

Shriram,

That's very good. But it strikes me more as a good definition of what makes a good model. So is a design with CI one that has a model with these properties?

--Daniel

[See More from Shriram Krishnamurthi](#)

Daniel Jackson <dnj@mit.edu> September 1, 2013 5:36 PM
To: Kevin Sullivan <sullivan.kevinj@gmail.com> [Hide Details](#)
Cc: Shriram Krishnamurthi <sk@cs.brown.edu>, William Griswold <wgg@cs.ucsd.edu> Sent - csail imap
Re: memo on research agenda

Kevin,

Thanks for the link. A thought provoking article. I agree that the biology-homeopathy equation is strange; it's also odd that he acts surprised that the view that a program is a mathematical construct isn't more widely accepted. It seems to me that the question of whether software should be treated as an engineered system (like an automobile, the comparison he starts by rejecting) or as a mathematical construct should be answered operationally rather than ontologically. He almost recognizes this by arguing that the mathematical viewpoint should lead to more predictable and reliable software. Be he seems to willfully ignore the evidence in favor of thinking of software in broader design and engineering terms. It's all very well to say that software doesn't need to be maintained like a car does, but in practice it does, and the reason seems less important than the fact that it is so.

selecting a message outside the conversation
causes all messages in the conversation to be selected

orthogonality apple mail

The screenshot shows the Apple Mail interface. On the left is a list of messages, sorted by date. The selected message is highlighted in blue. On the right is the content of the selected message, which is a conversation thread.

Sort by Date ▾	
↩ Santiago Perez De Rosso designations and dependences	12/11/13 32 KB 2 ▶
↩ Santiago Perez De Rosso Fwd: Software Carpentry and Git	10/31/13 7 KB 1 ▶
Jonathan Edwards Fwd: Re: 500 lines or less	10/30/13 12 KB 1 ▶
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Daniel Jackson Analysing git with Alloy	10/11/13 46 KB 2 ▶
↩ Leonid Grinberg some initial "bad design" examples	10/11/13 5 KB 1 ▶
↩ Kelly Zhang Re: SuperUROP	10/10/13 13 KB 1 ▶
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William G. Griswold memo on research agenda	9/9/13 197 KB 16 ▶
Daniel Jackson Conceptual Design of Software: A Research Agenda	8/18/13 42 KB 2 ▶
Daniel Jackson Shepherding Note 2	7/26/13 72 KB 3 ▶
↩ Santiago Perez De Rosso Re: memo	7/12/13 17 KB 1 ▶
↩ Santiago Perez De Rosso Re-thinking software design kickoff kit	6/28/13 255 KB
↩ Michael Jackson Re: yippeel	6/26/13 10 KB 1 ▶
↩ Anthony Finkelstein Re: requirements diagrams with influences	6/7/13 7 KB 1 ▶
↩ Santiago Perez De Rosso Re-thinking software design kickoff kit	5/16/13 253 KB 1 ▶

William G. Griswold <wgg@cs.ucsd.edu> September 9, 2013 4:55 PM
[Hide Details](#)
To: Daniel Jackson <dnj@mit.edu>
Cc: Kevin Sullivan <sullivan.kevinj@gmail.com>, Shriram Krishnamurthi <sk@cs.brown.edu>
Re: memo on research agenda

Just catching up here, sorry for the long silence.

Thanks for thinking so hard about my thoughts.

Your observation about CI reducing the design space is a superb one. The fact that this works at both the artifact and behavioral levels makes it especially attractive. I'll definitely use this idea when I next teach it!

--bill

On 9/1/13 3:10 PM, Daniel Jackson wrote:
Hi Bill,

On Aug 21, 2013, at 9:59 PM, William Griswold <wgg@cs.ucsd.edu <<mailto:wgg@cs.ucsd.edu>>> wrote:

If I might counter/expand on this a little here. In Daniel's manuscript, he critiqued my definition of conceptual integrity for being too code centric.

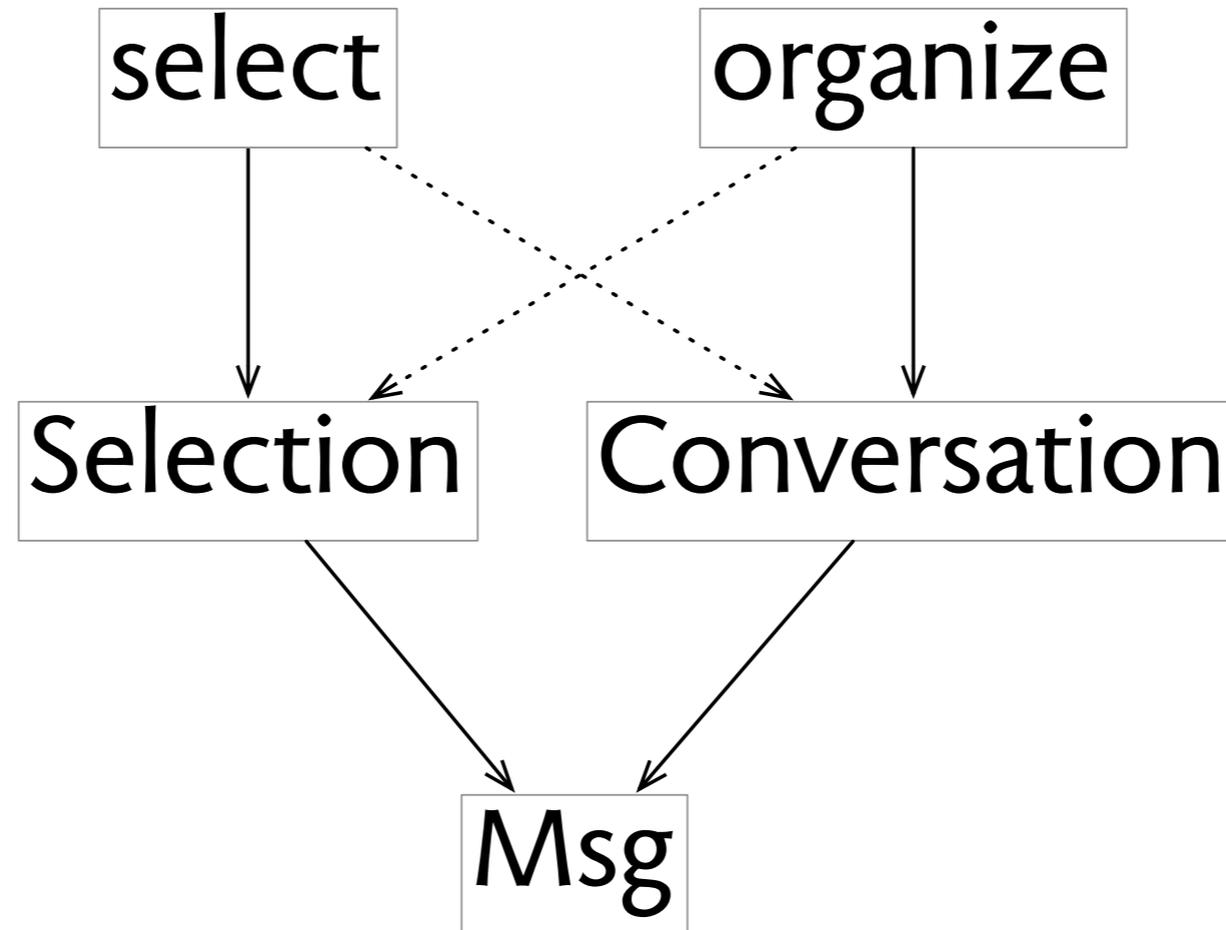
I didn't mean to imply that. I meant only to be observing that one definition of CI is what I called "stylistic uniformity", and I quoted your definition as (what seemed to me) a nice and clear articulation of that. I think CI likely involves that, but other properties too. I went on to say that my view of CI is that it's not so much about how the code is structured, but that wasn't intended to be a critique of your point of view. Code seems to be a very good arena in which to define the notion of stylistic uniformity.

While I agree, I think that my definition is appropriate for software engineers in contrast to interaction designers (or software engineers doing interaction design, which is dangerous -- just look at Google's interaction designs :).

Your definition, it seems to me, would work for I/A design too: all it seems to require is the idea that you can perceive the hidden hand behind the artifact, and that seems equally true of an interface.

selecting a message outside the conversation
causes all messages in the conversation to be selected

orthogonality apple mail



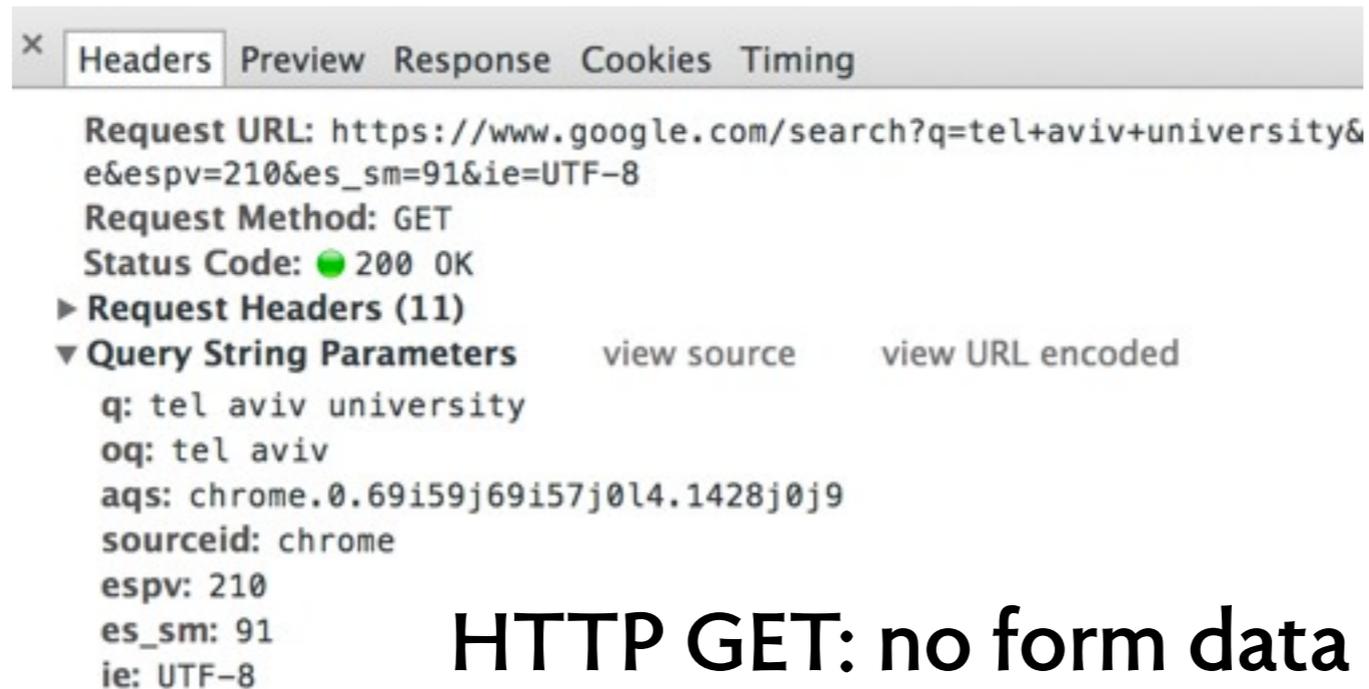
orthogonality HTTP methods

orthogonality HTTP methods

```
x Headers Preview Response Cookies Timing
Request URL: https://www.google.com/search?q=tel+aviv+university&
e&espv=210&es_sm=91&ie=UTF-8
Request Method: GET
Status Code: 200 OK
▶ Request Headers (11)
▼ Query String Parameters view source view URL encoded
q: tel aviv university
oq: tel aviv
aqs: chrome.0.69i59j69i57j0l4.1428j0j9
sourceid: chrome
espv: 210
es_sm: 91
ie: UTF-8
```

HTTP GET: no form data

orthogonality HTTP methods



× Headers Preview Response Cookies Timing

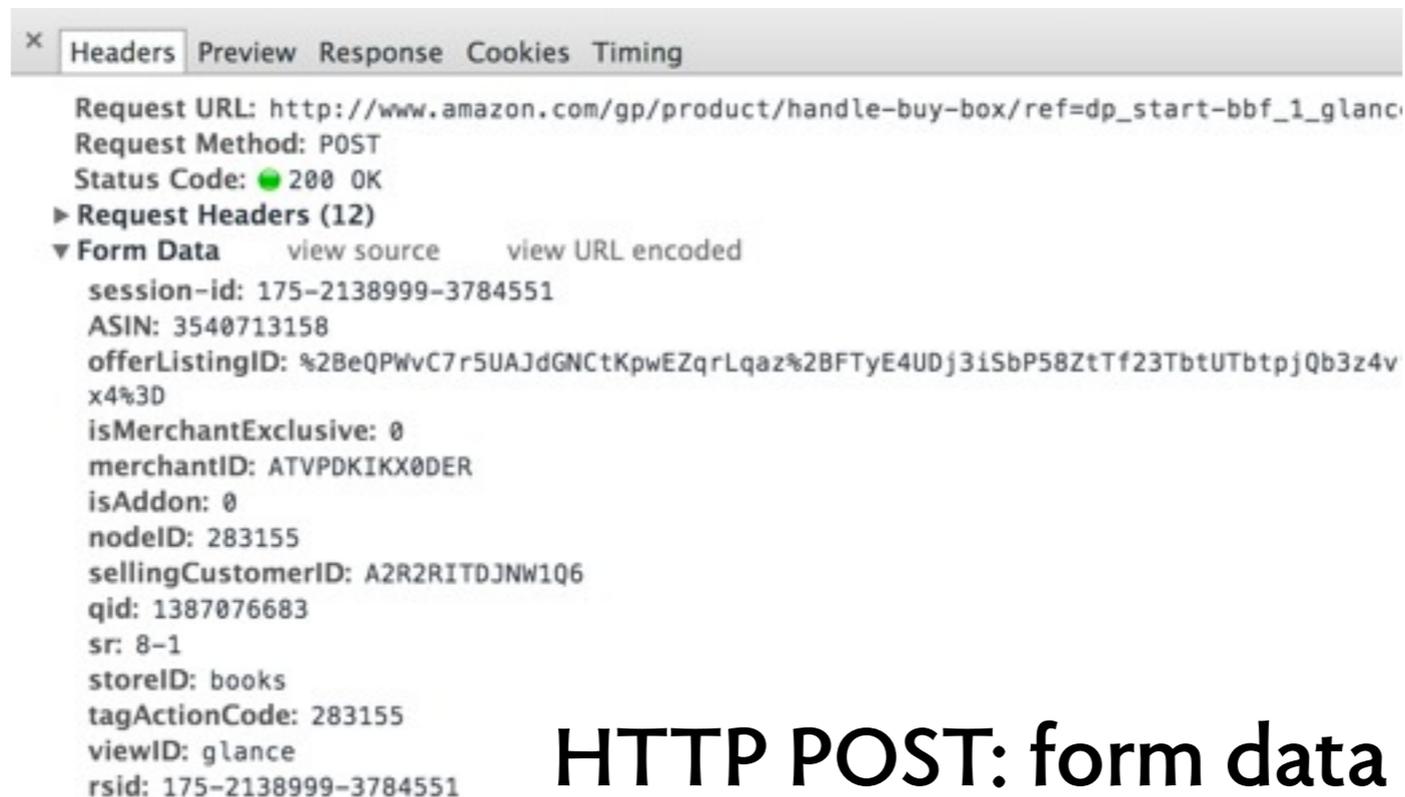
Request URL: https://www.google.com/search?q=tel+aviv+university&e&espv=210&es_sm=91&ie=UTF-8
Request Method: GET
Status Code: ● 200 OK

▶ Request Headers (11)

▼ Query String Parameters [view source](#) [view URL encoded](#)

- q: tel aviv university
- oq: tel aviv
- aqs: chrome.0.69i59j69i57j0l4.1428j0j9
- sourceid: chrome
- espv: 210
- es_sm: 91
- ie: UTF-8

HTTP GET: no form data



× Headers Preview Response Cookies Timing

Request URL: http://www.amazon.com/gp/product/handle-buy-box/ref=dp_start-bbf_1_glance
Request Method: POST
Status Code: ● 200 OK

▶ Request Headers (12)

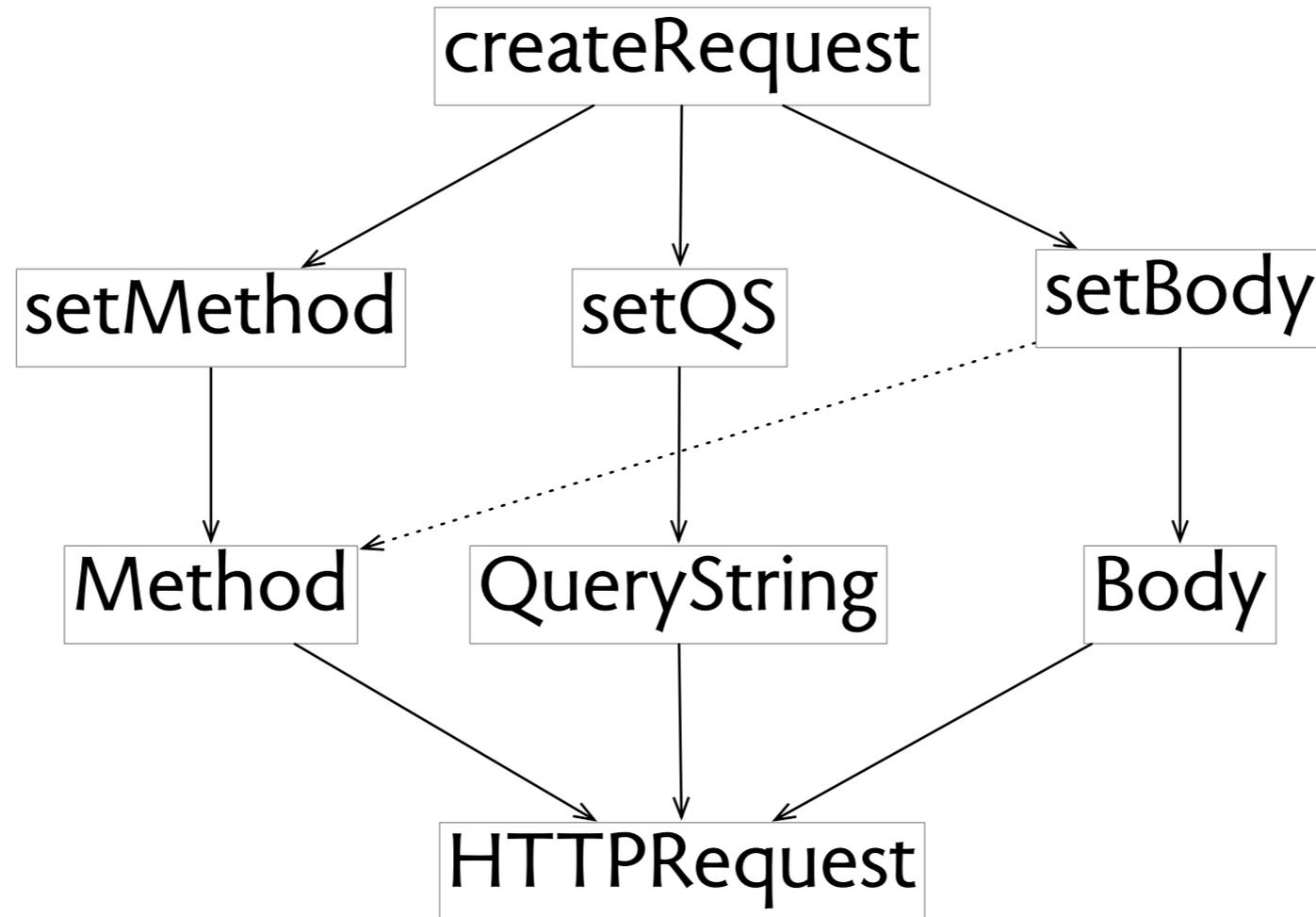
▼ Form Data [view source](#) [view URL encoded](#)

- session-id: 175-2138999-3784551
- ASIN: 3540713158
- offerListingID: %2BeQPwvC7r5UAJdGNctKpwEZqrLqaz%2BFTyE4UDj3iSbP58ZtTf23TbtUTbtpjQb3z4vx4%3D
- isMerchantExclusive: 0
- merchantID: ATVPDKIKX0DER
- isAddon: 0
- nodeID: 283155
- sellingCustomerID: A2R2RITDJNW1Q6
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- viewID: glance
- rsid: 175-2138999-3784551

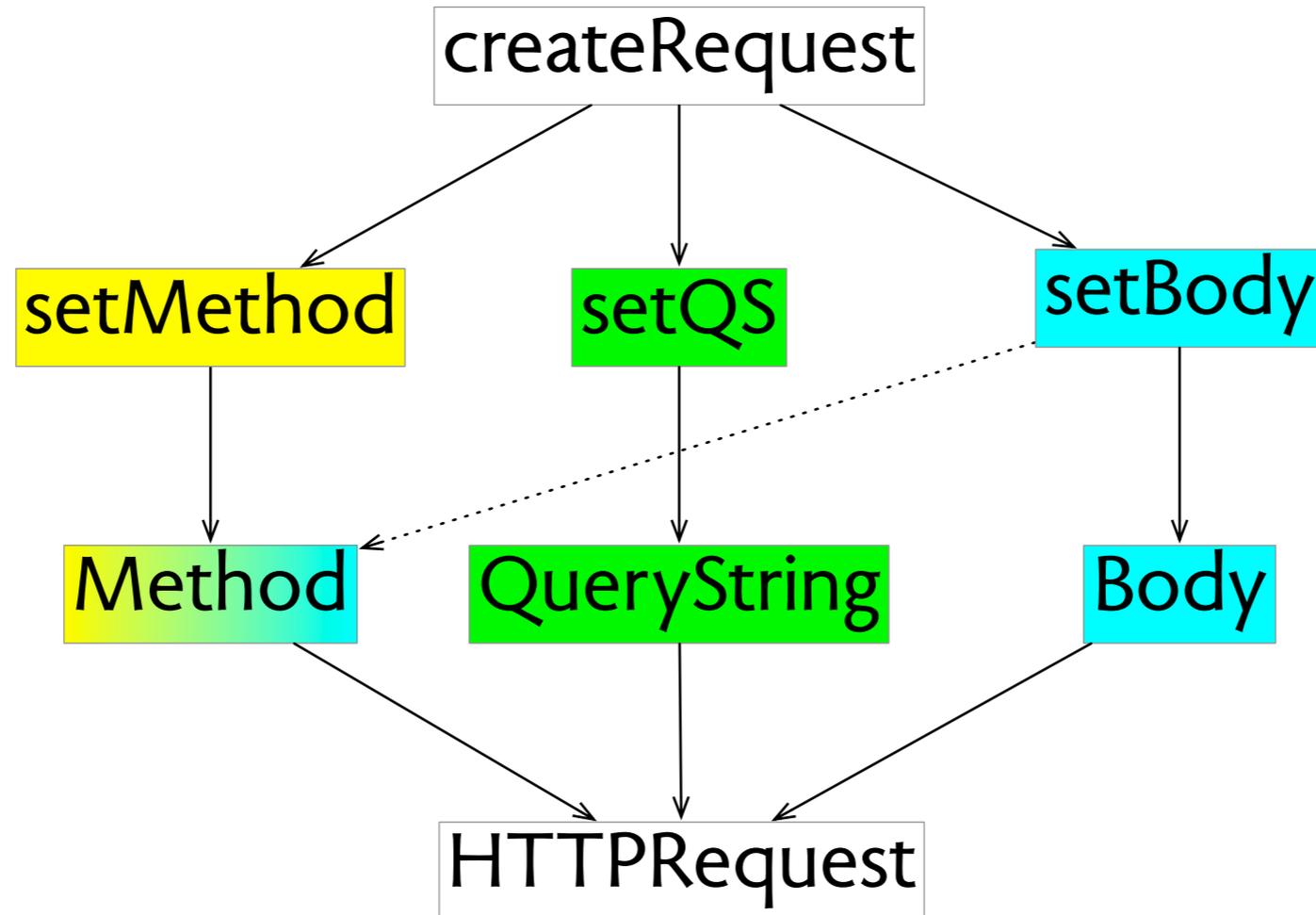
HTTP POST: form data

orthogonality HTTP methods

orthogonality HTTP methods

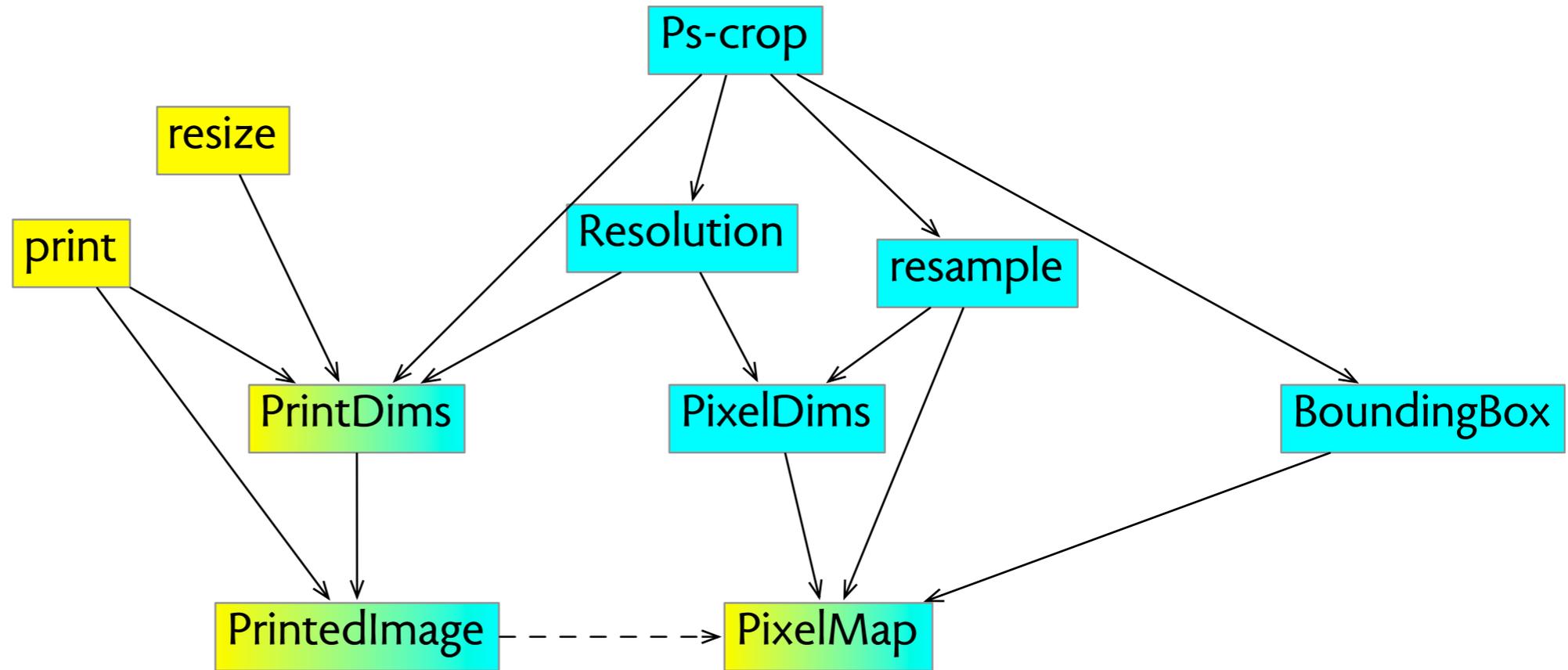


orthogonality HTTP methods

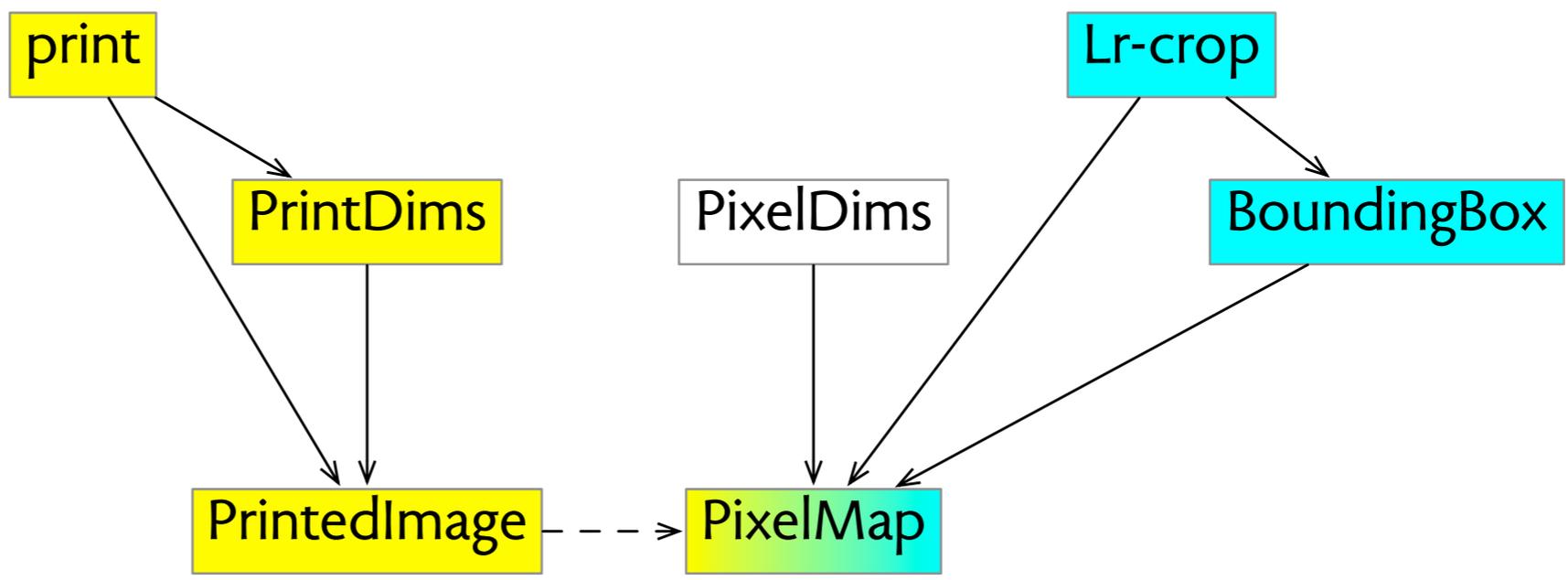
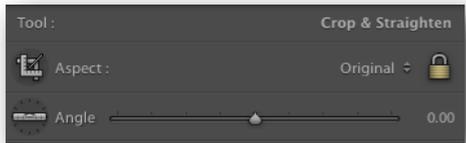
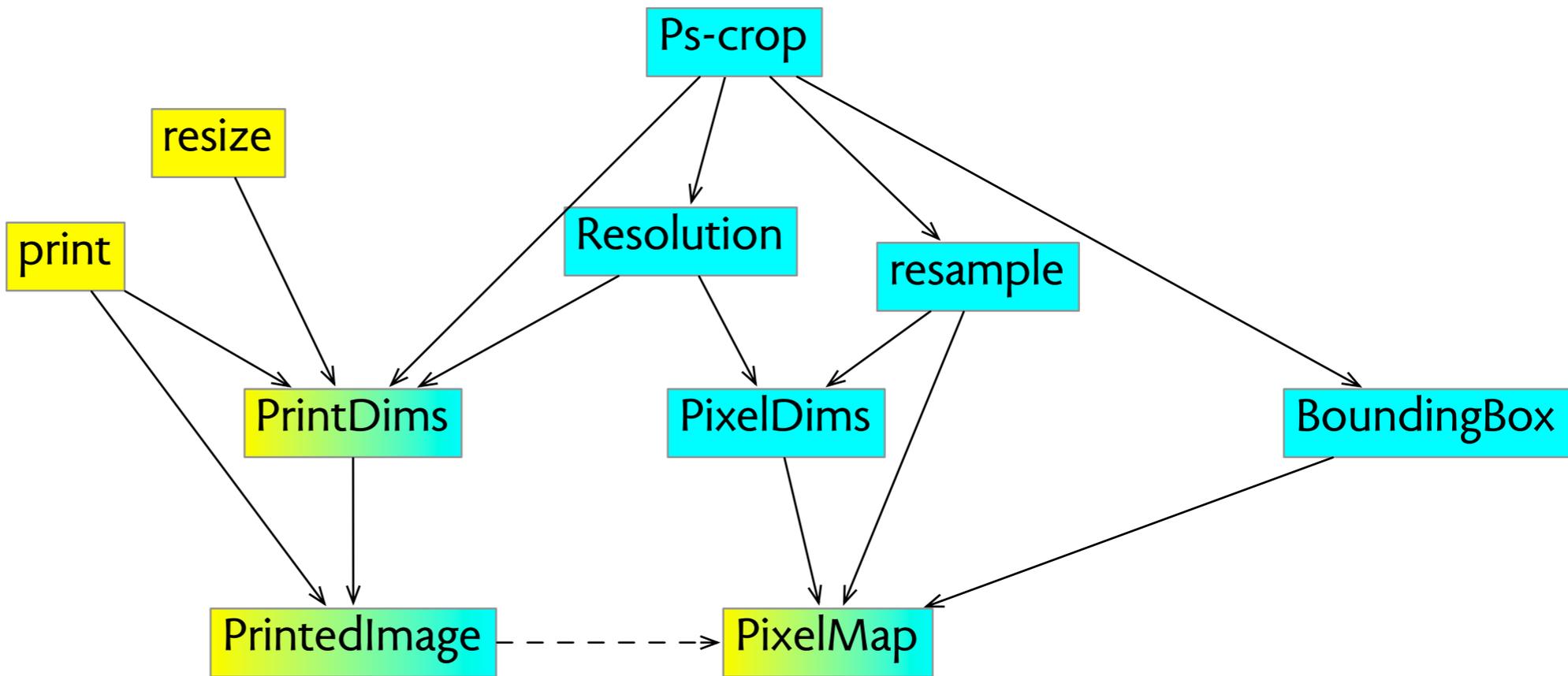


orthogonality cropping in Ps and Lr

orthogonality cropping in Ps and Lr



orthogonality cropping in Ps and Lr



generality apple keynote

generality apple keynote

text



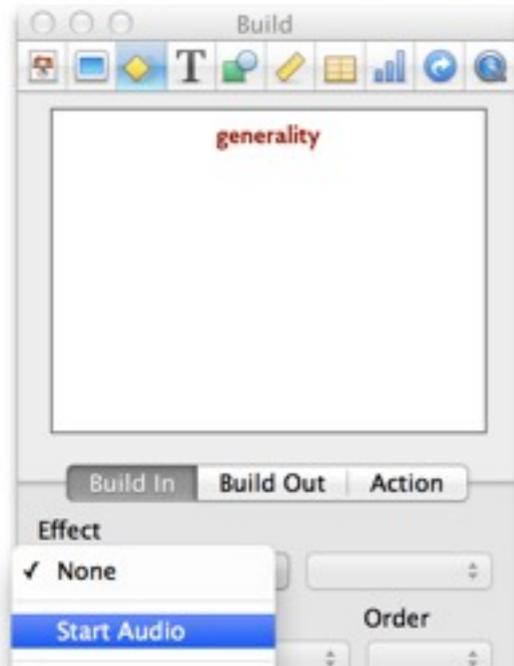
generality apple keynote

text



generality apple keynote

text



Animation

TextAction

Action

AudioAction

Object

Text

Audio



generality gmail

generality gmail

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Quick Tech Tip: Disabling Gmail's Category Tabs

Mon, 07/29/2013 - 12:17 | [Chuck Gray](#)

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Are you a Gmail user? Did you wake up a week or two ago to find that your new messages were now being automatically organized by Gmail into tabs of different, pre-determined categories? And, did you think, like me, that they were really ugly, stupid, and unnecessary? Here's a quick tip on how to rid yourself of them!

generality gmail

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Quick Tech Tip: Disabling Gmail's Category Tabs

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MELANIE PINOLA on LIFEHACKER - GMAIL - 6/07/13 8:00am

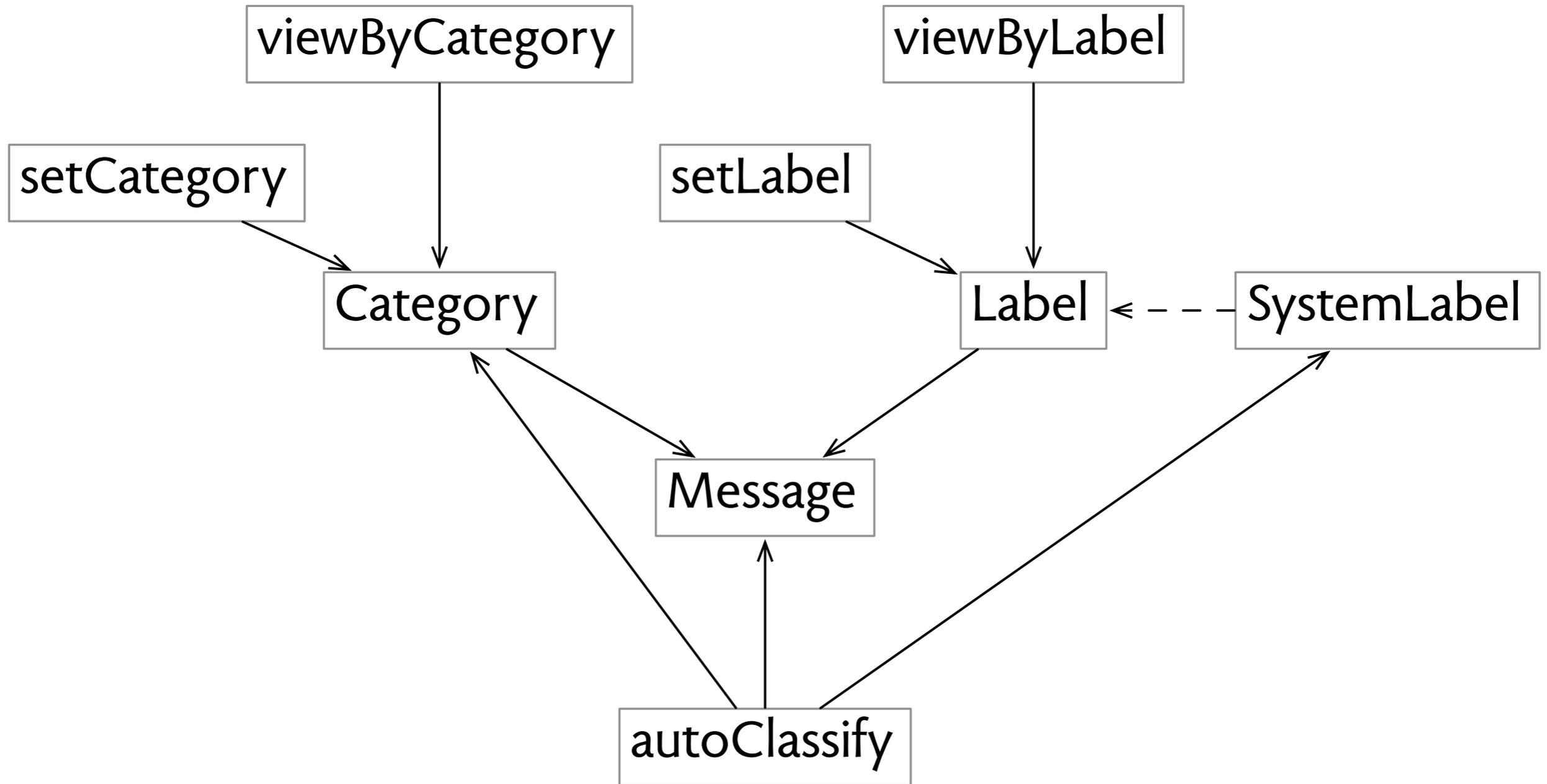
204,173 🔥 181 💬

Everything You Need to Know About Gmail's New, Super-Confusing Layout

🔍 EXPAND



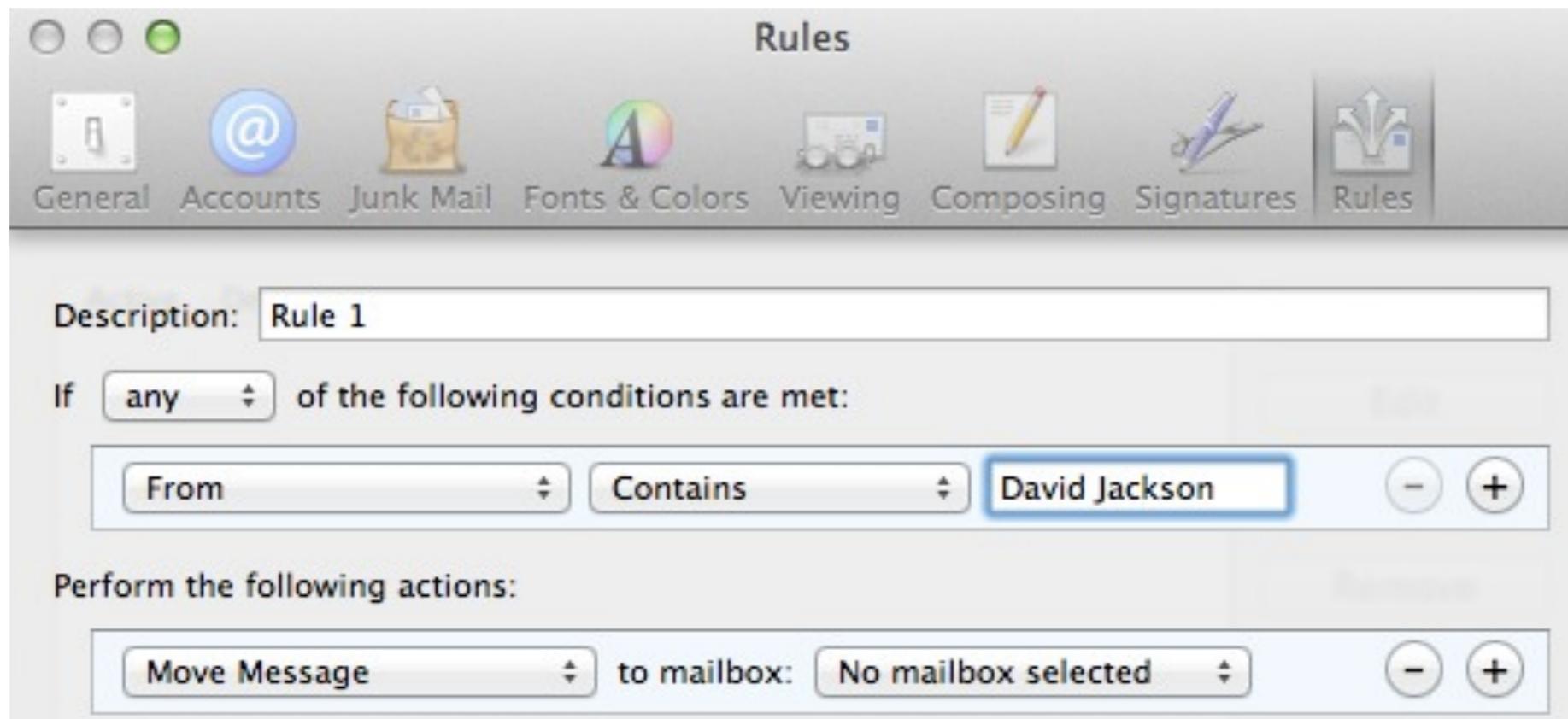
generality gmail



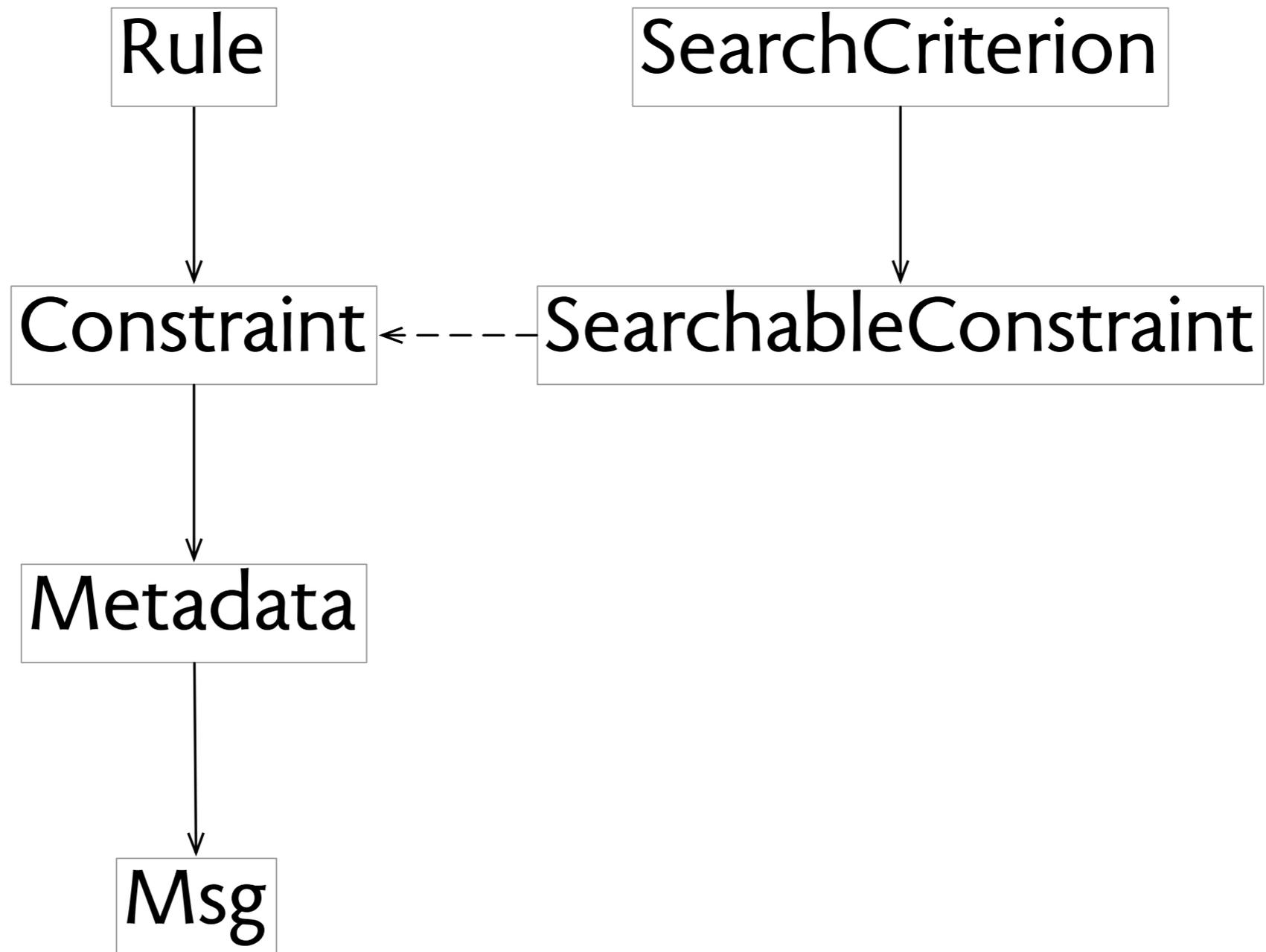
generality apple mail



generality apple mail



generality apple mail



generality programming languages

generality programming languages

JavaScript holes
undefined, null and ReferenceError

generality programming languages

JavaScript holes
undefined, null and ReferenceError

Java
primitive & boxed types

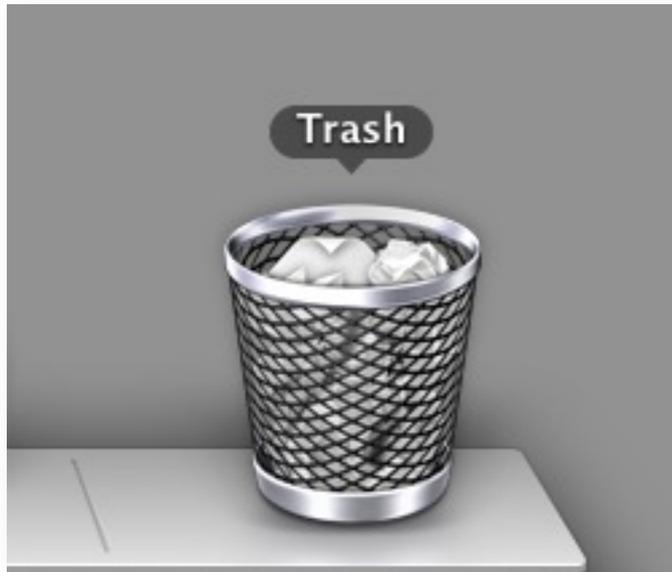
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JavaScript holes
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Java
primitive & boxed types

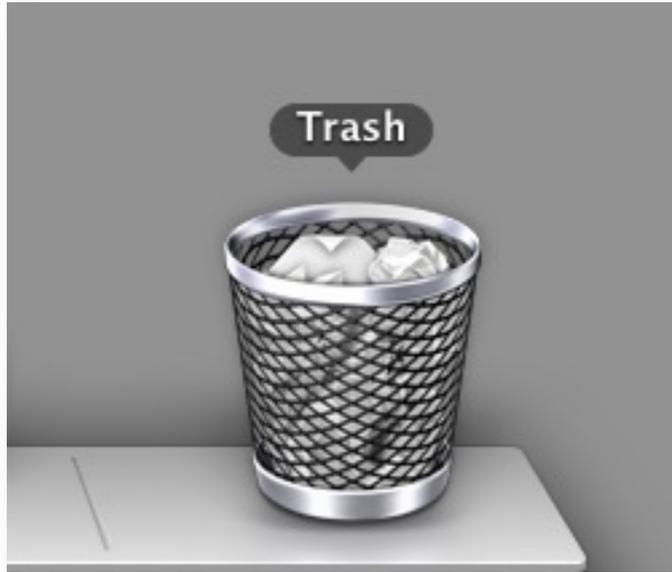
Ruby closures
lambda, proc and block

completeness apple OS X trash



Trash		
Name	Date Modified	Size
Screen Shot 2013-02-25 at 11.46.27 AM	Today 11:46 AM	58 KB
Screen Shot 2013-02-25 at 11.45.46 AM	Today 11:45 AM	39 KB
bits.key	Yesterday 7:09 PM	326 KB
▶ 2013 2.16.58 PM	Feb 22, 2013 2:16 PM	--
▶ 2013-02-18	Feb 22, 2013 2:12 PM	--
▶ 2013-02-17	Feb 22, 2013 2:12 PM	--
▶ 2013-02-15	Feb 22, 2013 2:12 PM	--

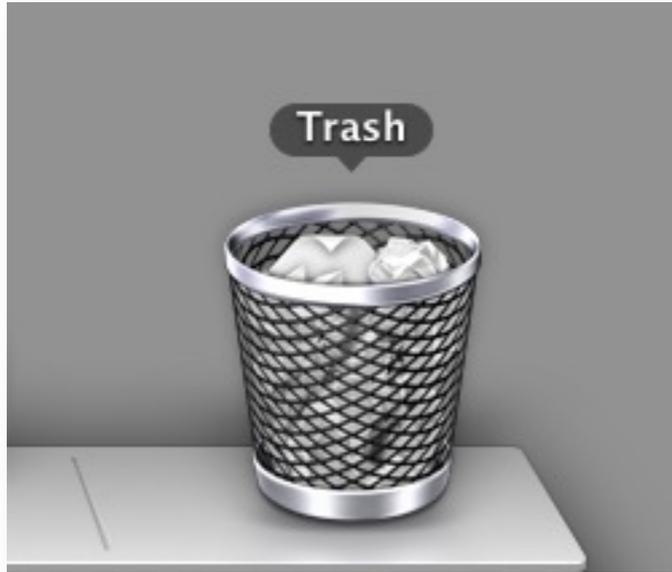
completeness apple OS X trash



Trash		
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▶ 2013-02-18	Feb 22, 2013 2:12 PM	--
▶ 2013-02-17	Feb 22, 2013 2:12 PM	--
▶ 2013-02-15	Feb 22, 2013 2:12 PM	--

trash is just like any other folder..

completeness apple OS X trash

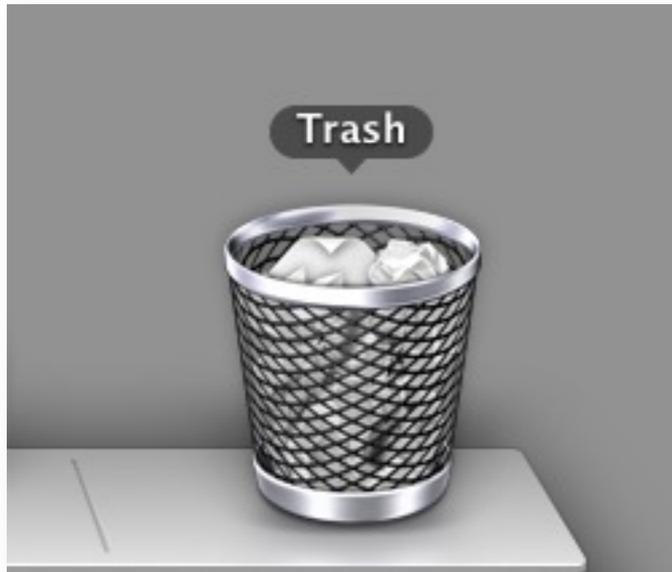


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trash is just like any other folder...

if you delete an old file by mistake,
how do you find it?

completeness apple OS X trash



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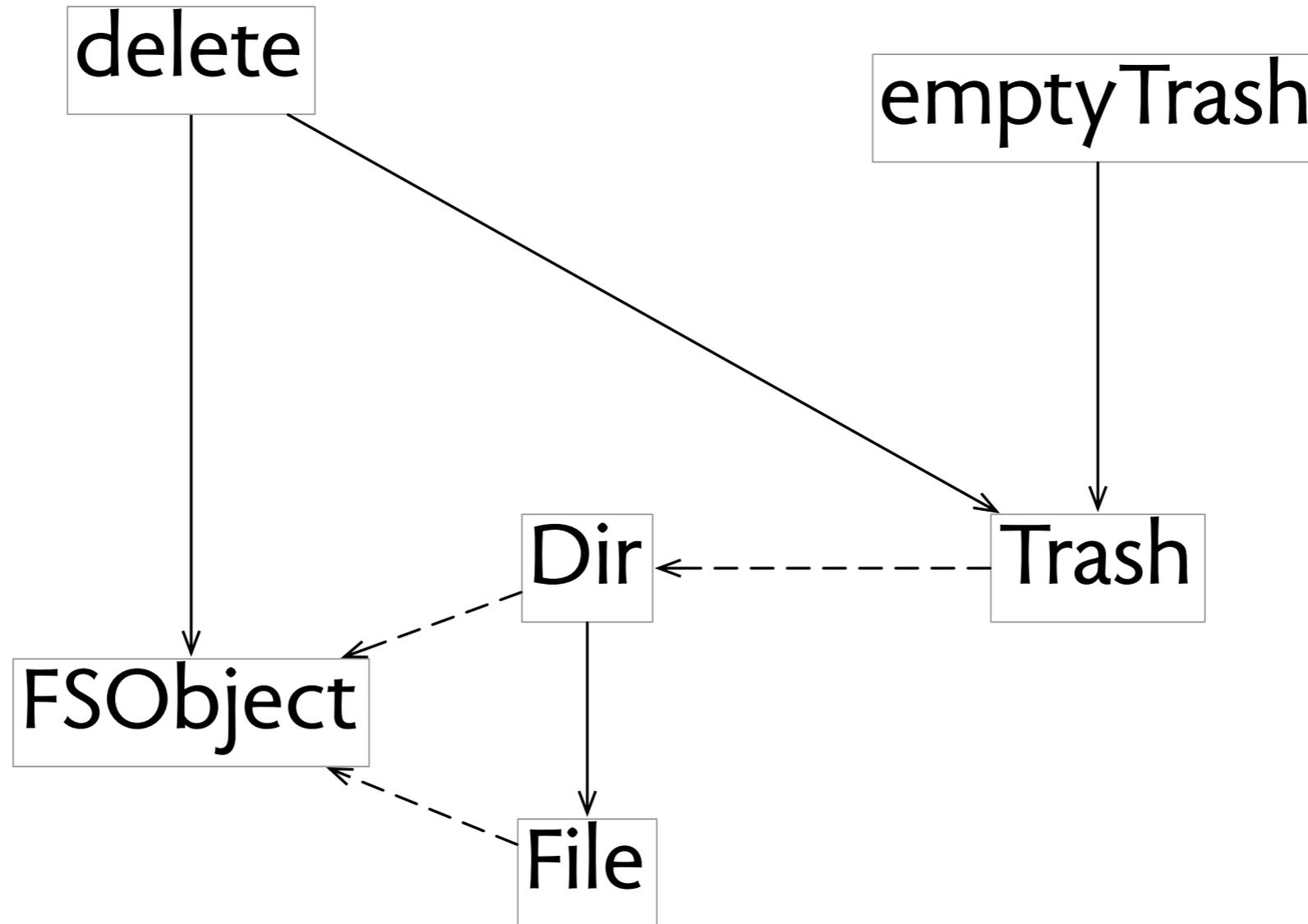
trash is just like any other folder...

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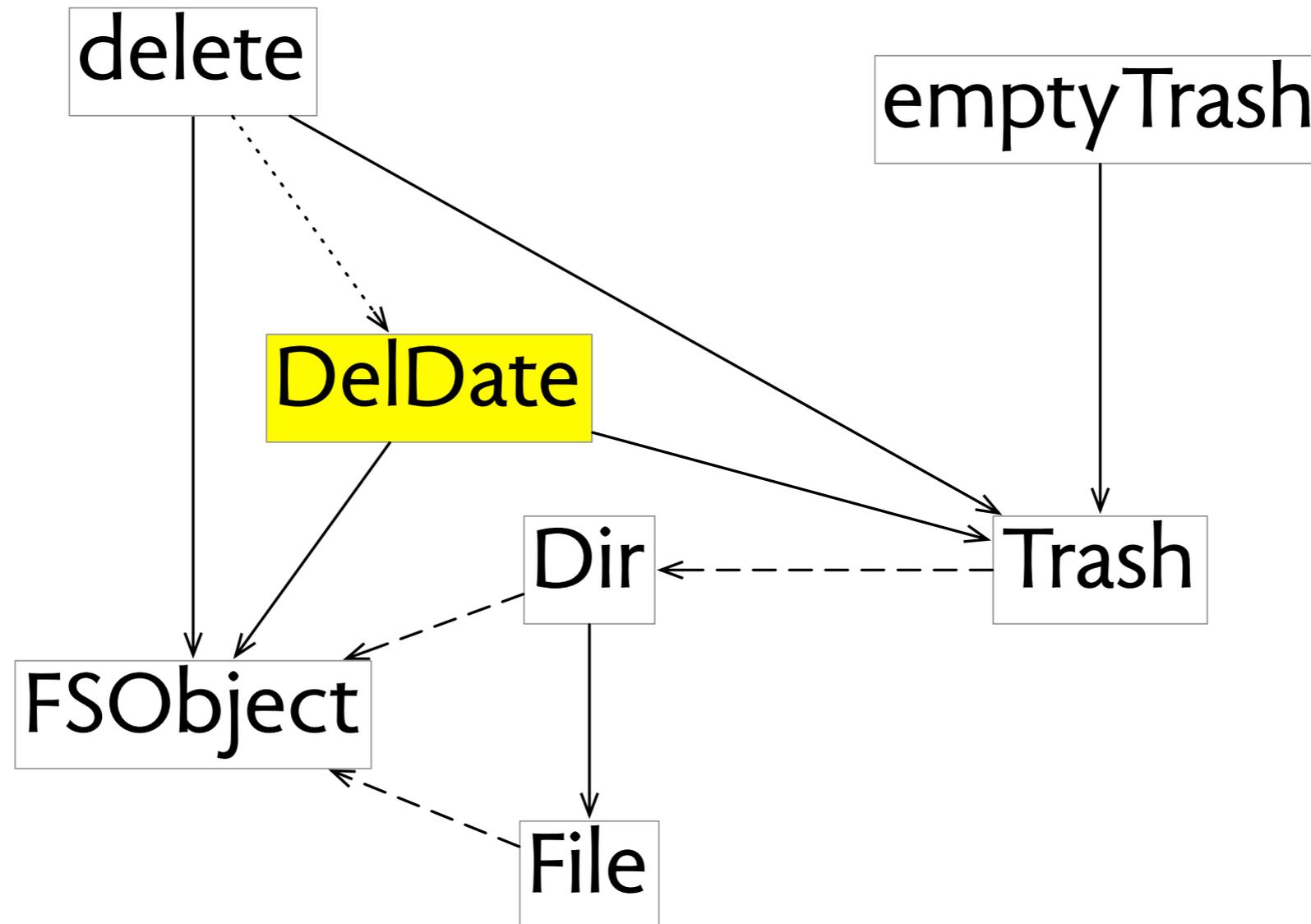
can't search by deletion date

completeness apple OS X trash

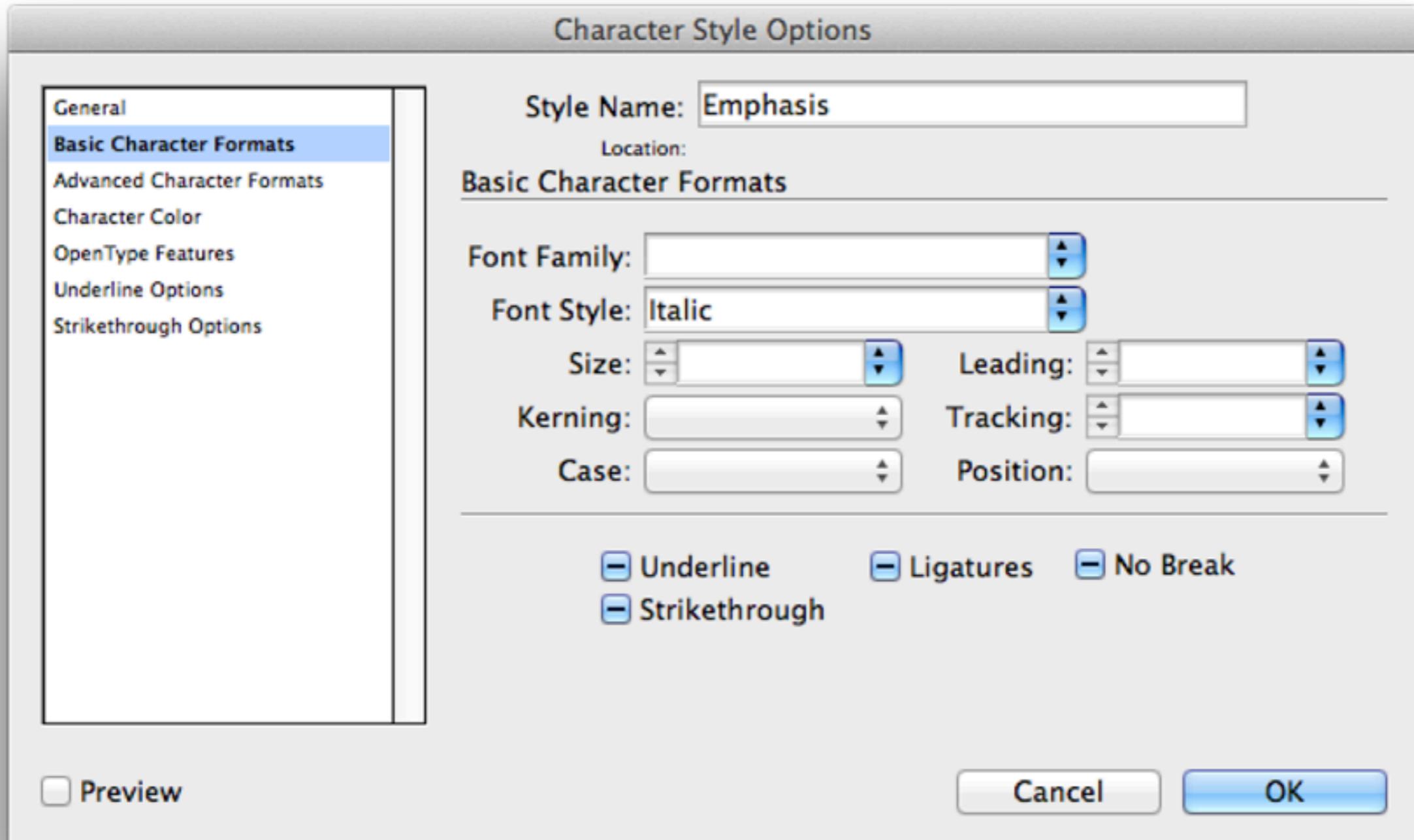
completeness apple OS X trash



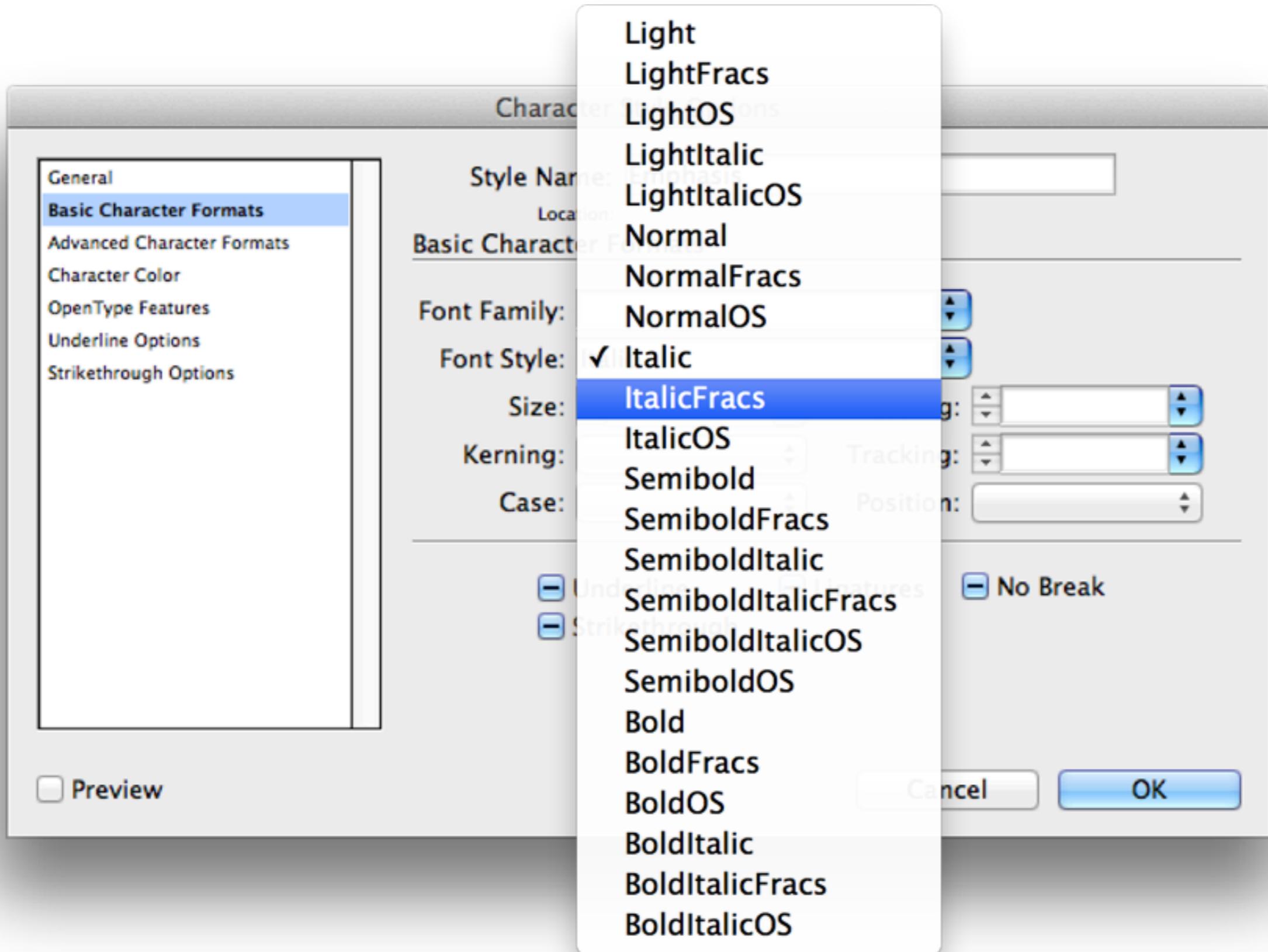
completeness apple OS X trash



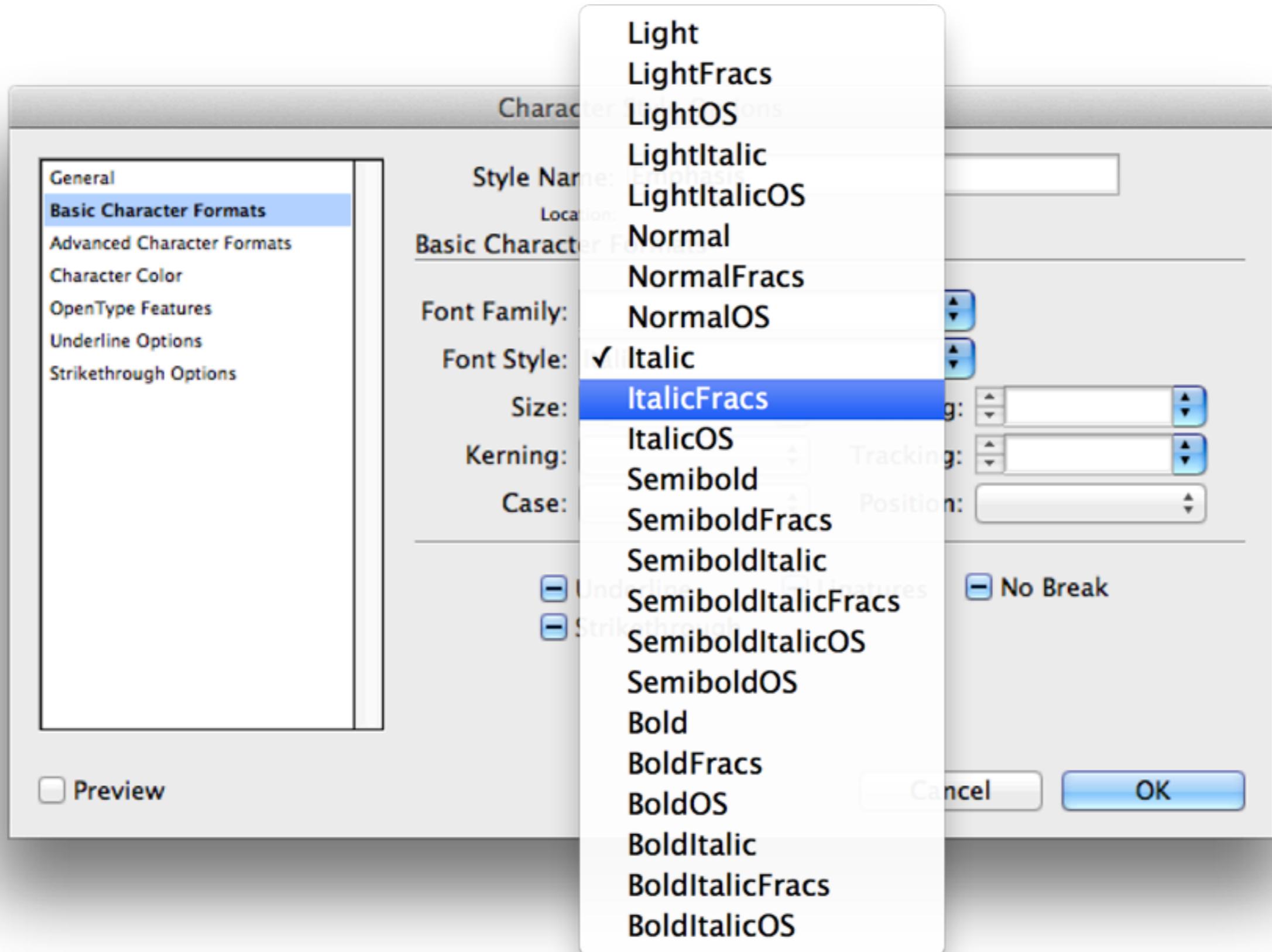
completeness adobe indesign



completeness adobe indesign



completeness adobe indesign



so character style can only italicize some typefaces

Character Style Options

- General
- Basic Character Formats**
- Advanced Character Formats
- Character Color
- OpenType Features
- Underline Options
- Strikethrough Options
- Export Tagging

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Font Family:

Font Style:

Size:

Leading:

Kerning:

Tracking:

Case:

Position:

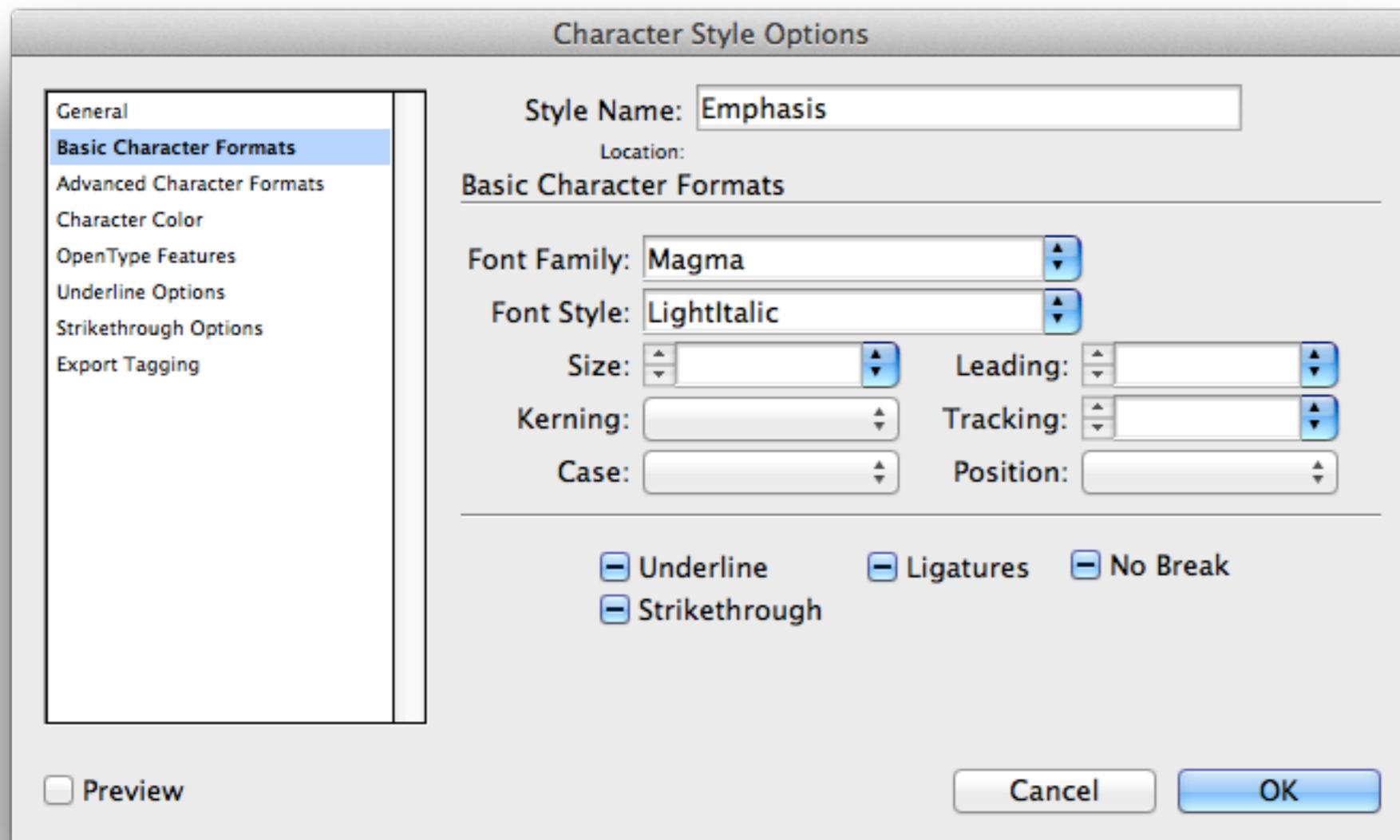
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- No Break
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Preview

Cancel

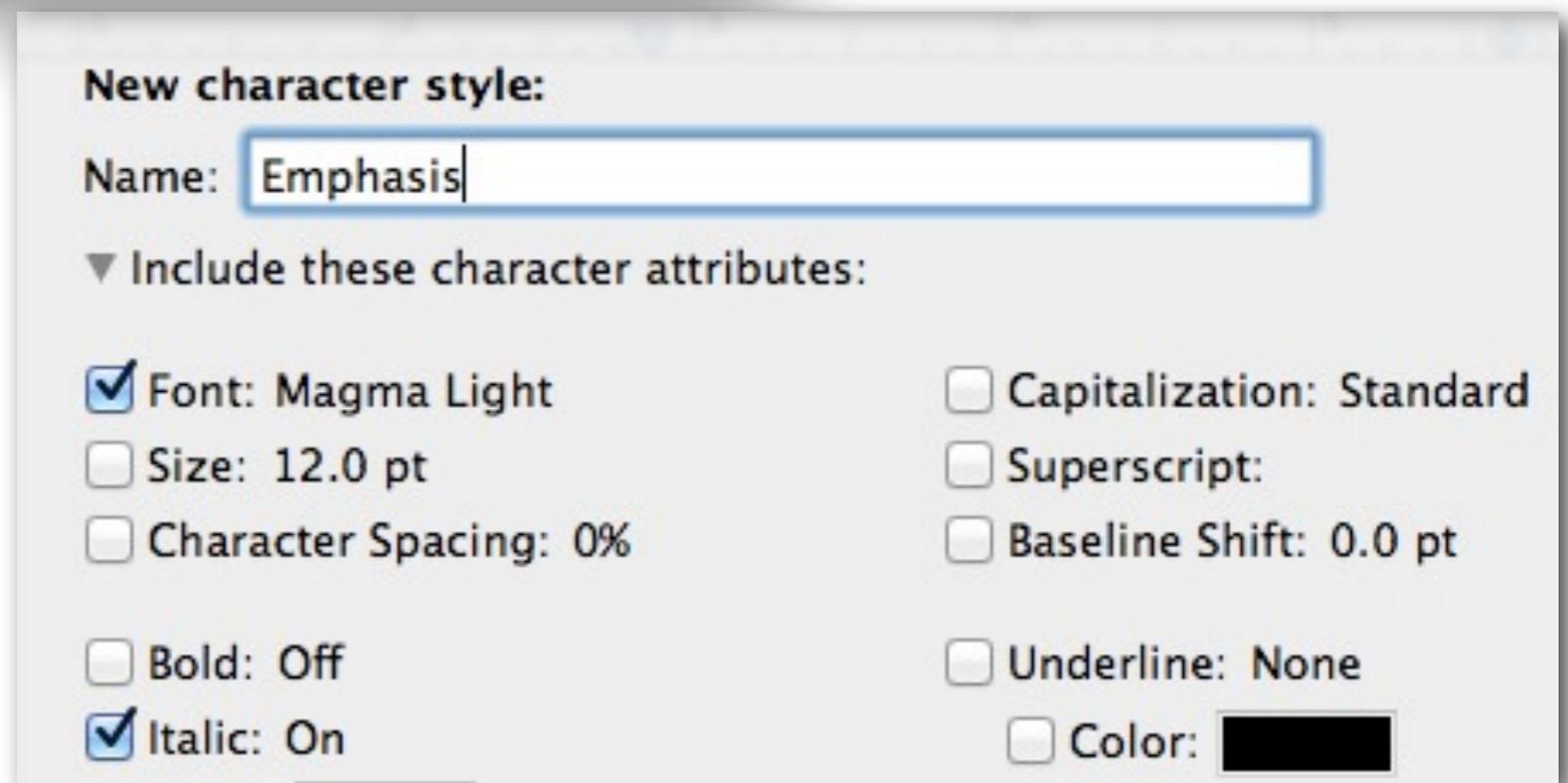
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adobe indesign:
face & style



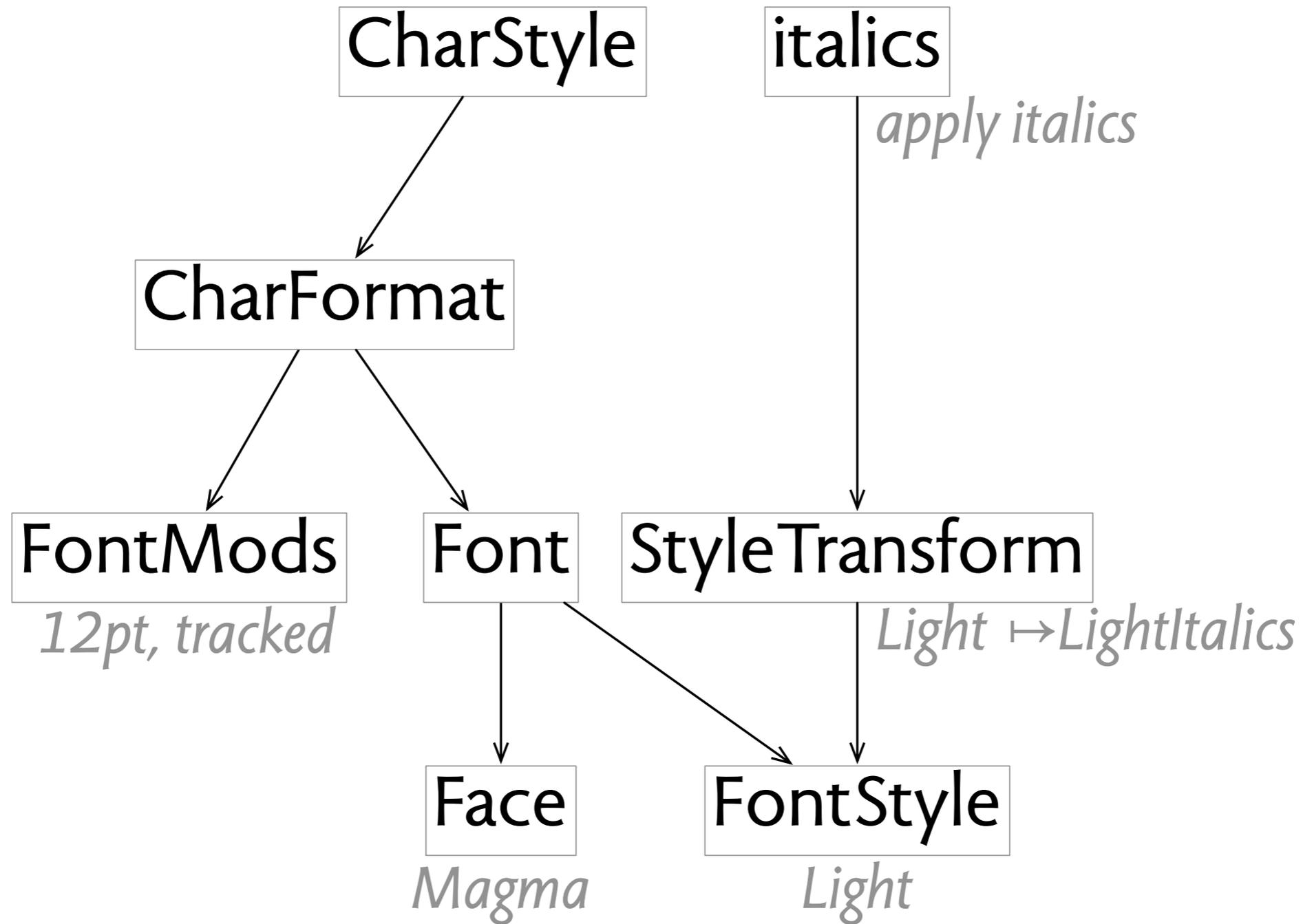
adobe indesign:
face & style

apple pages:
font & transform

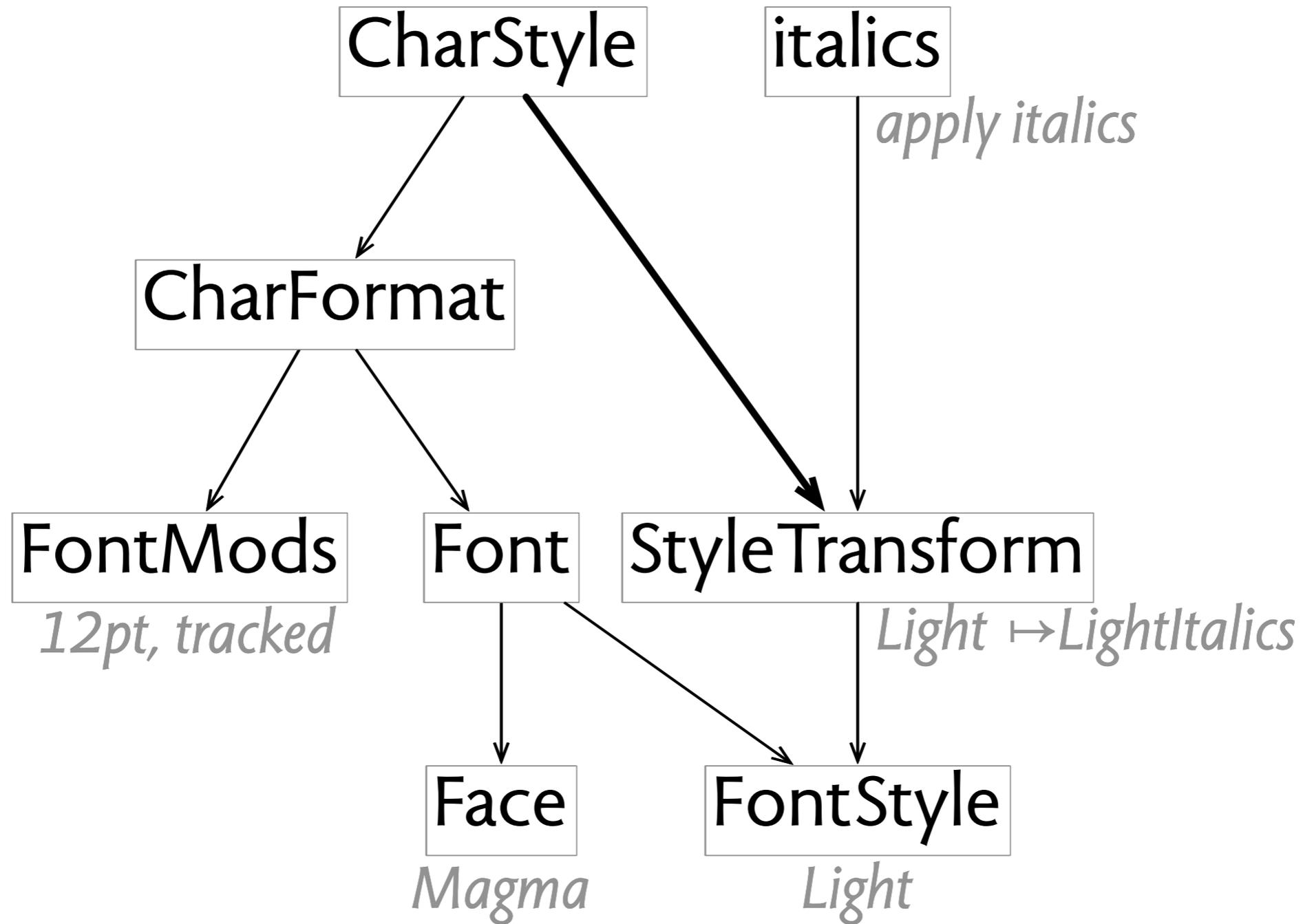


completeness adobe indesign

completeness adobe indesign



completeness adobe indesign



completeness (a note)

completeness means
existing features must have enough concepts

completeness does not mean
enough concepts for additional features

examples

Git has no concept of directory
Keynote and Powerpoint have no styles

consistency apple preview

consistency apple preview

The Washington Post

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Private consultants warned of risks before HealthCare.gov's Oct. 1 launch

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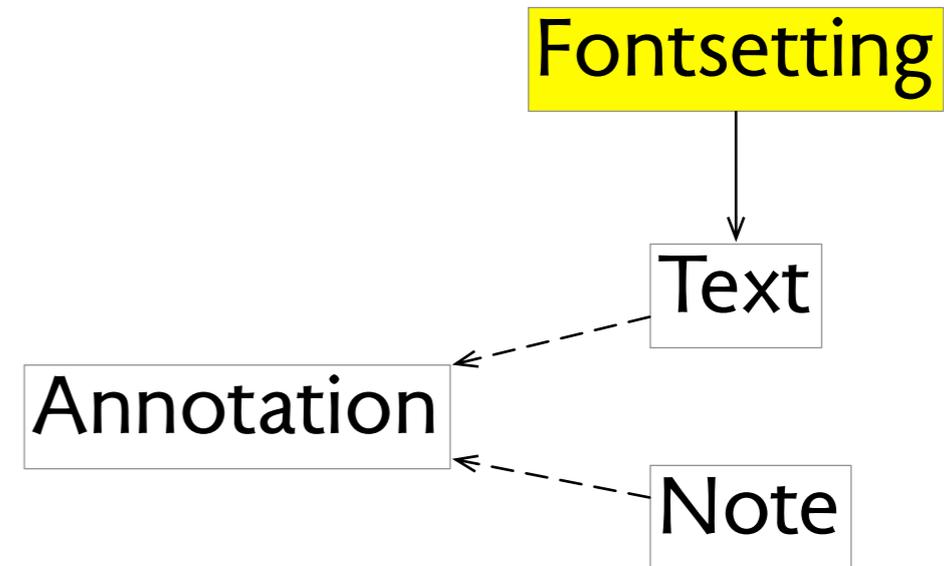
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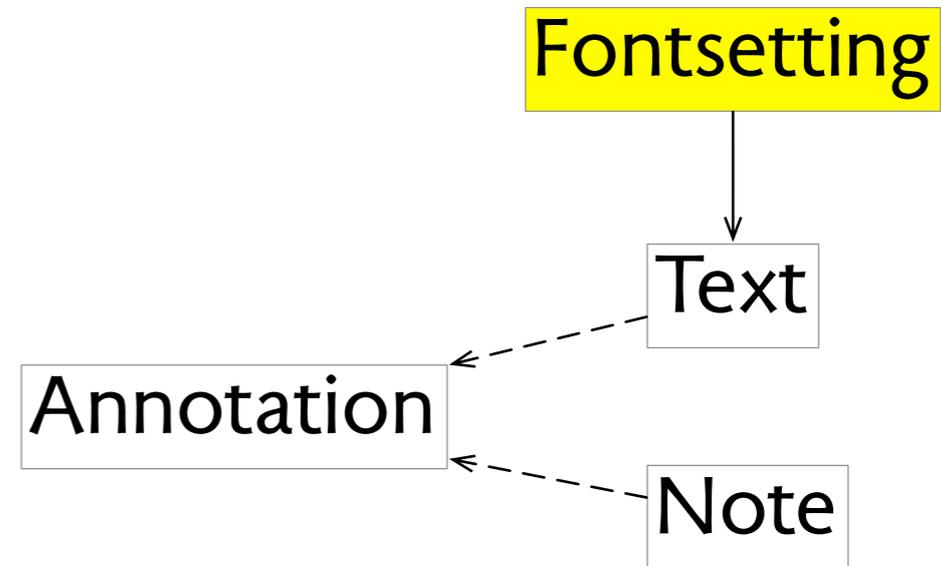
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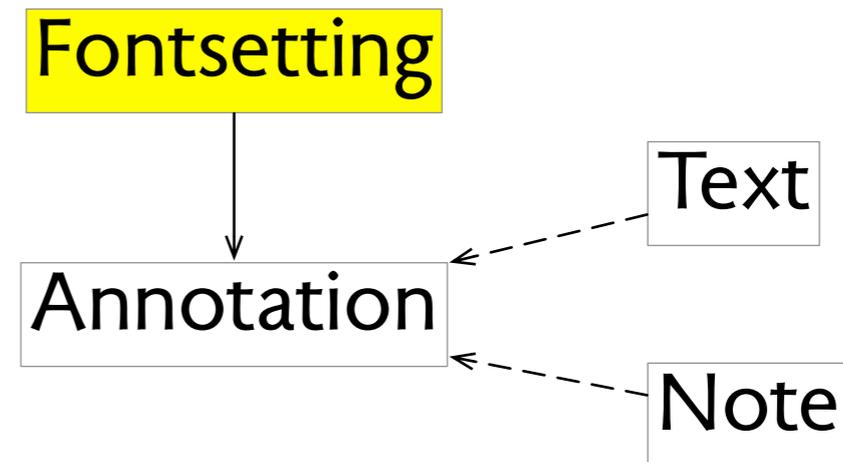


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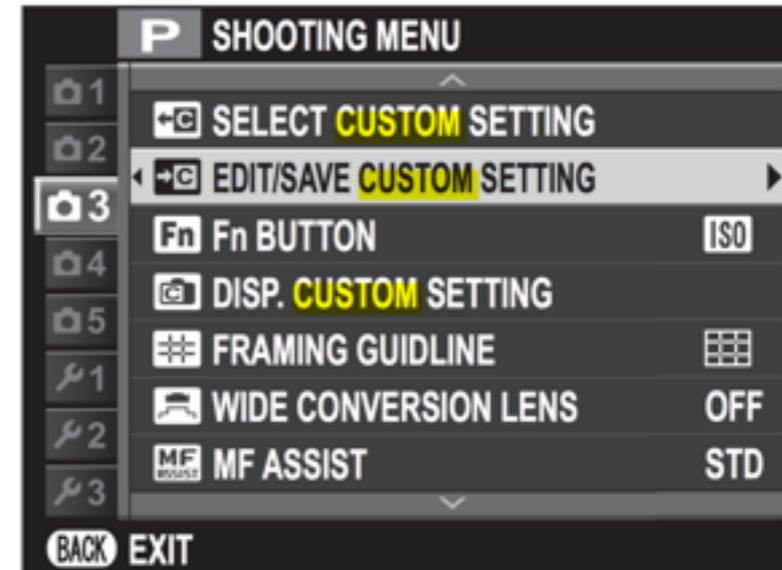
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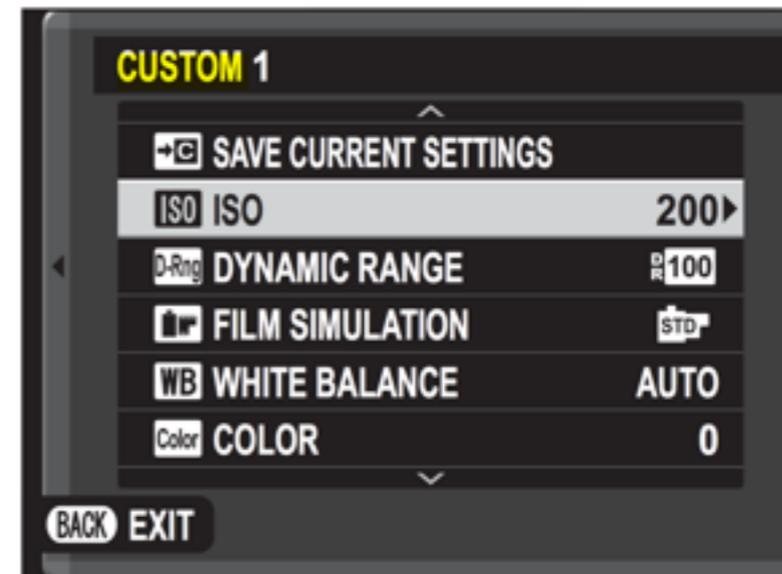
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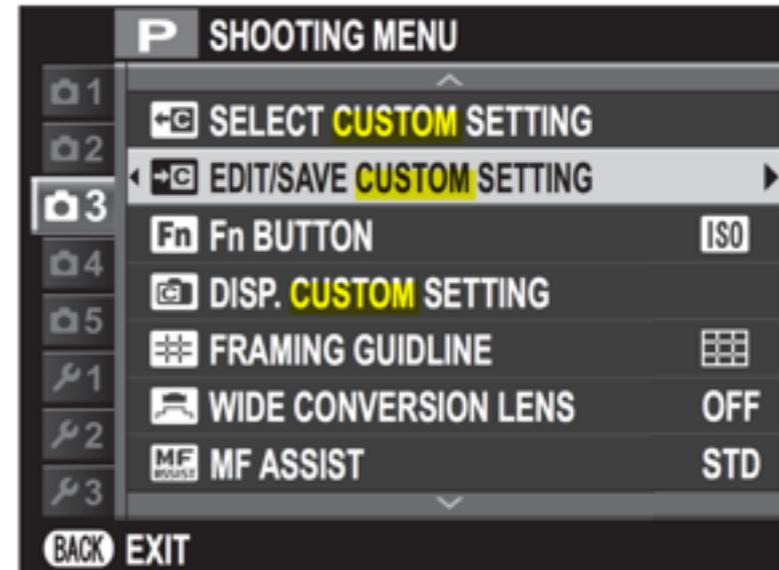
consistency fuji x100s



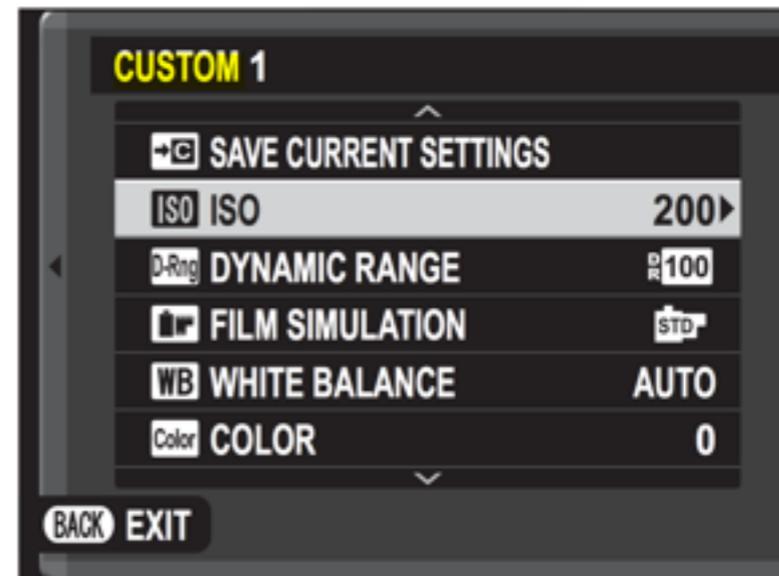
2 Highlight a custom settings bank and press **MENU/OK** to select. Adjust the following as desired and press **DISP/BACK** when adjustments are complete: **ISO** ISO, **D-Rng** DYNAMIC RANGE, **F** FILM SIMULATION, **WB** WHITE BALANCE, **Color** COLOR, **Sharp** SHARPNESS, **Tone** HIGHLIGHT TONE, **Tone** SHADOW TONE, **NR** NOISE REDUCTION, and **C*** RESET.



consistency fuji x100s

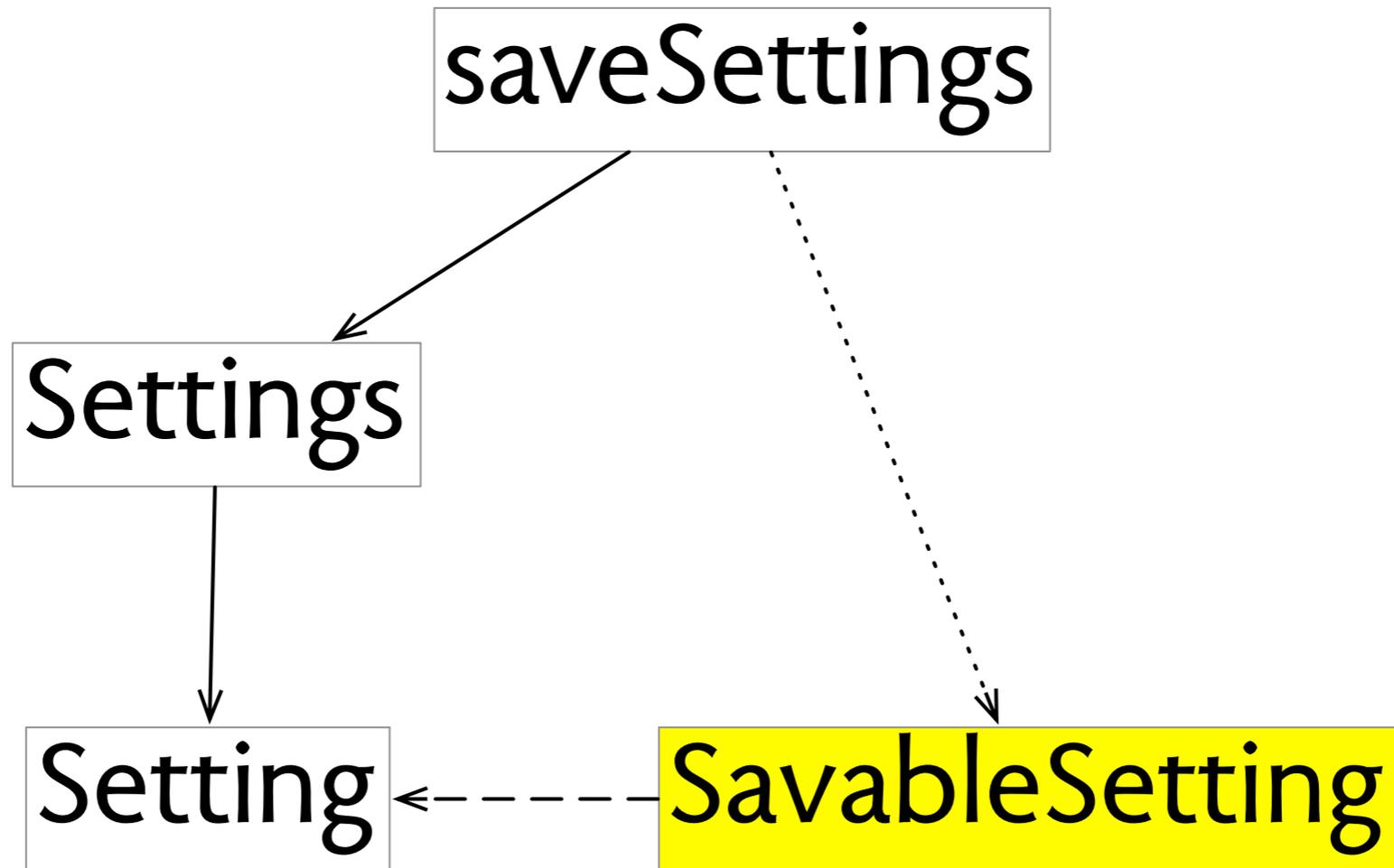


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1.) The X100's Custom Settings memories are useless. Unlike [Canon's brilliant C1, C2 and C3 Total Recall modes](#), the X100's EDIT/SAVE CUSTOM SETTINGS function only stores and recalls a few of the image parameters like sharpness and white balance, but not Auto ISO, image size, AF mode, flash or anything else. For these to be useful, they need to save *everything*, as Canon does. Even the LCD brightness needs to be saved and recalled, for instance, on my Canons, I use different presets for shooting outdoors or indoors.

consistency fuji x100s

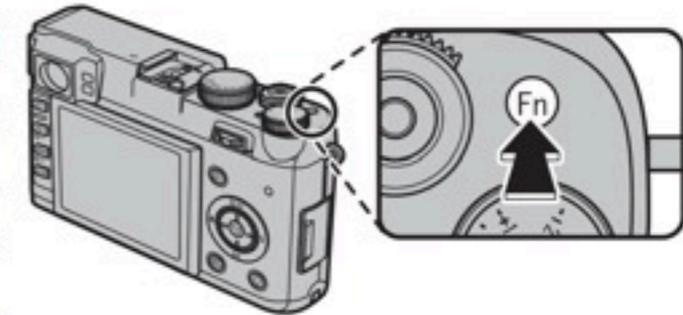


completeness fuji x100s



The Fn Button

The role played by the **Fn** button can be selected using the **Fn Fn BUTTON** option in the shooting menu (📖 74). The options available include multiple exposure (📖 57), depth-of-field preview (📖 38), sensitivity (📖 44), the self-timer (📖 53), image size (📖 72), image quality (📖 73), dynamic range (📖 73), film simulation (📖 55), ND filter (📖 65), AF mode (📖 77), custom settings (📖 70), movie recording (📖 32), advanced filter (📖 77), RAW/JPEG toggle (📖 63), and wide conversion lens (📖 108).



◆ The **Fn Fn BUTTON** menu can also be displayed by pressing and holding the **Fn** button.

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FunctionButton



Function

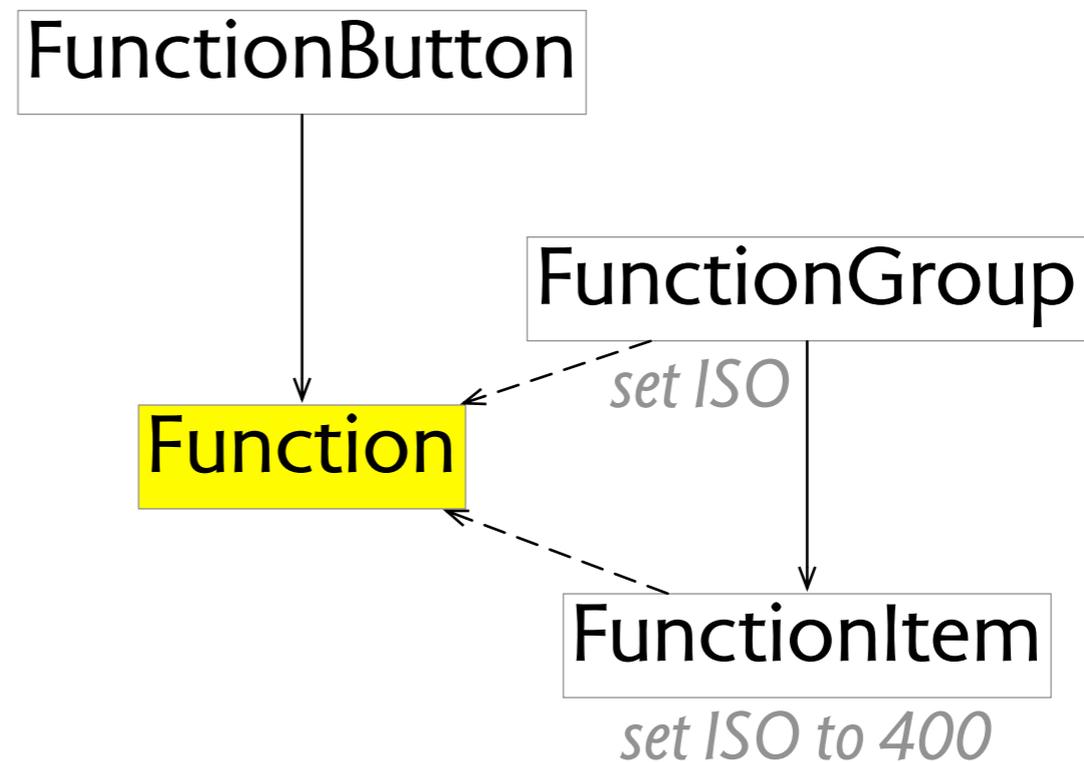
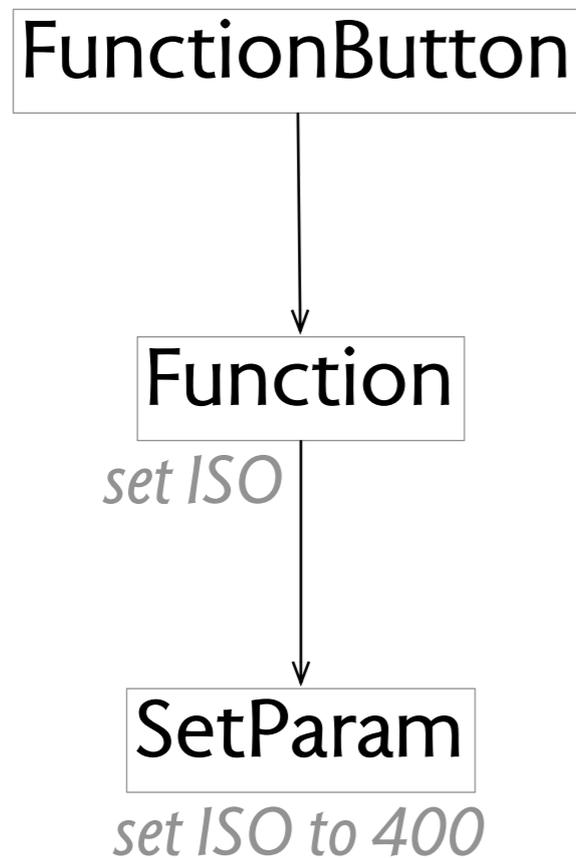
set ISO



SetParam

set ISO to 400

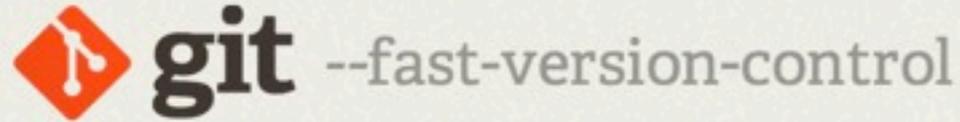
completeness fuji x100s



analyzing git

with Santiago Perez De Rosso

git, distributed version control



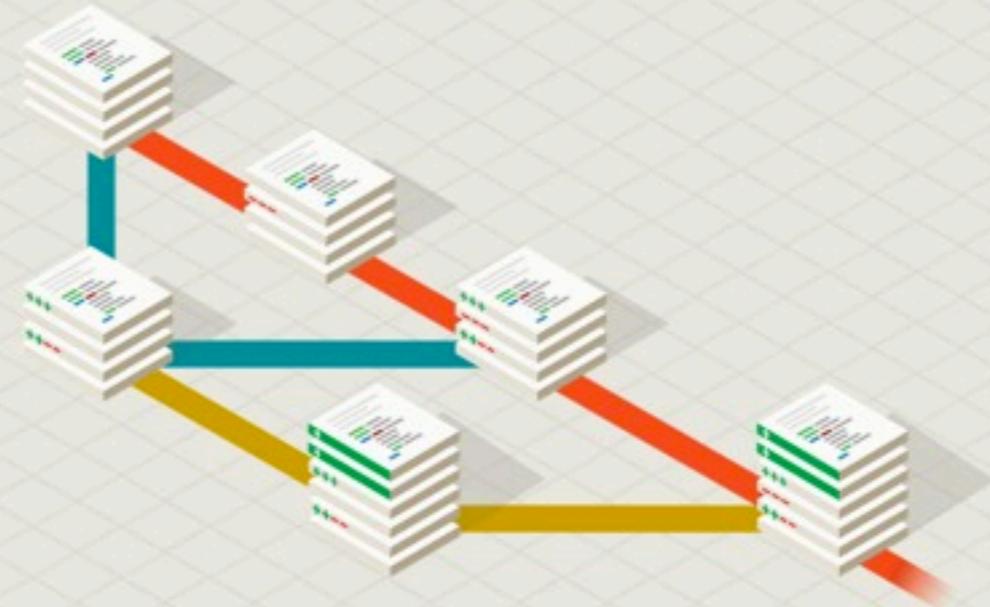
Search entire site...

Git is a **free and open source** distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

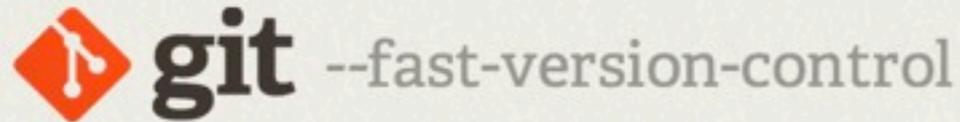
Git is **easy to learn** and has a **tiny footprint with lightning fast performance**. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like **cheap local branching**, convenient **staging areas**, and **multiple workflows**.



Learn Git in your browser for free with **Try Git**.



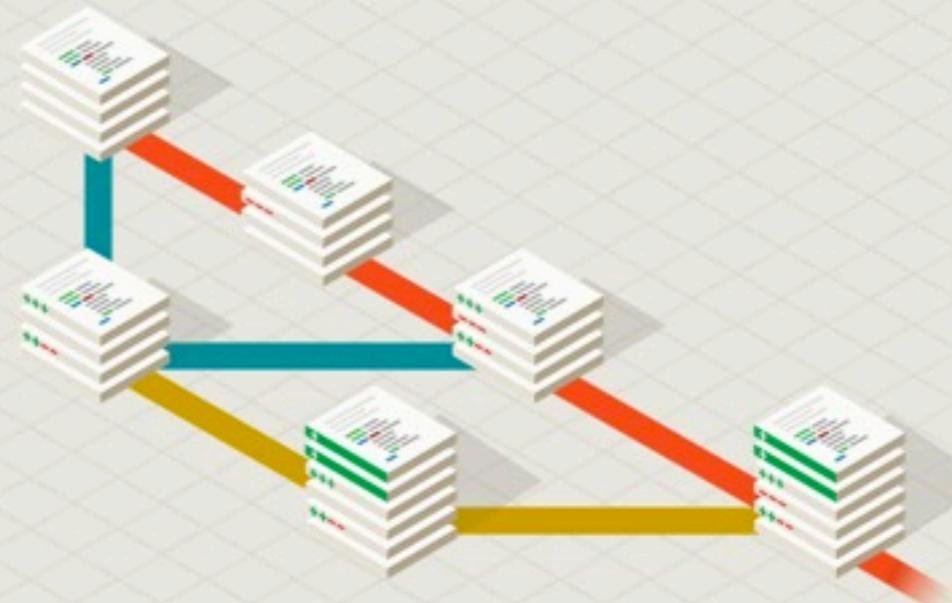
git, distributed version control



Search entire site...

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Browser address bar: <https://github.com>

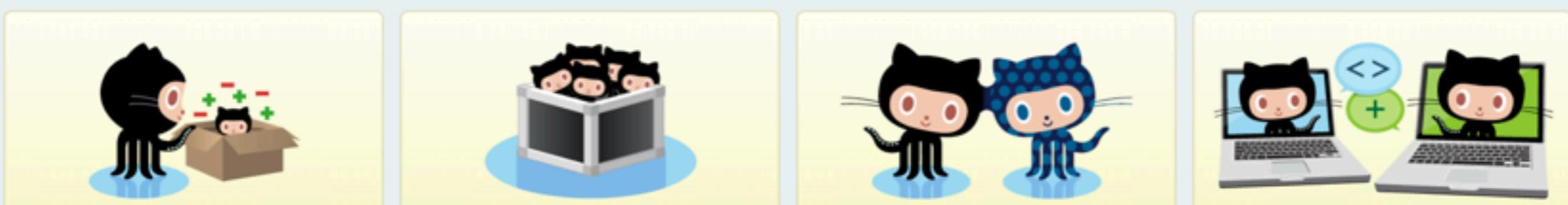
Navigation: Search or type a command | Explore | Gist | Blog | Help

User: dnjackson

News Feed

- News Feed
- Pull Requests
- Issues
- Stars

GitHub Bootcamp If you are still new to things, we've provided a few walkthroughs to get you started.



tracking & untracking

2.2.2 Tracking New Files

In order to begin tracking a new file, you use the command `git add`. To begin tracking the README file, you can run this:

```
$ git add README
```

If you run your status command again, you can see that your README file is now tracked and staged:

```
$ git status
# On branch master
# Changes to be committed:
#   (use "git reset HEAD <file>..." to unstage)
#
# new file:   README
#
```

tracking & untracking

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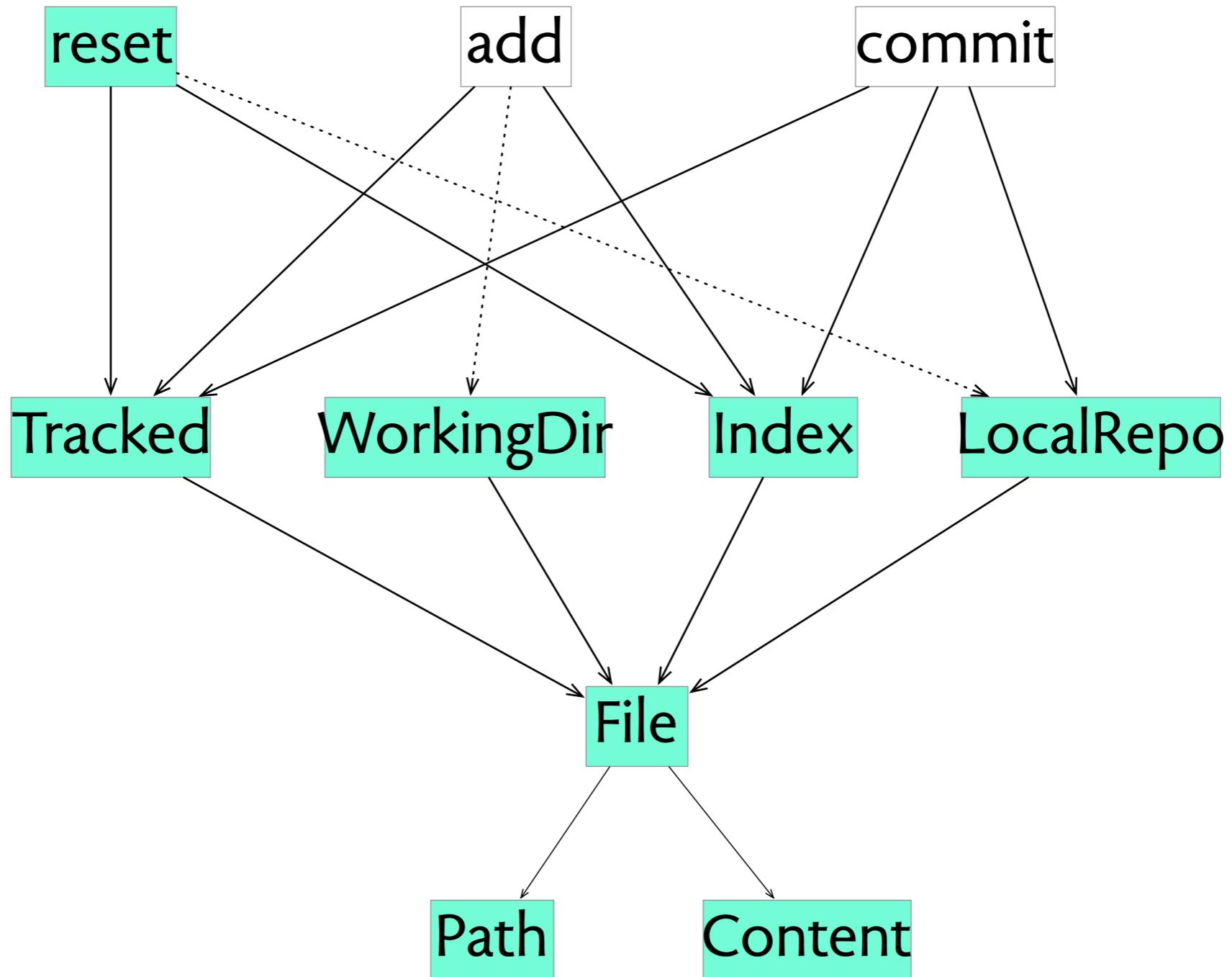
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```

but if file is committed,
reset will NOT untrack it

to untrack in that case,
update-index to make it
"assumed unchanged"

after that, reset will
TRACK the file

untracking in git



gitless: our reworking of git

[about & download](#)

[documentation](#)

[community](#)

[code](#)

Gitless: a version control system

About Gitless

Gitless is an experimental version control system built on top of Git. We are exploring what conceptual integrity means with the goal of building a rigorous foundation for concept design. We encourage you to try out the current version of Gitless and [send feedback](#). Keep in mind that Gitless might change in non-retrocompatible ways (so don't script around it just yet) as we seek to answer the fundamental question that drives this software project: if we were to challenge the very core concepts in version control systems, what would version control look like?

In its current state, Gitless is a distributed version control system that supports all of the most commonly used Git features. We are missing some things like submodules and cherry-picking but these are coming soon (maybe; only if we don't find a superior, more robust way of achieving the same goal). Either way, since Gitless is implemented on top of Git (could be considered what Git pros call a 'porcelain' of Git) you can always fallback to the 'git' command to finish a task.

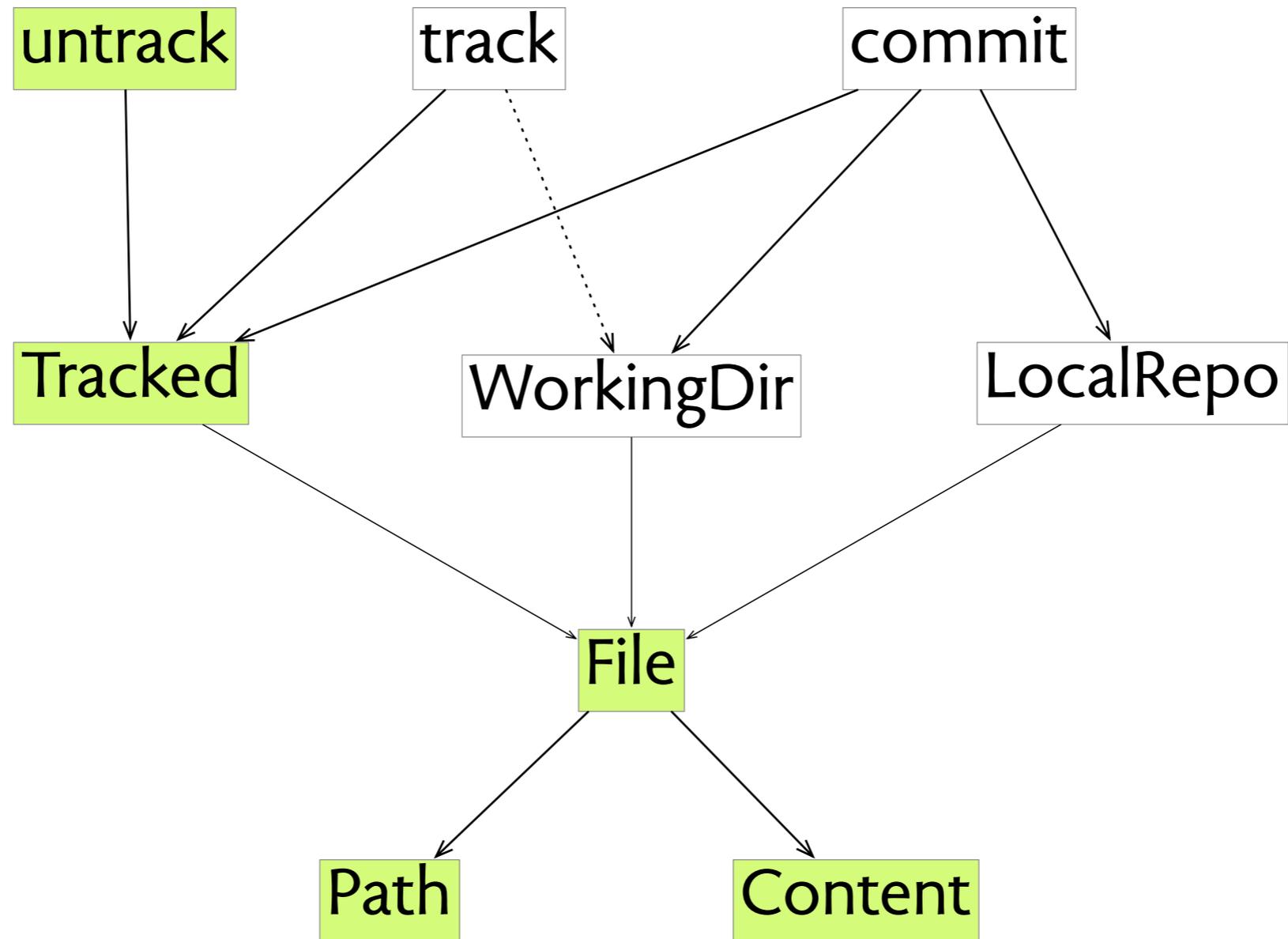
Install

You need to have Python 2.7 and Git 1.7.12+. The easiest way to install Gitless is through the Python Package Index (pip):

```
pip install gitless
```

For more detailed instructions see the [README file](#).

untracking in gitless



postscript: acrobat

orthogonality acrobat

orthogonality acrobat



orthogonality acrobat



orthogonality acrobat



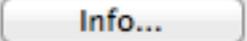
Certify

 With Visible Signature

 Without Visible Signature

Sign Document

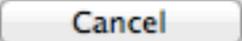
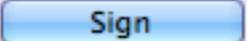
Sign As: Daniel Jackson <dnj@CSAIL.MIT.EDU> 

Certificate Issuer: Client CA 

Appearance: Standard Text 

Daniel Jackson  Digitally signed by Daniel Jackson
DN: c=US, st=Massachusetts, l=Cambridge, o=MIT Computer Science & Artificial Intelligence Laboratory, ou=Users, cn=Daniel Jackson, email=dnj@CSAIL.MIT.EDU
Date: 2013.12.18 09:57:07 +02'00' 

Lock Document After Signing 

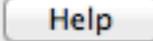
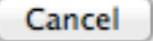
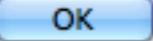
Save as Certified Document

 You are about to create a certified document. By certifying a document, you vouch for its contents and enable recipients to verify that the document came from you. Certifying a document also adds tamper-resistance to detect and prevent unwanted changes.

To certify a document, you need to have a digital ID. If you intend to distribute this document to a large audience, it is suggested that you use a digital ID from one of Adobe's partners. This will allow any recipient with Acrobat or Adobe Reader to automatically verify the certification.

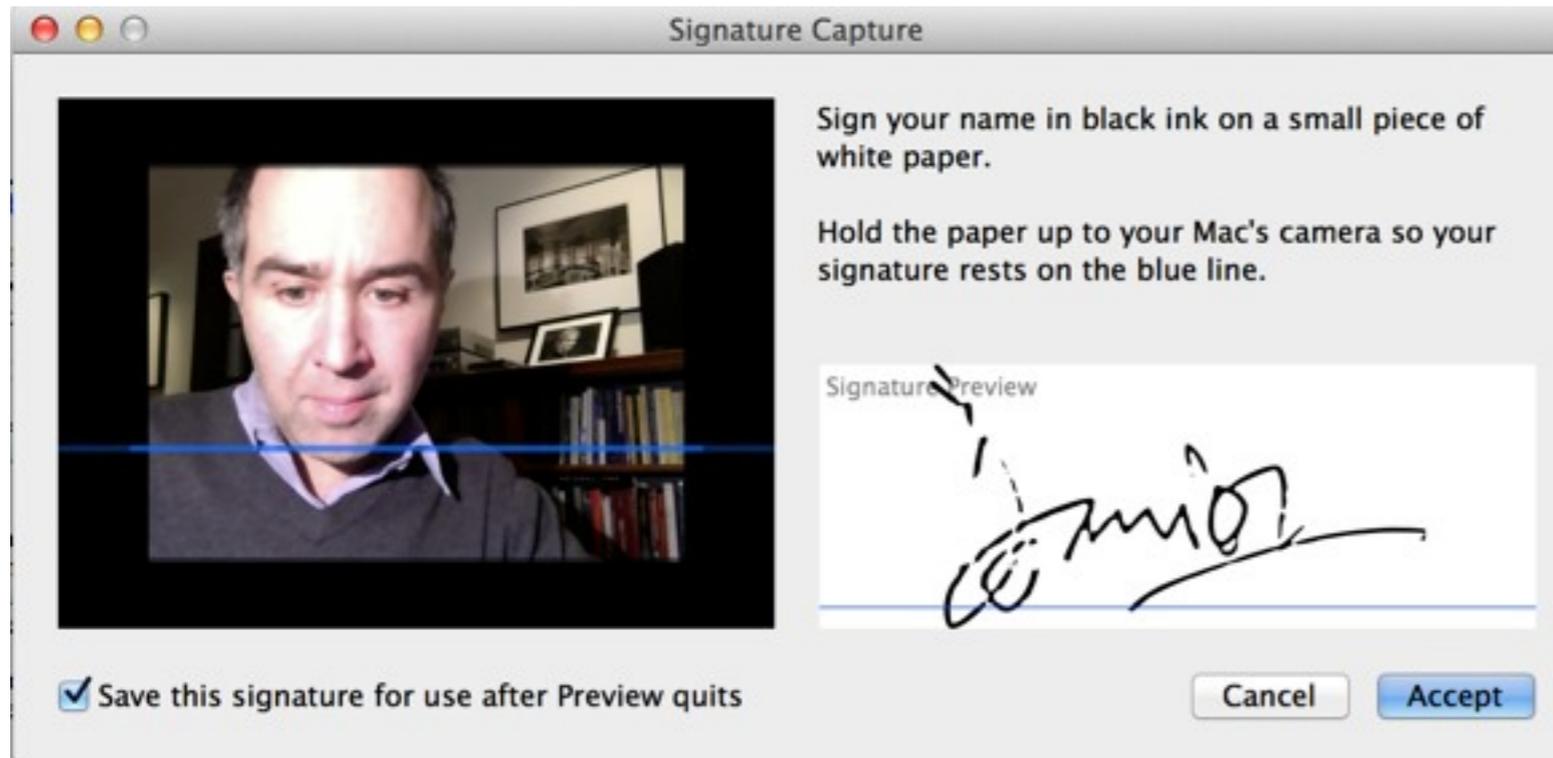
 Get Digital ID from Adobe Partner...

Don't show again

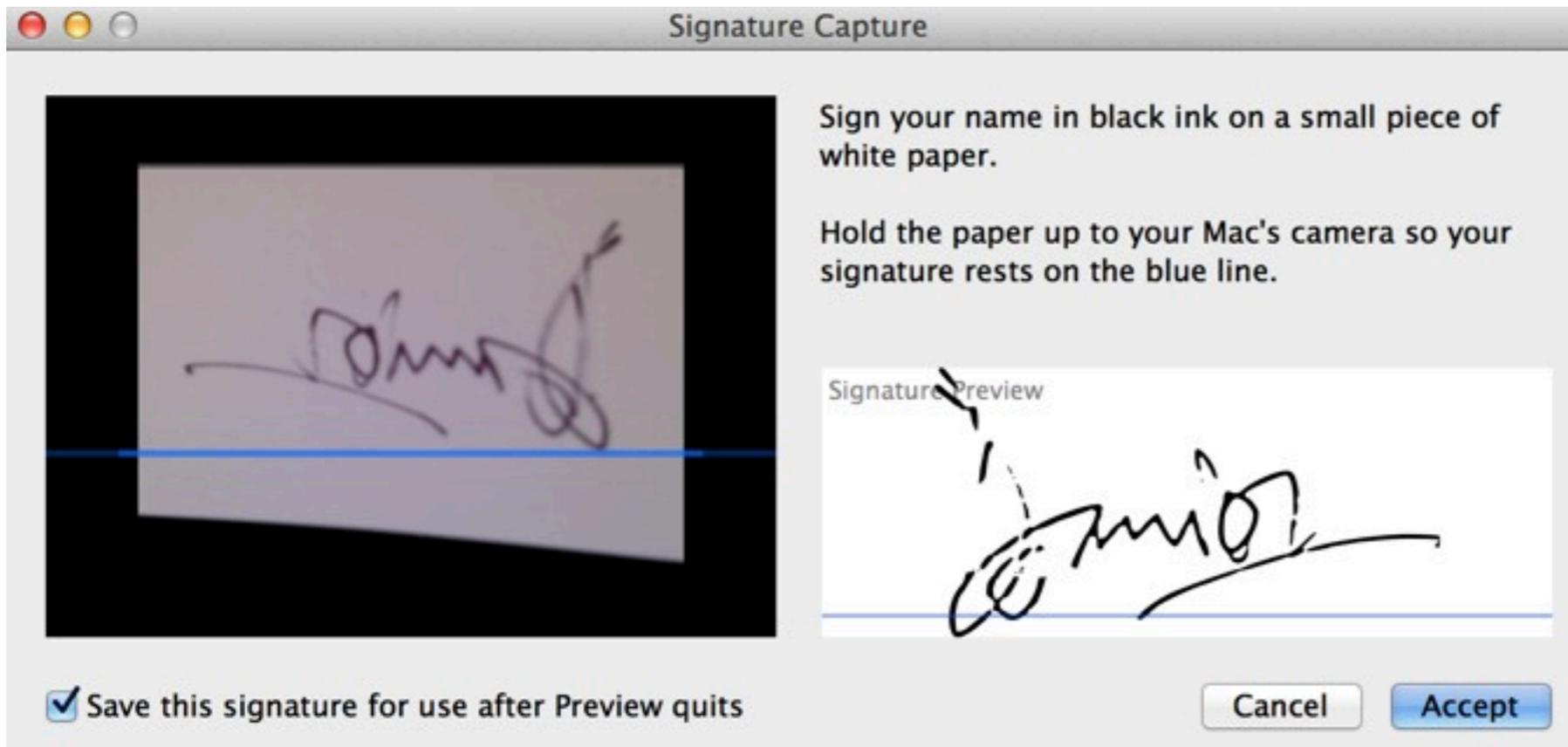
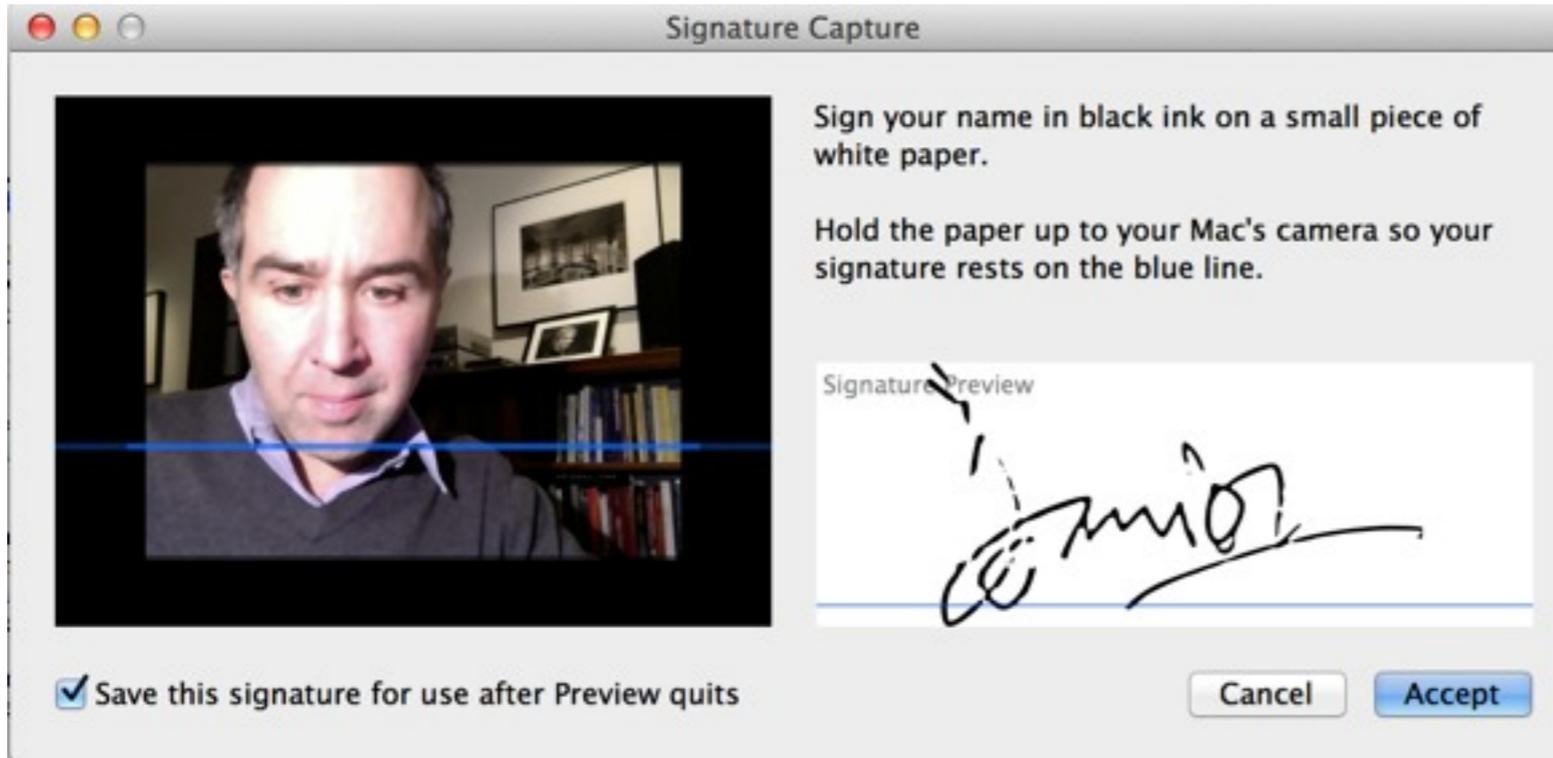
  

completeness apple preview

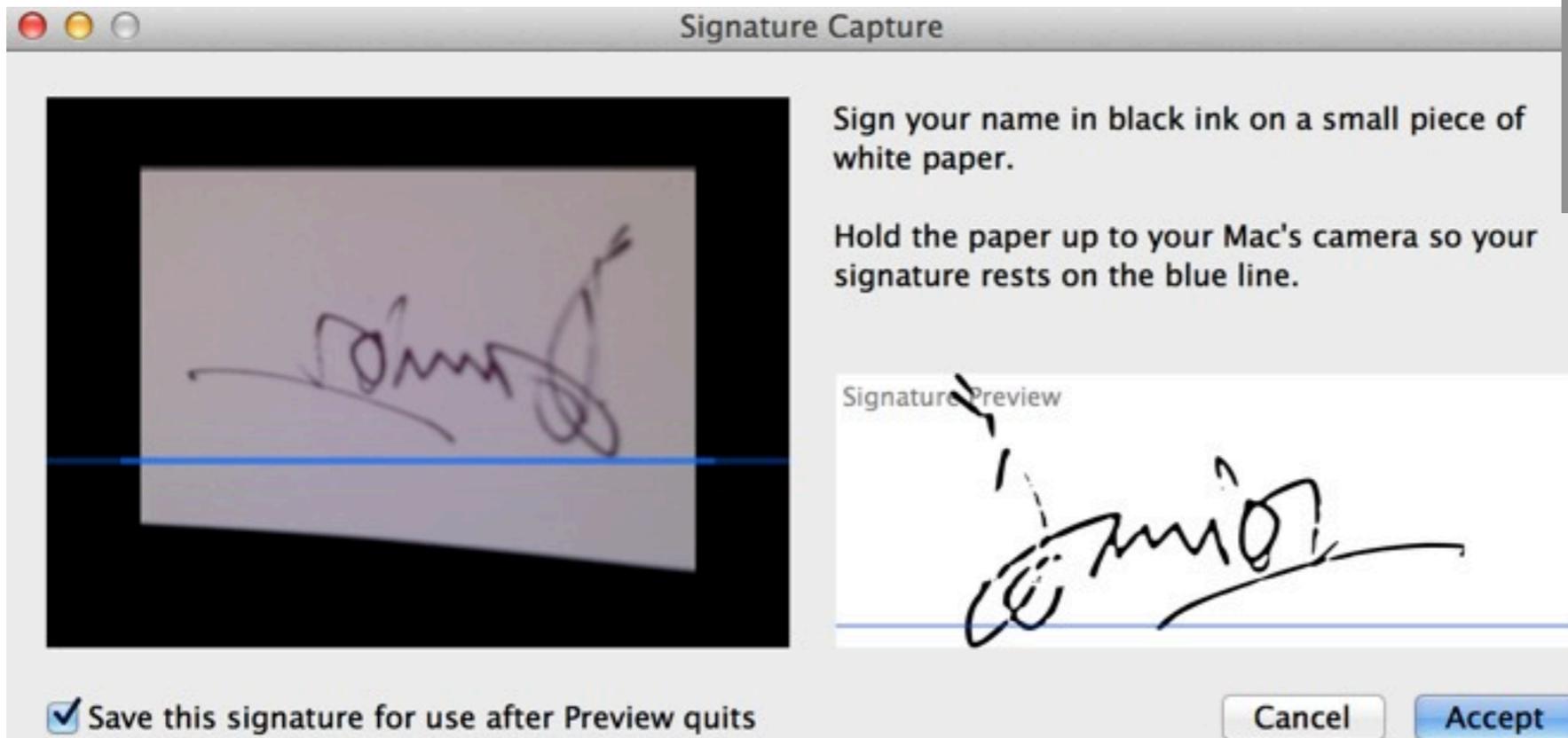
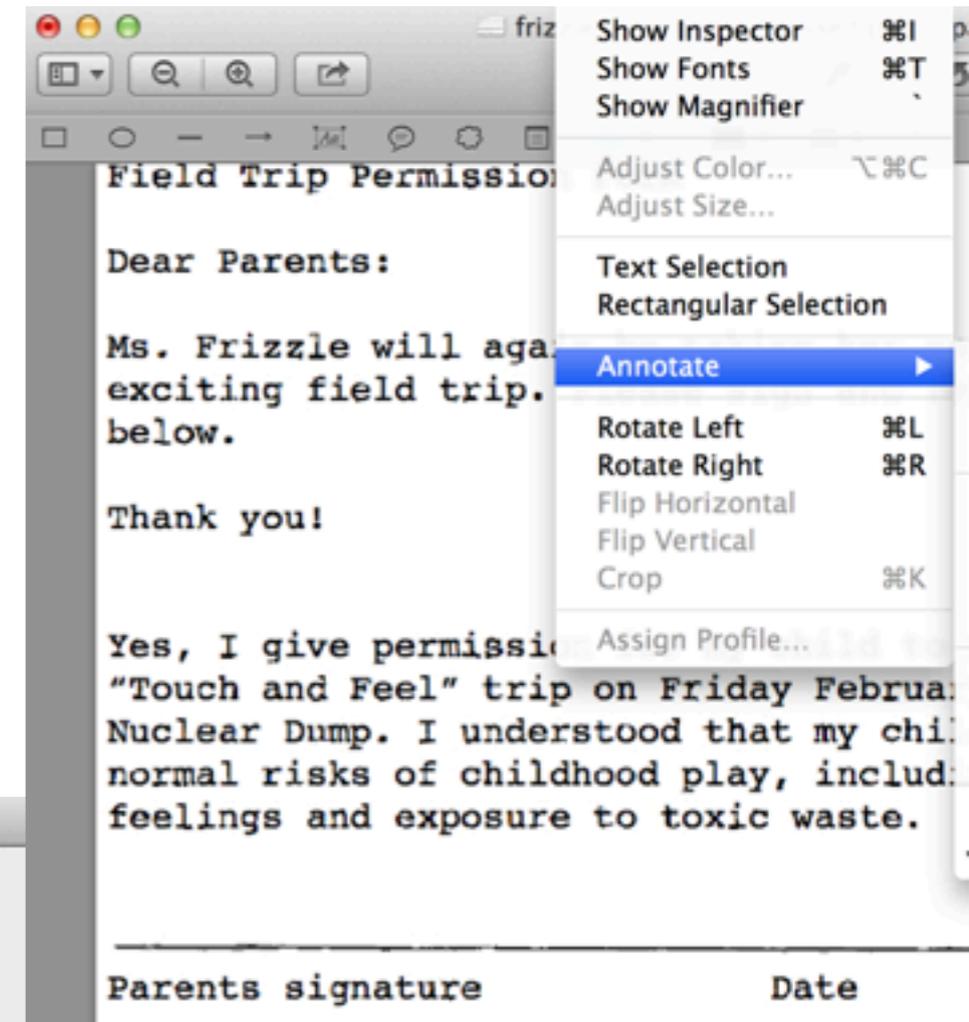
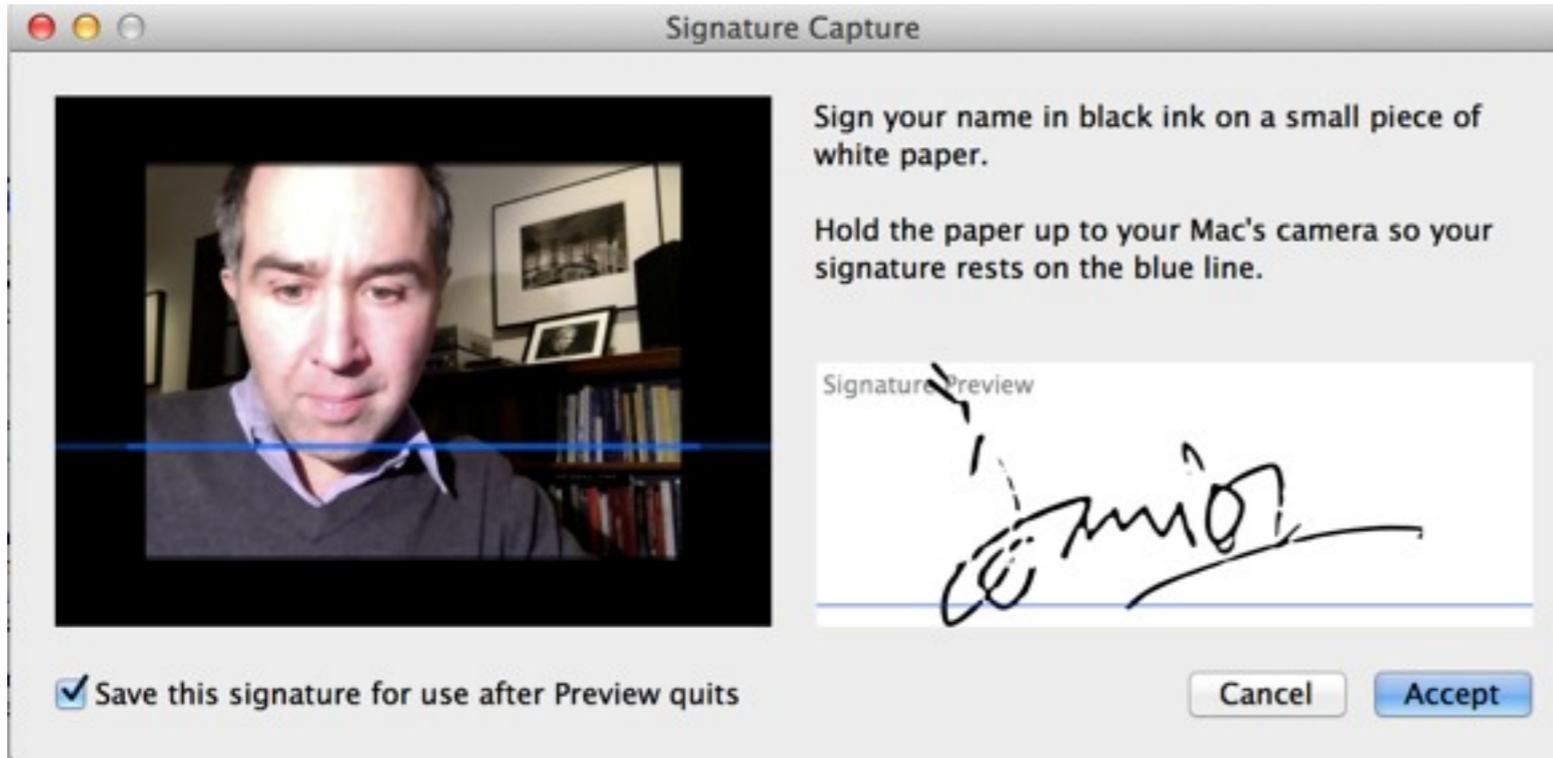
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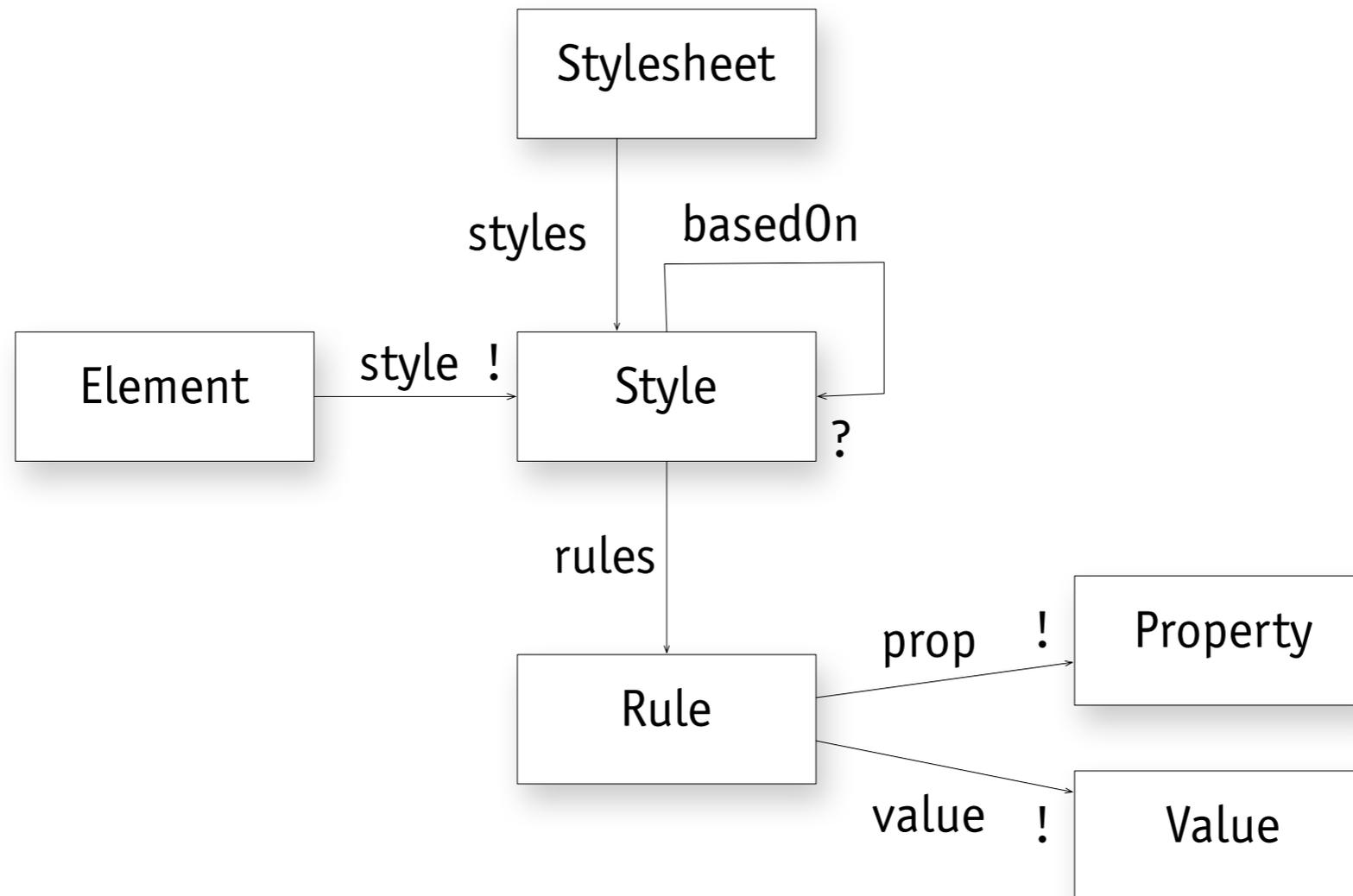
completeness apple preview



conclusion

idioms concept state structure

idea: classify idioms; invariants expose tricky design problems



all s : **Style**, p : **Property** | some s .rules | r .prop = p

next steps

analyzing diagrams

- › do graph properties (eg cycles) have design implications?

new case studies

- › Gmail, CSS and DropBox underway

evaluation

- › is Gitless easy to use?

concept to code dependences

- › does a concept dependence imply a code dependence?

related work

related work

on concept description

- › *Analysis Patterns* (Fowler, 1997)
- › *Data Model Patterns* (Hay, 2011)
- › *Conceptual Models* (Henderson & Johnson, 2011)

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- › “orthogonality, propriety & generality” (Brooks, 1997)

on dependences

- › the uses relation (Parnas, 1978)
- › Design Rules (Baldwin & Clark, 2000)