HEURISTIC EVALUATION

CS 77 + CS 147

Scott Klemmer and Michael Bernstein

Heuristic evaluation is a hill-climbing technique

Heuristic evaluation gives you terms for intuitive ideas

it is a suite of unit tests for user interfaces

Multiple ways to evaluate

Empirical	Assess with real users
Formal	Models and formulas to calculate measures
Automated	Software measures
Critique	Expertise and heuristic feedback

When to get design critique?

- **Before user testing.** Don't waste users on the small stuff. Critique can identify minor issues that can be resolved before testing, allowing users to focus on the big issues.
- **Before redesigning.** Don't throw out the baby with the bathwater. Critique can help you learn what works and what should change.
- **When you know there are problems, but you need evidence.** Perhaps you've received complaints from customers or found yourself stumbling around your own site. Critique can help you articulate problems and provide you with ammunition for redesign.
- **Before release.** Smooth off the rough edges.

http://www.etre.com/usability/inspection

Begin Review with a Clear Goal

Heuristic Evaluation

- Developed by Jakob Nielsen
- Helps find usability problems in a design
- Small set (3-5) of evaluators examine UI
  - independently check for compliance with usability principles (“heuristics”)
  - different evaluators will find different problems
  - evaluators only communicate afterwards
    - findings are then aggregated
- Can perform on working UI or sketches

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

Ten Design Heuristics

- Show system status
- Familiar metaphors & language
- Control & freedom
- Consistency
- Error prevention
- Recognition over recall
- Flexibility & efficiency
- Aesthetic & minimalist design
- Recognize, diagnose, & recover from errors
- Help

Somewhat revised names for Jacob Nielsen's heuristics, http://www.useit.com/papers/heuristic

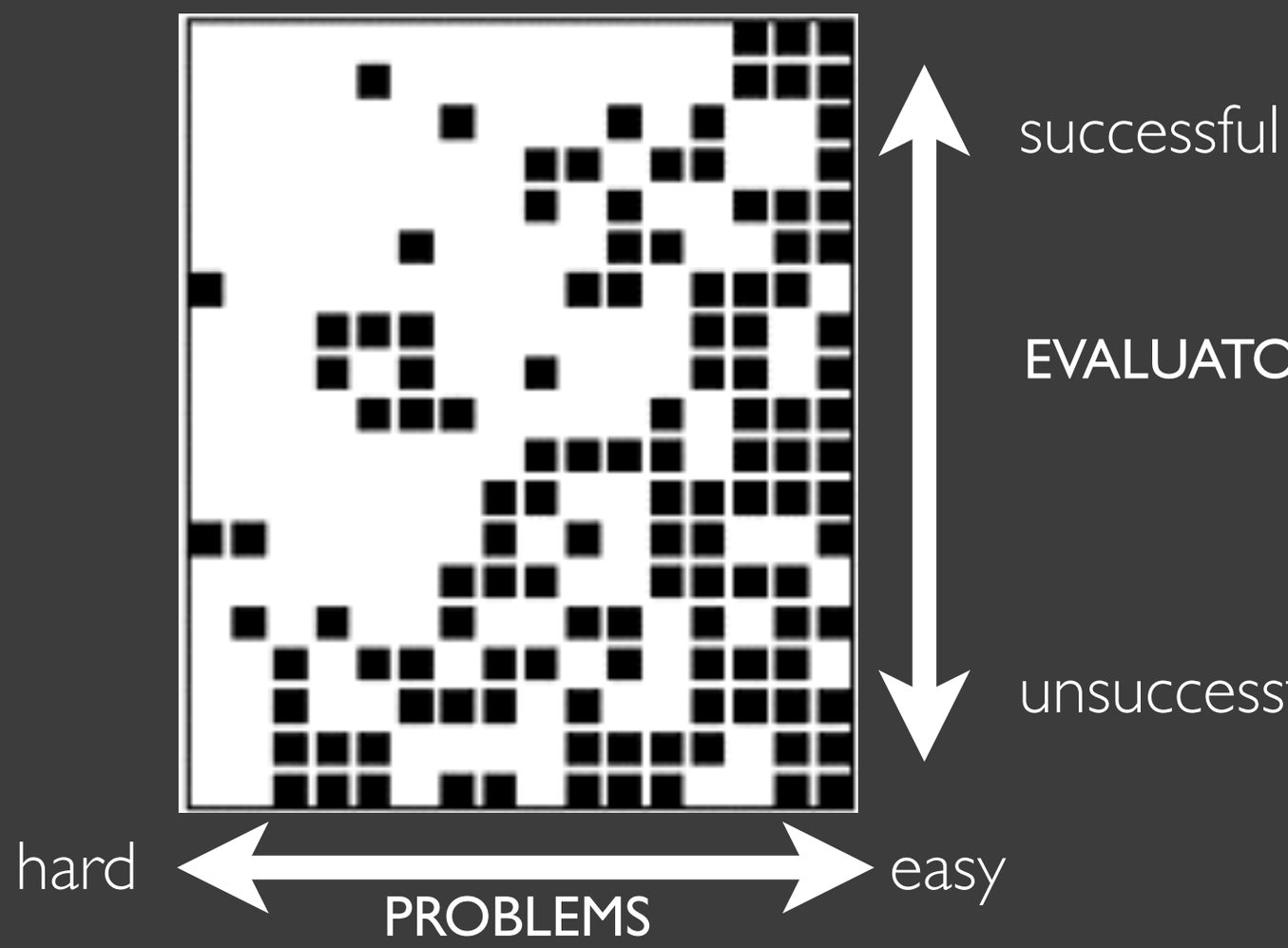
Evaluators' Process

- Step through design several times
  - Examine details, flow, and architecture
  - Consult list of usability principles
  - ..and anything else that comes to mind
- Which principles?
  - Nielsen's "heuristics"
  - **Category-specific heuristics** from e.g., design goals, competitive analysis, existing designs
- Use violations to redesign/fix problems

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

Why Multiple Evaluators?

- No evaluator finds everything
- Some find more than others



Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

Decreasing Returns

- Caveat: graphs for a specific example

problems found

benefits / cost

Heuristic Eval: Cost-effective

- In one case: benefit-cost ratio of 48
  - estimated benefit $500,000; cost $10,500
  - value of each problem ~$15K
  - how might we calculate this value?
    - in-house -> productivity; open market -> sales
- Severe problems found more often
- Single evaluator achieves poor results
  - only finds 35% of usability problems
  - 5 evaluators find ~ 75% of problems

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

Heuristics vs. User Testing

- Heuristic Evaluation often faster
  - 1-2 hours each evaluator
- HE results come pre-interpreted
- User testing is more accurate (by def.)
  - takes into account actual users and tasks
  - HE may miss problems & find "false positives"
- Valuable to alternate methods
  - find different problems
  - don't waste participants

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

Phases of Heuristic Evaluation

1. **Pre-evaluation training:** give evaluators needed domain knowledge and information on the scenario
2. **Evaluation:** individuals evaluate and then aggregate results
3. **Severity rating:** determine how severe each problem is (priority). Can do first individually and then as a group
4. **Debriefing:** review with design team

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

How-to: Heuristic Evaluation

- At least two passes for each evaluator
  - first to get feel for flow and scope of system
  - second to focus on specific elements
- If system is walk-up-and-use or evaluators are domain experts, no assistance needed
  - otherwise might supply evaluators with scenarios
- Each evaluator produces list of problems
  - explain why with reference to heuristic or other information
  - be specific and list each problem separately

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

How-to: Heuristic Evaluation

- Why separate listings for each violation?
  - risk of repeating problematic aspect
  - may not be possible to fix all problems
- Where problems may be found
  - single location in UI
  - two or more locations that need to be compared
  - problem with overall structure of UI
  - something is missing
    - ambiguous with early prototypes; clarify in advance
    - sometimes features are implied by design docs and just haven't been "implemented" – relax on those

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

Severity Rating

- Independently estimate after review
- Allocate resources to fix problems
- Estimate need for more usability efforts
- Severity combines
  - frequency
  - impact
  - persistence

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

Severity Ratings

0 - don't agree that this is a usability problem

1 - cosmetic problem

2 - minor usability problem

3 - major usability problem; important to fix

4 - usability catastrophe; imperative to fix

Severity Ratings Example

- *Issue*: Unable to edit one's weight
- *Severity*: 2
- *Heuristics violated*: User control and freedom

- *Description*: when you open the app for the first time, you have to enter your weight, but you cannot update it. It could be useful if you mistyped your weight, or if one year or two after the first use of the app, your weight has changed.

Courtesy Sebastien Robaszkiewicz, cs147 2011

Debriefing

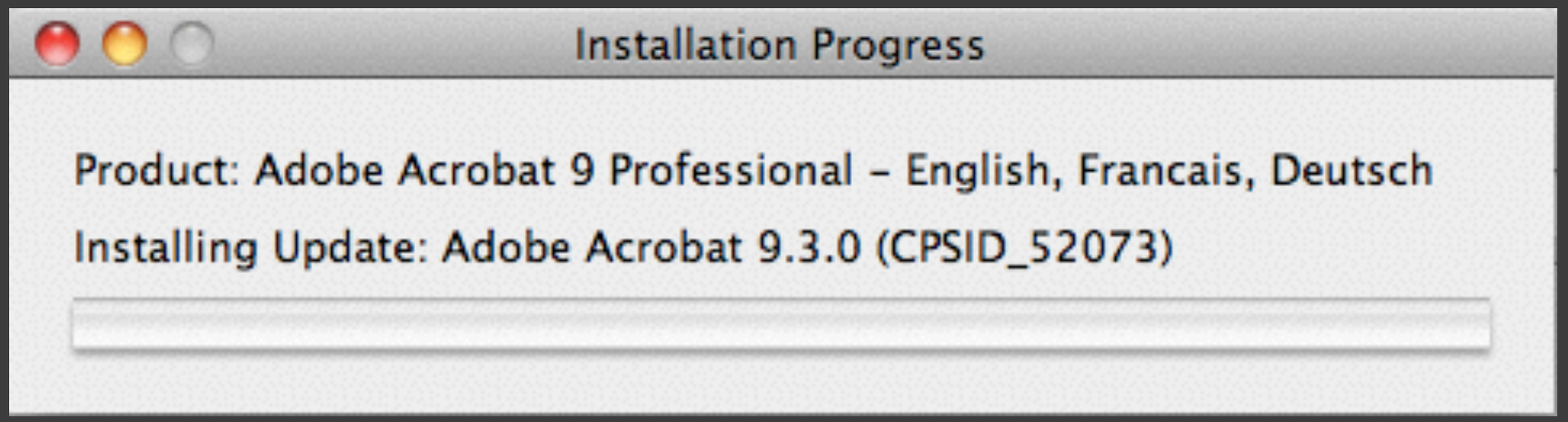
- Conduct with evaluators, observers, and development team members
- Discuss general characteristics of UI
- Suggest potential improvements to address major usability problems
- Dev. team rates effort to fix
- Brainstorm solutions

Jacob Nielsen, http://www.useit.com/papers/heuristic · Slide summary adapted from James Landay

The Heuristics

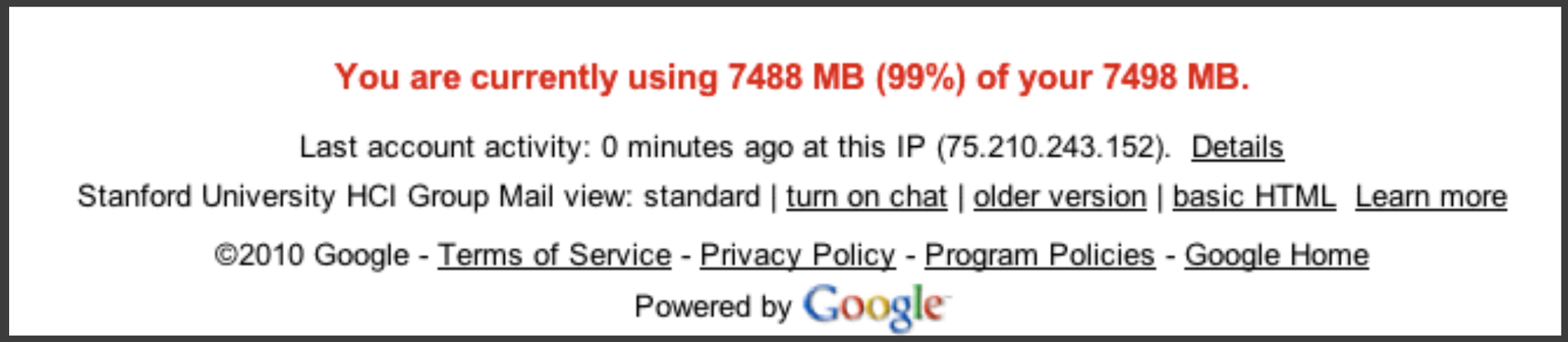
Show System Status

Show: Time



- Feedback depends on response time
  - < 1 s: just show outcome
  - ~ 1 s: feedback that activity is underway
  - >> 1 s: Show fractional progress; time

Show: Space

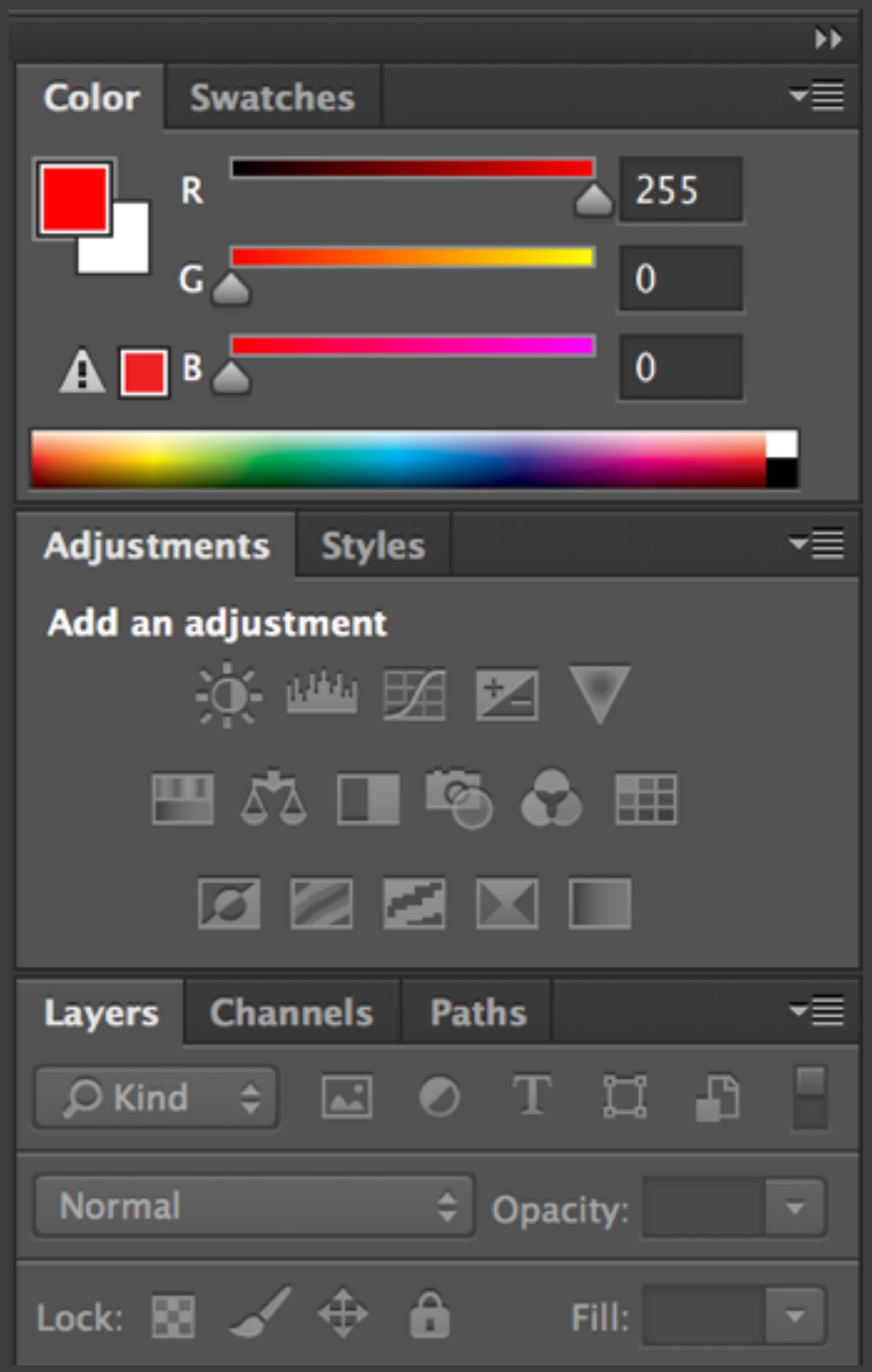


Google Gmail

Show: Change

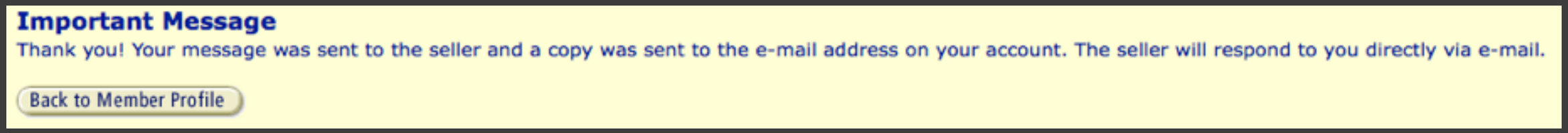
Apple TextEdit

Show: Action



Adobe Photoshop CC

Show: Next steps



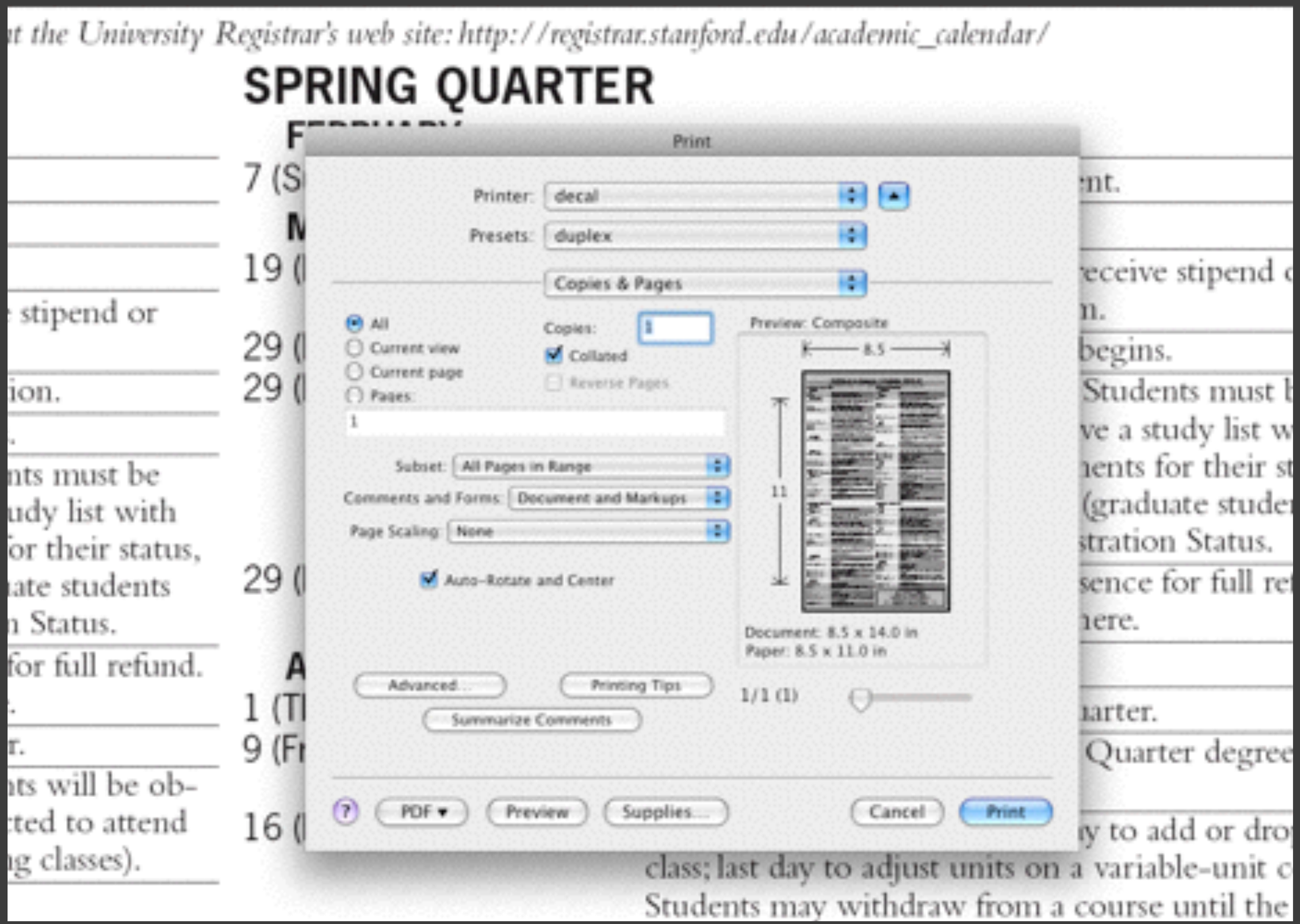
Amazon

Show: Completion

Handbrake

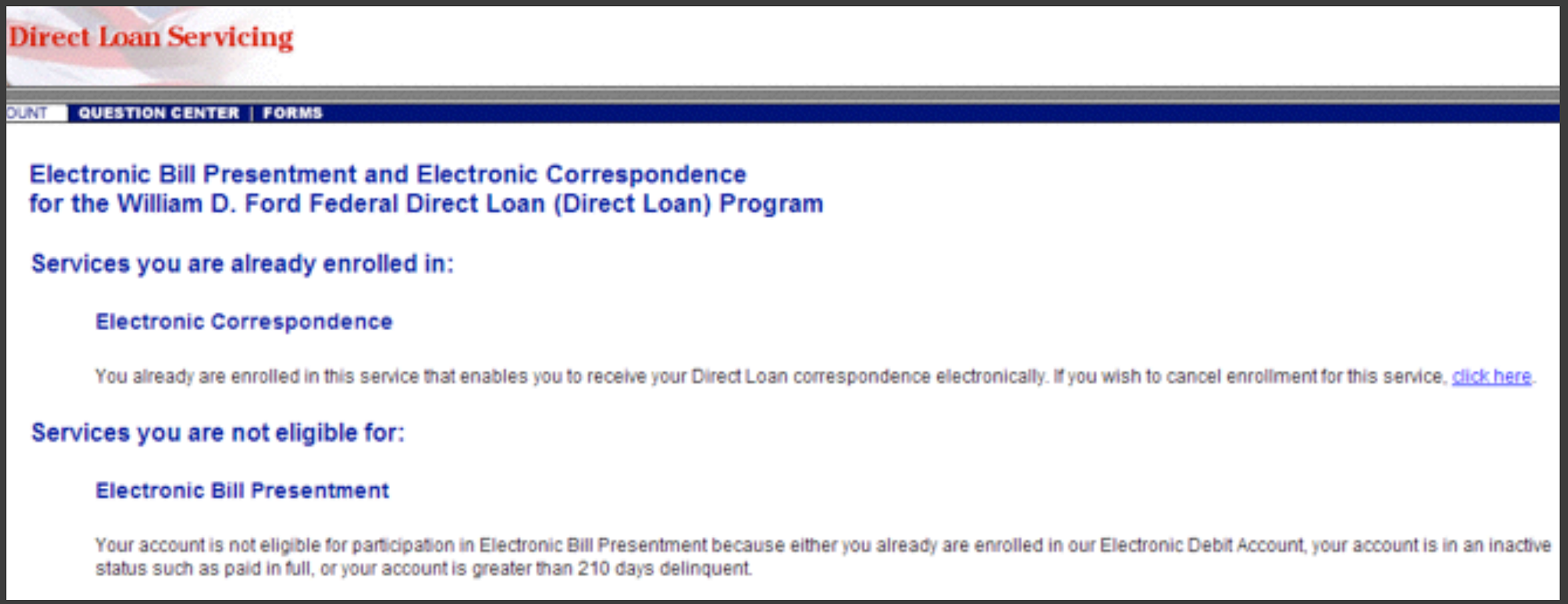
Familiar Metaphors & Language

Familiar Metaphors



Adobe Acrobat print dialog: Stanford Academic Calendar

Familiar Language



Direct Loan Servicing

OUNT | QUESTION CENTER | FORMS

Electronic Bill Presentment and Electronic Correspondence for the William D. Ford Federal Direct Loan (Direct Loan) Program

Services you are already enrolled in:

Electronic Correspondence

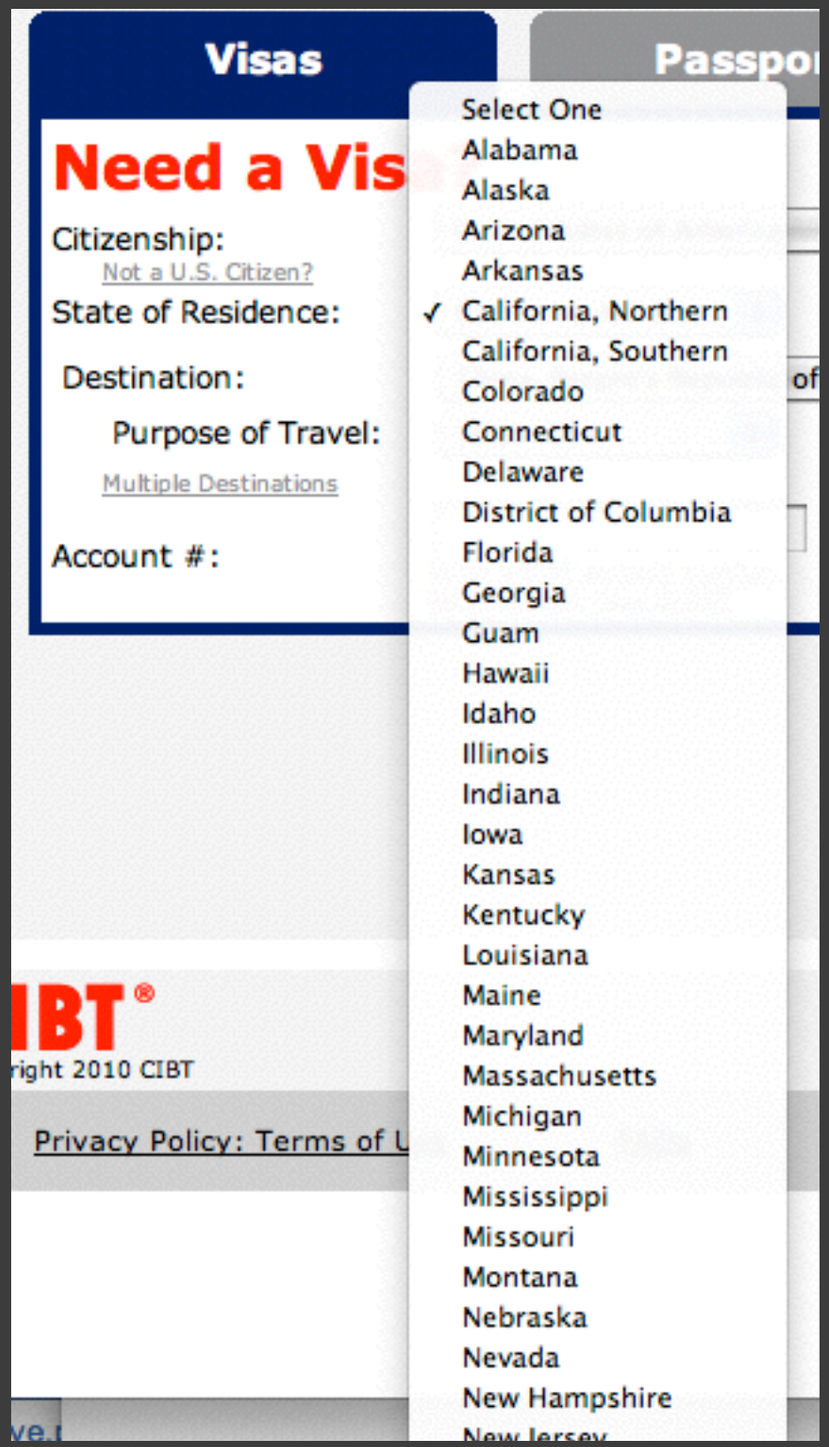
You already are enrolled in this service that enables you to receive your Direct Loan correspondence electronically. If you wish to cancel enrollment for this service, click here.

Services you are not eligible for:

Electronic Bill Presentment

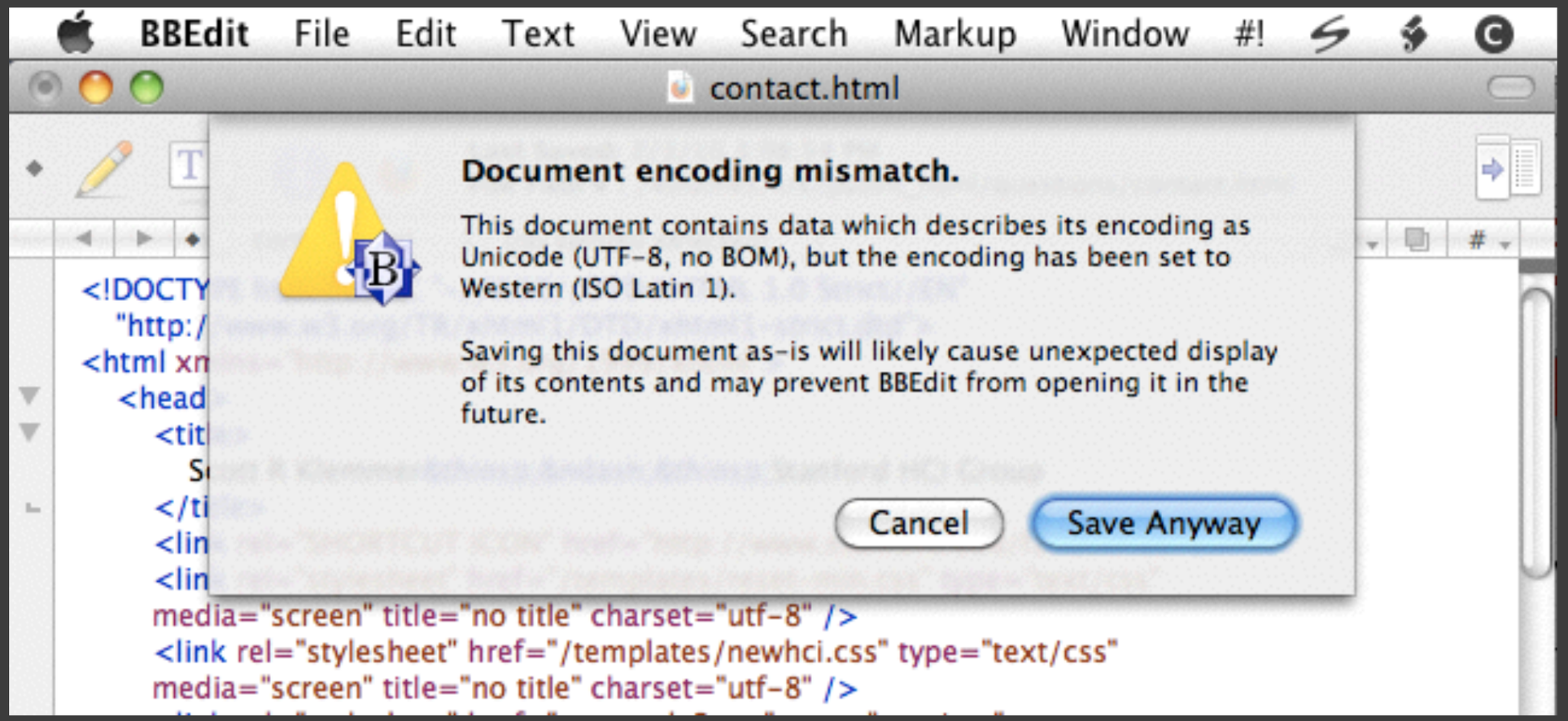
Your account is not eligible for participation in Electronic Bill Presentment because either you already are enrolled in our Electronic Debit Account, your account is in an inactive status such as paid in full, or your account is greater than 210 days delinquent.

Familiar Categories



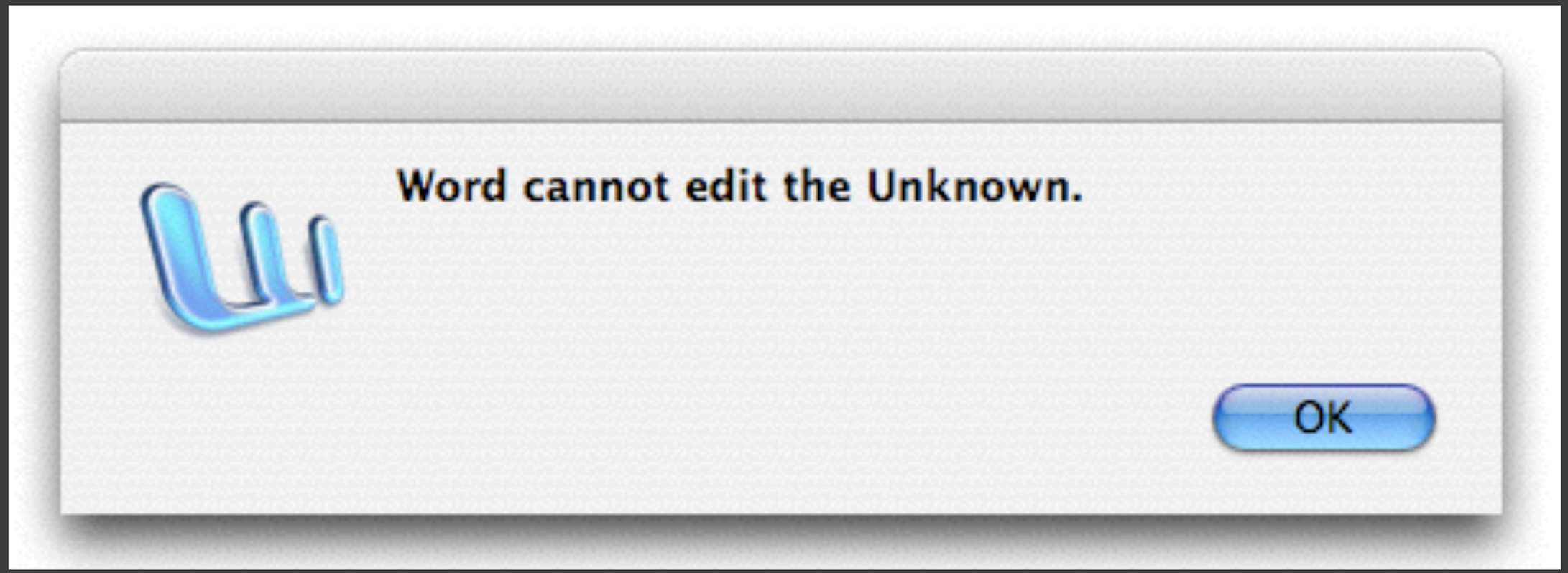
CIBT Visa Application

Familiar Choices



BBEdit

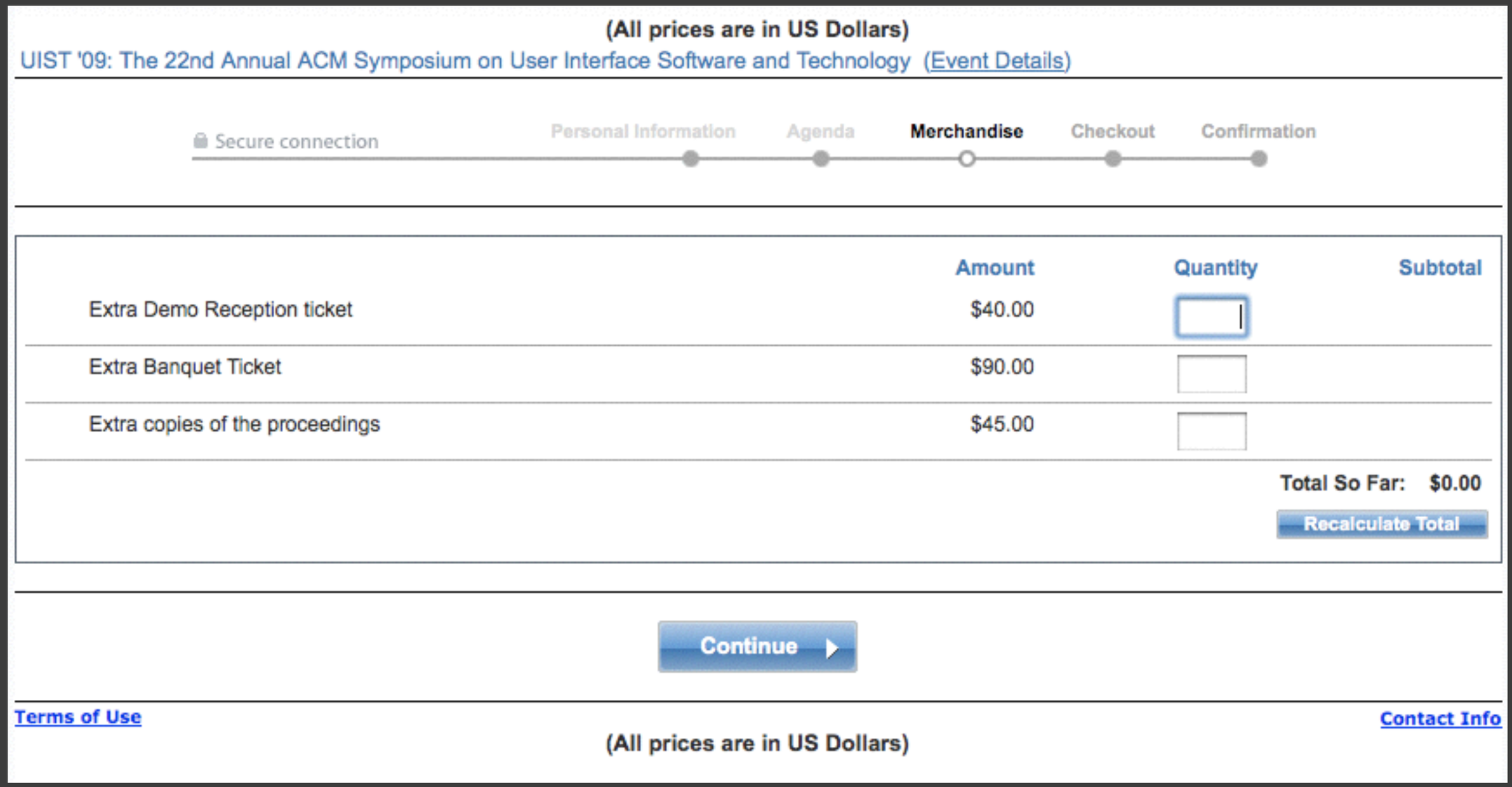
Consider corner cases



Microsoft Word for Mac

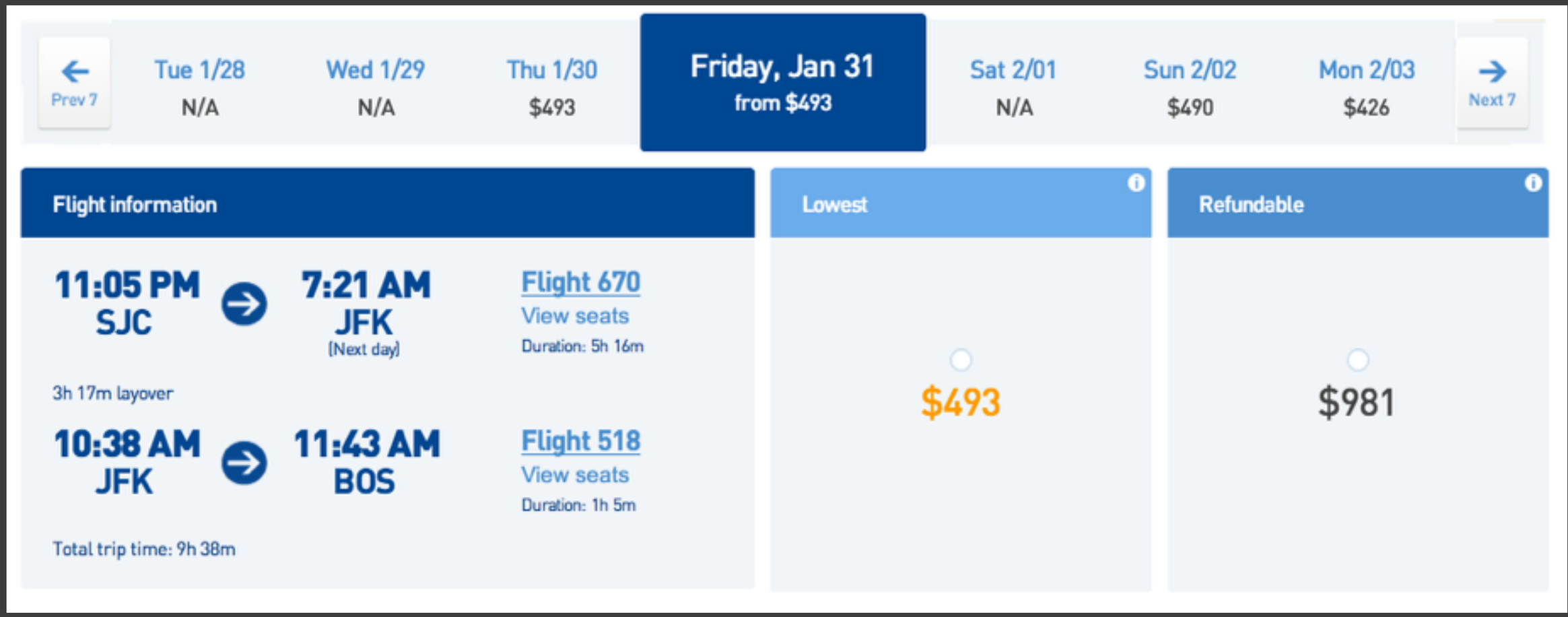
User Control & Freedom

Freedom to Undo



ACM UIST 2009 Registration

Freedom to Explore



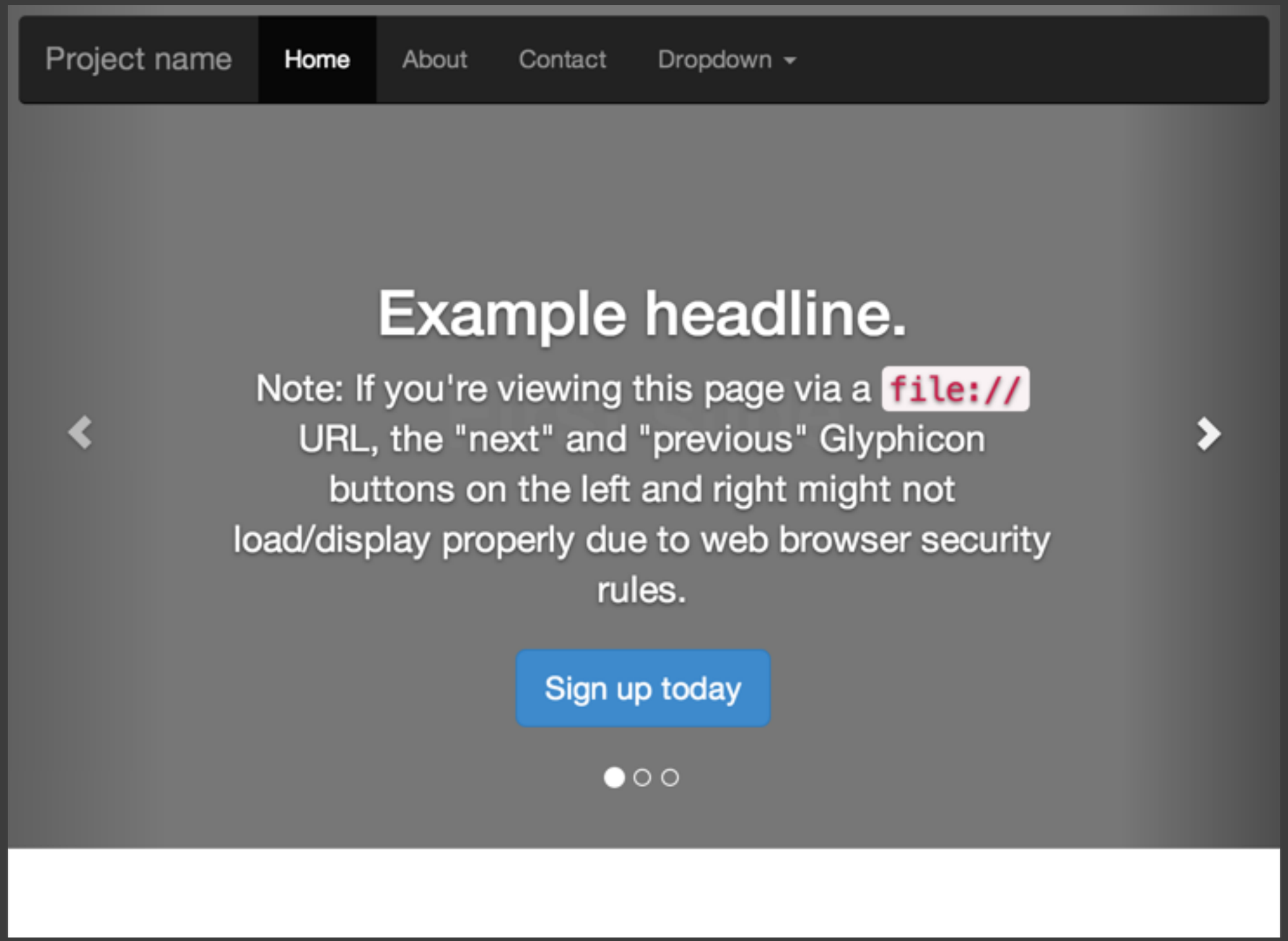
JetBlue

Consistency & Standards

Consistent Layout

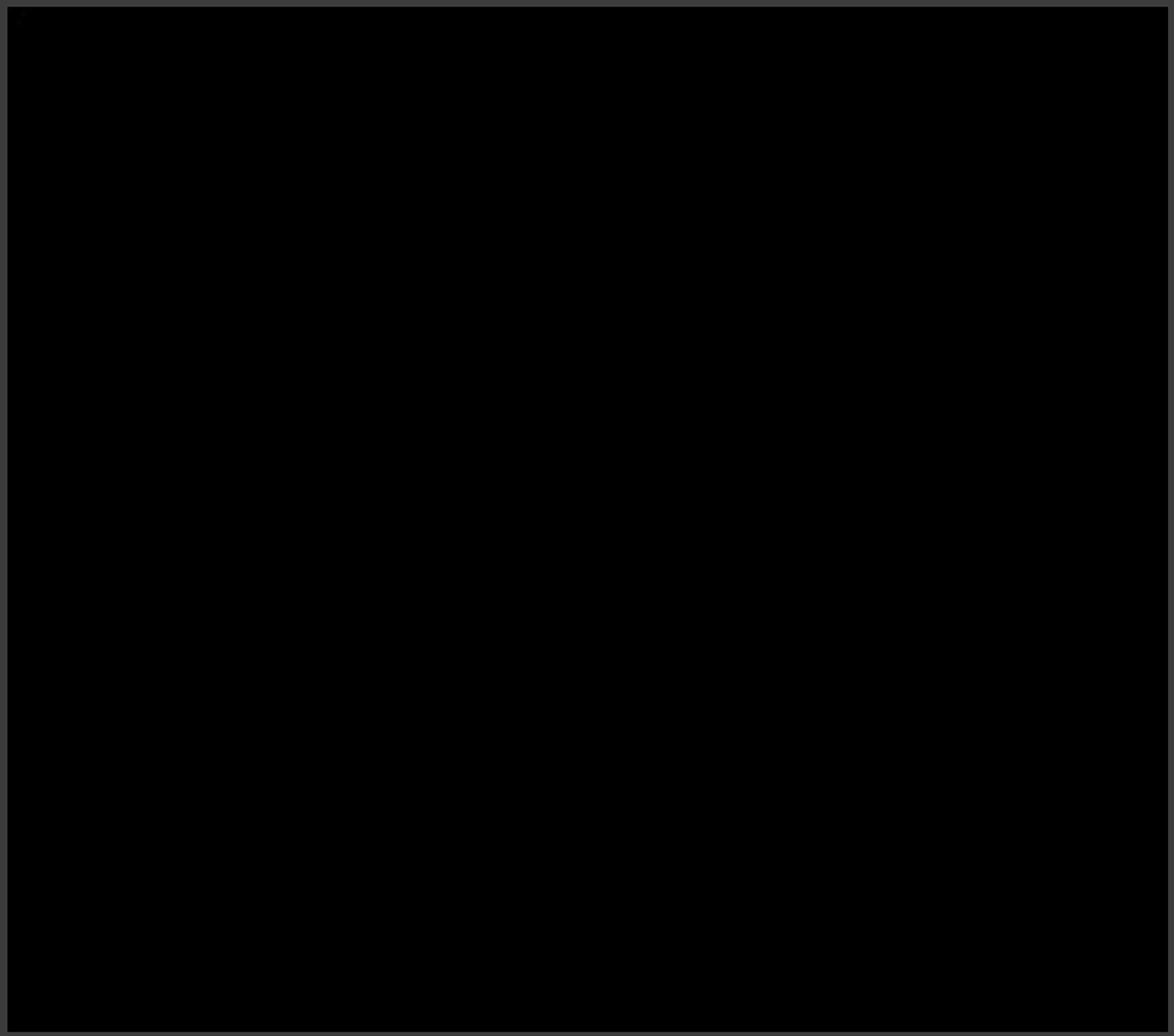
Tested.com, Ryan Whitman

Consistent Layout



Twitter Bootstrap

Consistent Layout



http://www.youtube.com/watch?v=jXaleptB54c

Consistent Names

Send an email

Please provide the requested information below to contact us by email. Your inquiry will be forwarded to our Customer Service Team for resolution. Our goal is to respond and resolve your inquiry within 24 hours.

Privacy and Security
Verizon Wireless considers your personal information completely private and will not disclose to any outside organization for its use in marketing or solicitation. View our Privacy Principles

* Indicates required fields.

Topic* Internet and Data Products

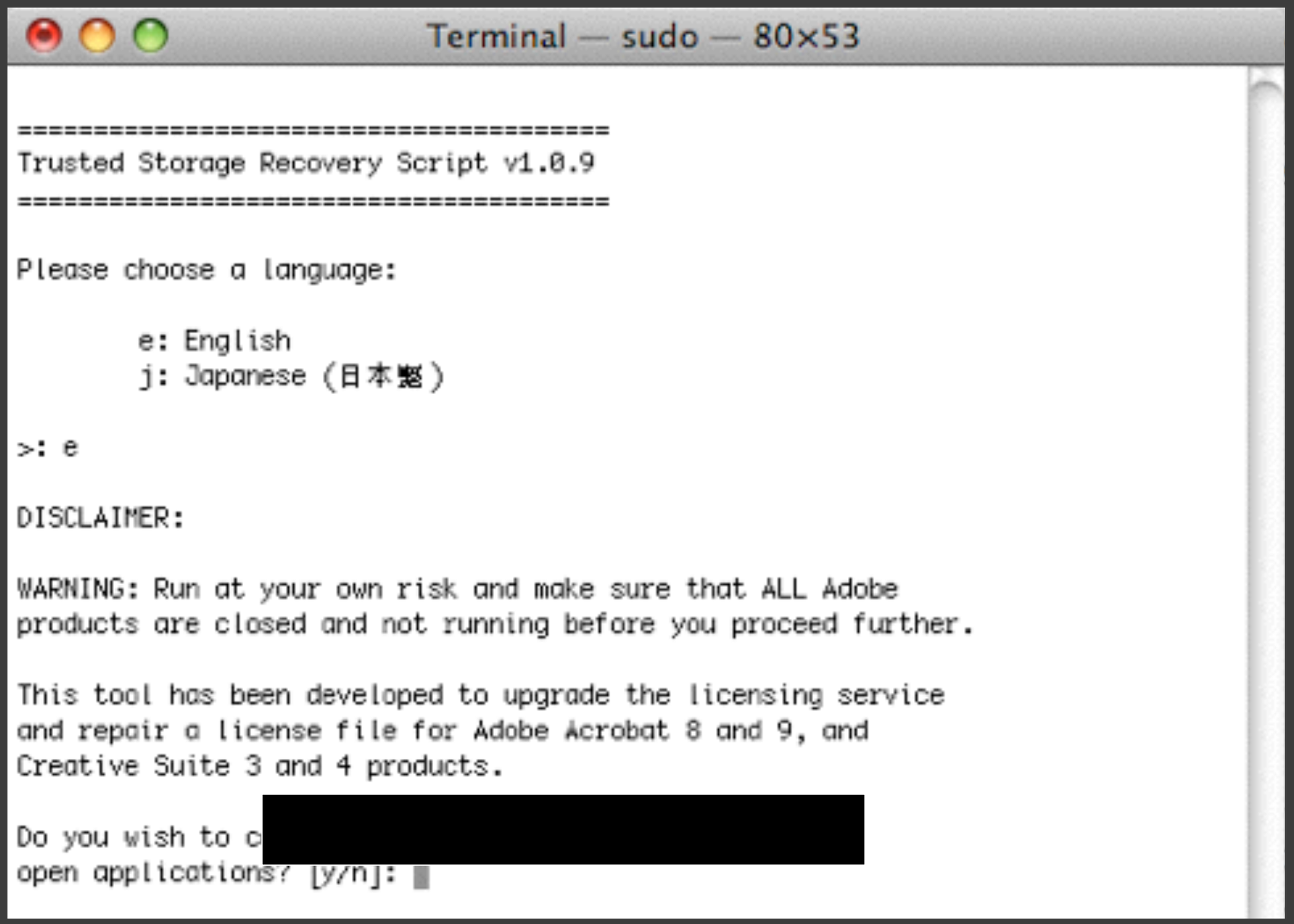
Subtopic*

- ✓ ---------- Please Select ----------
- Mobile Office
- Mobile Web
- National Access
- Bluetooth Technology
- Broadband Access
- Blackberry/PDA Smartphone
- Wireless Sync

Question or Comment (lir 2000

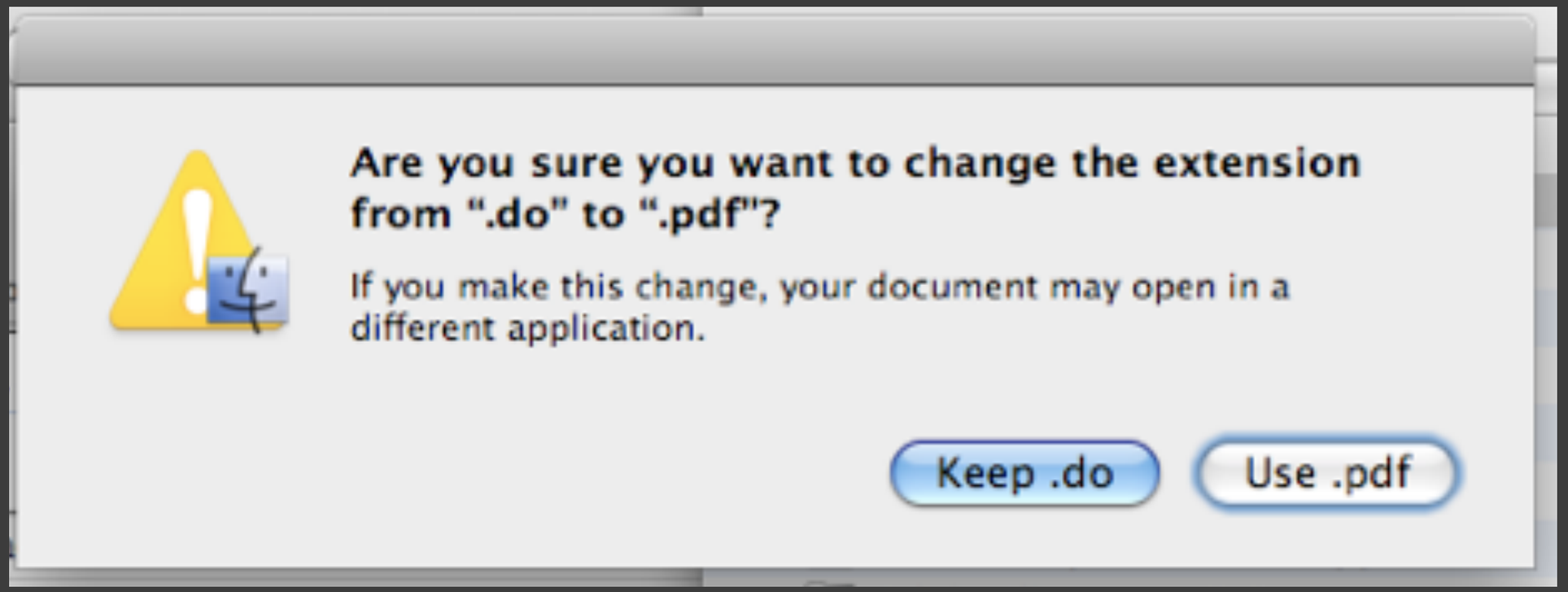
Verizon Support

Consistent Choices



Adobe Acrobat license repair utility

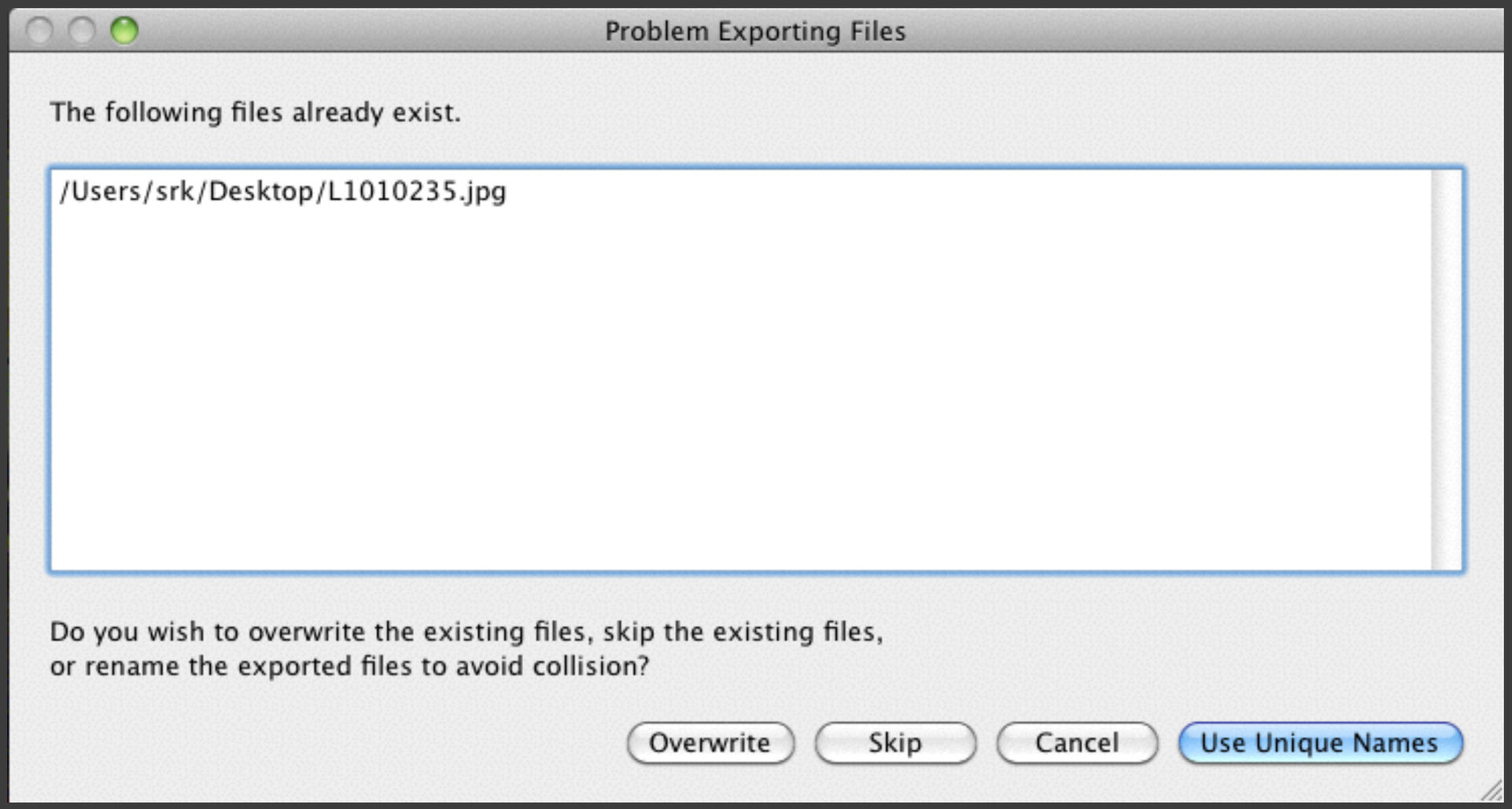
Clearer Choices...



Apple Mac OS X Finder

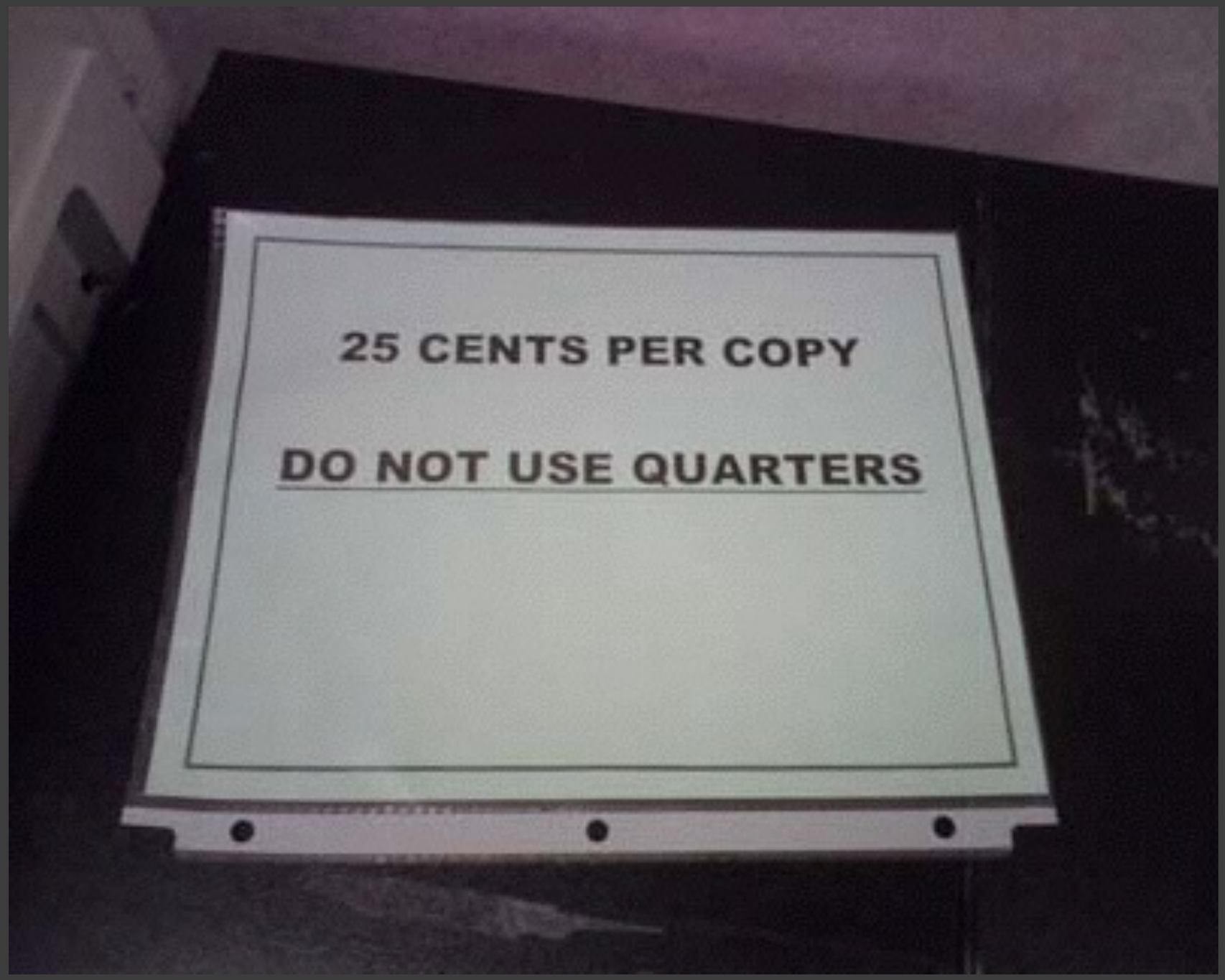
Error Prevention

Prevent Data Loss



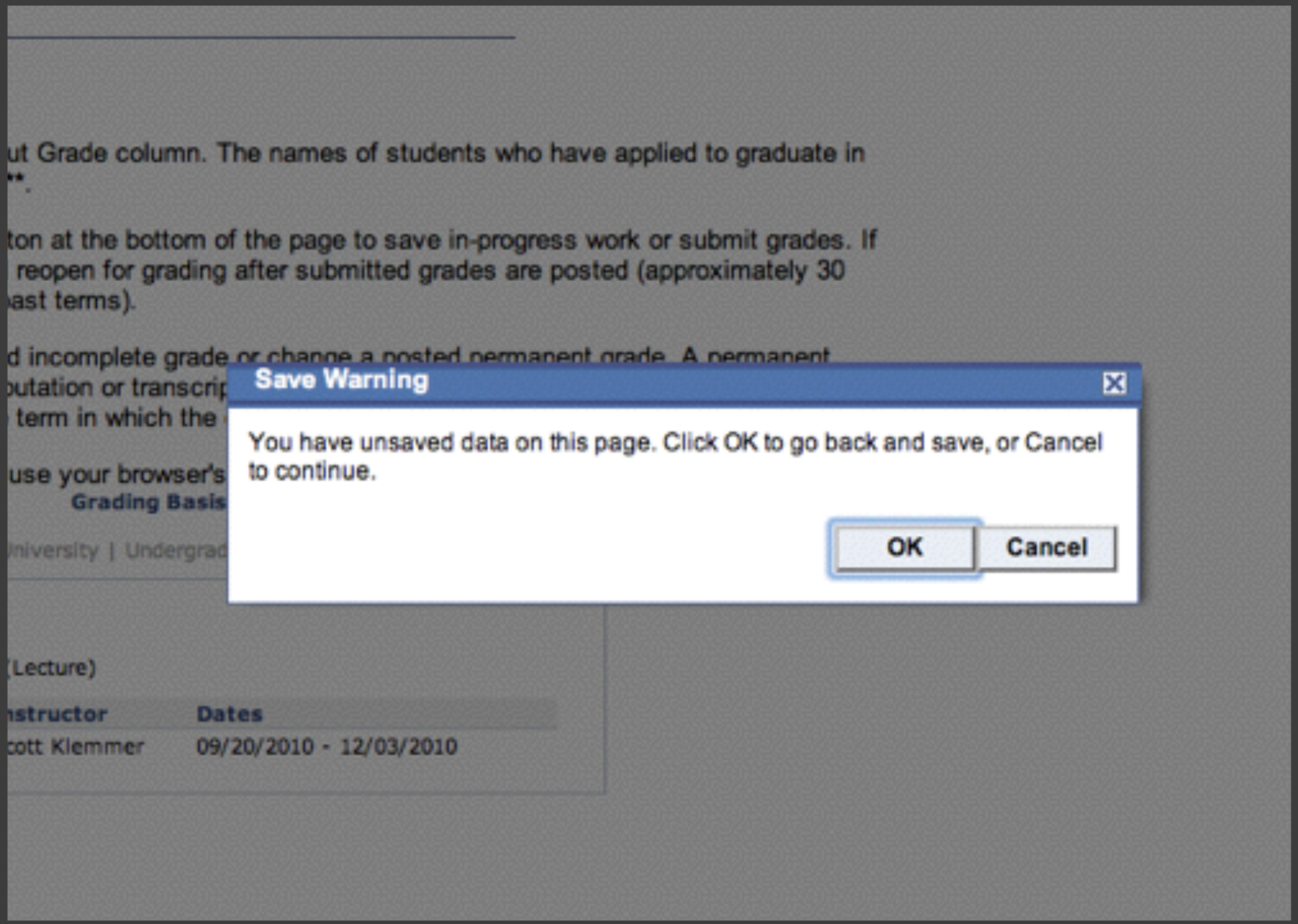
Adobe Lightroom

Prevent Painful Paths



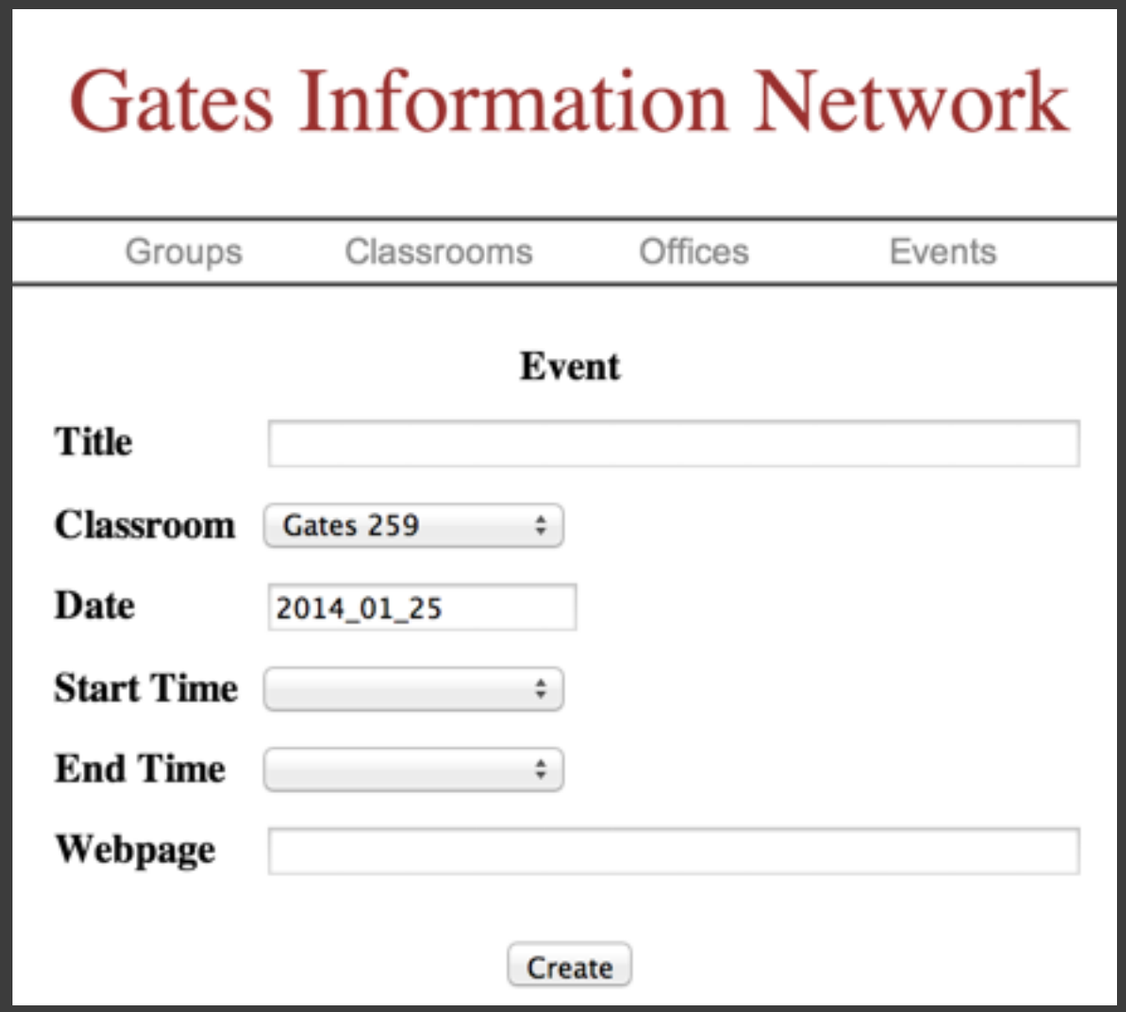
Photocopier

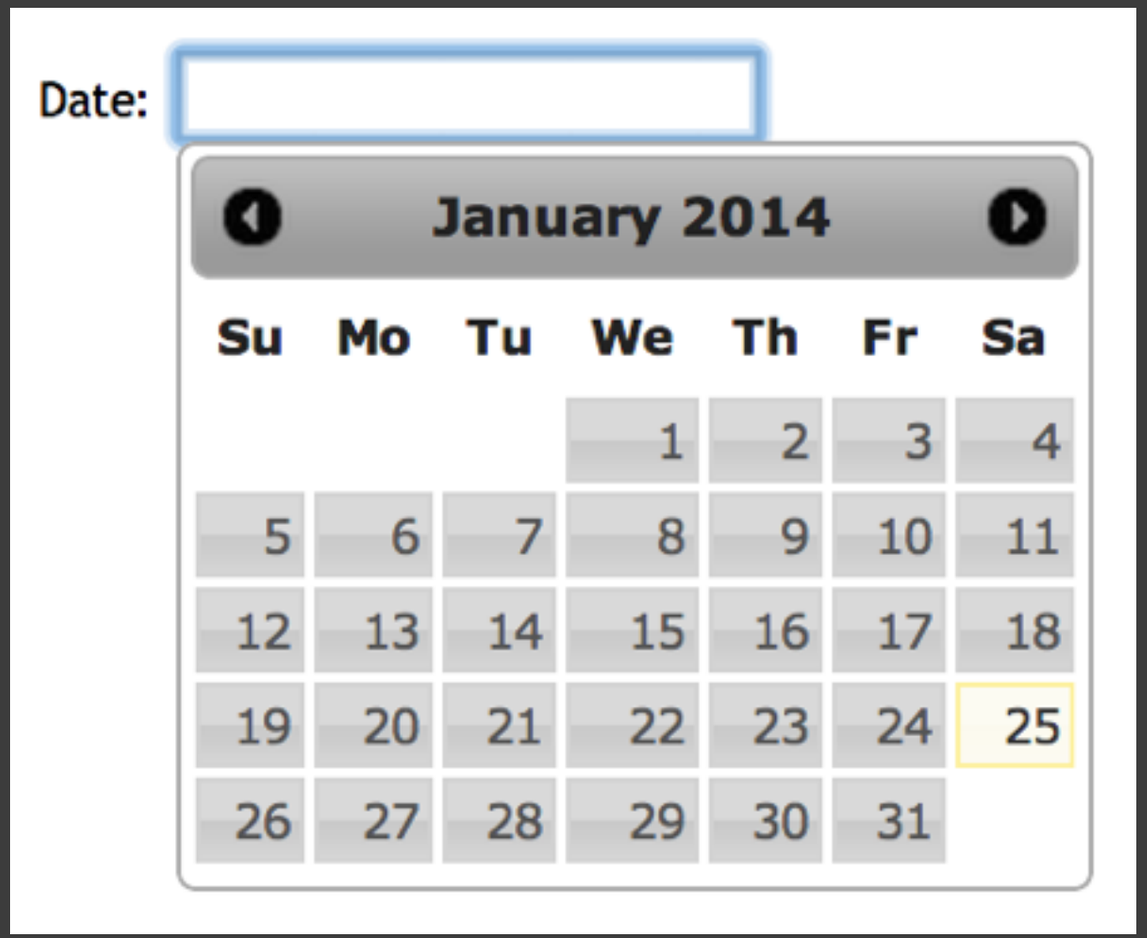
Prevent Misinterpretation



Stanford Axess

Prevent Bad input





Prevent Unnecessary Constraints

Cengage

Recognition Over Recall

Recognition: Avoid codes

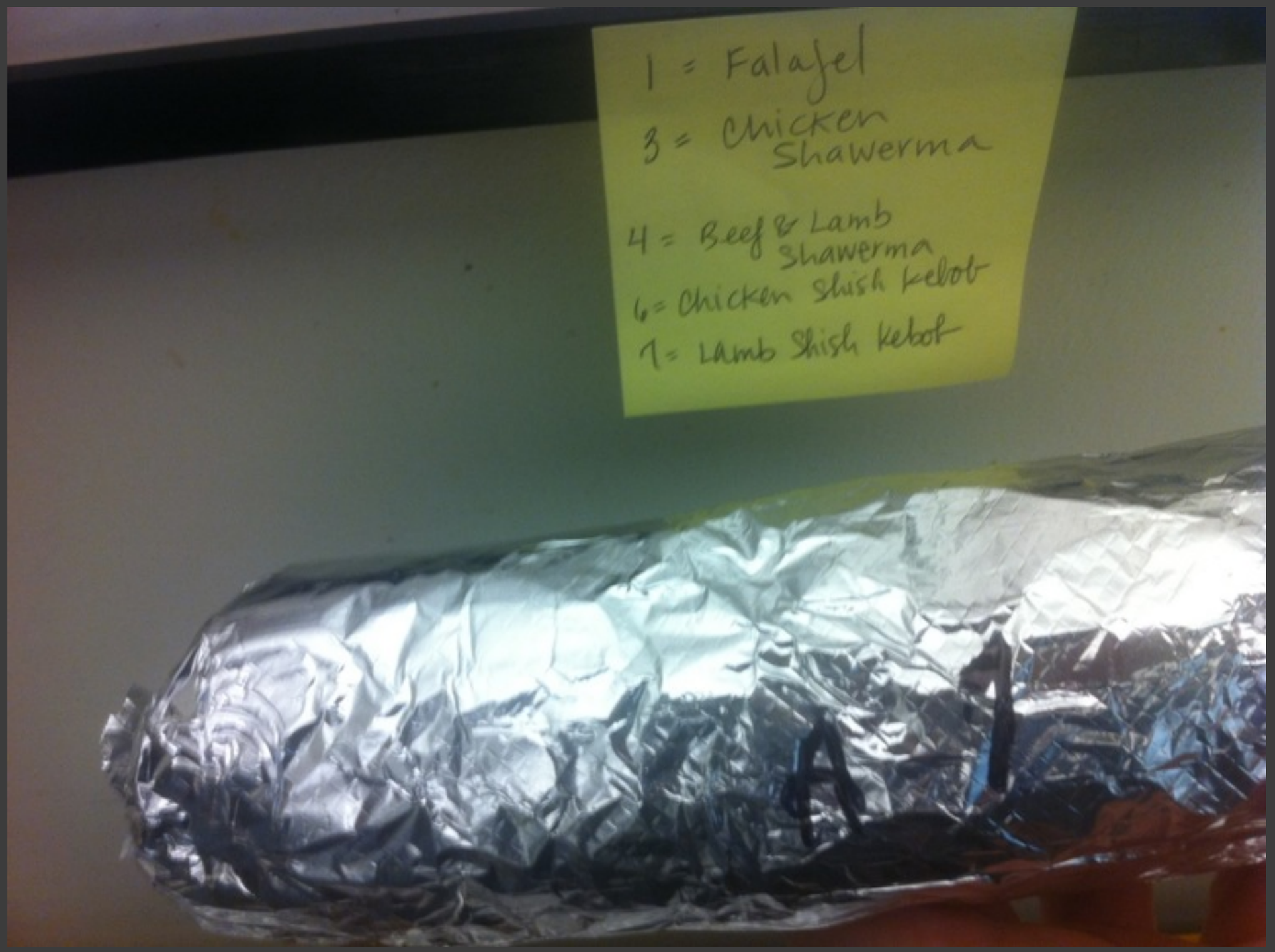
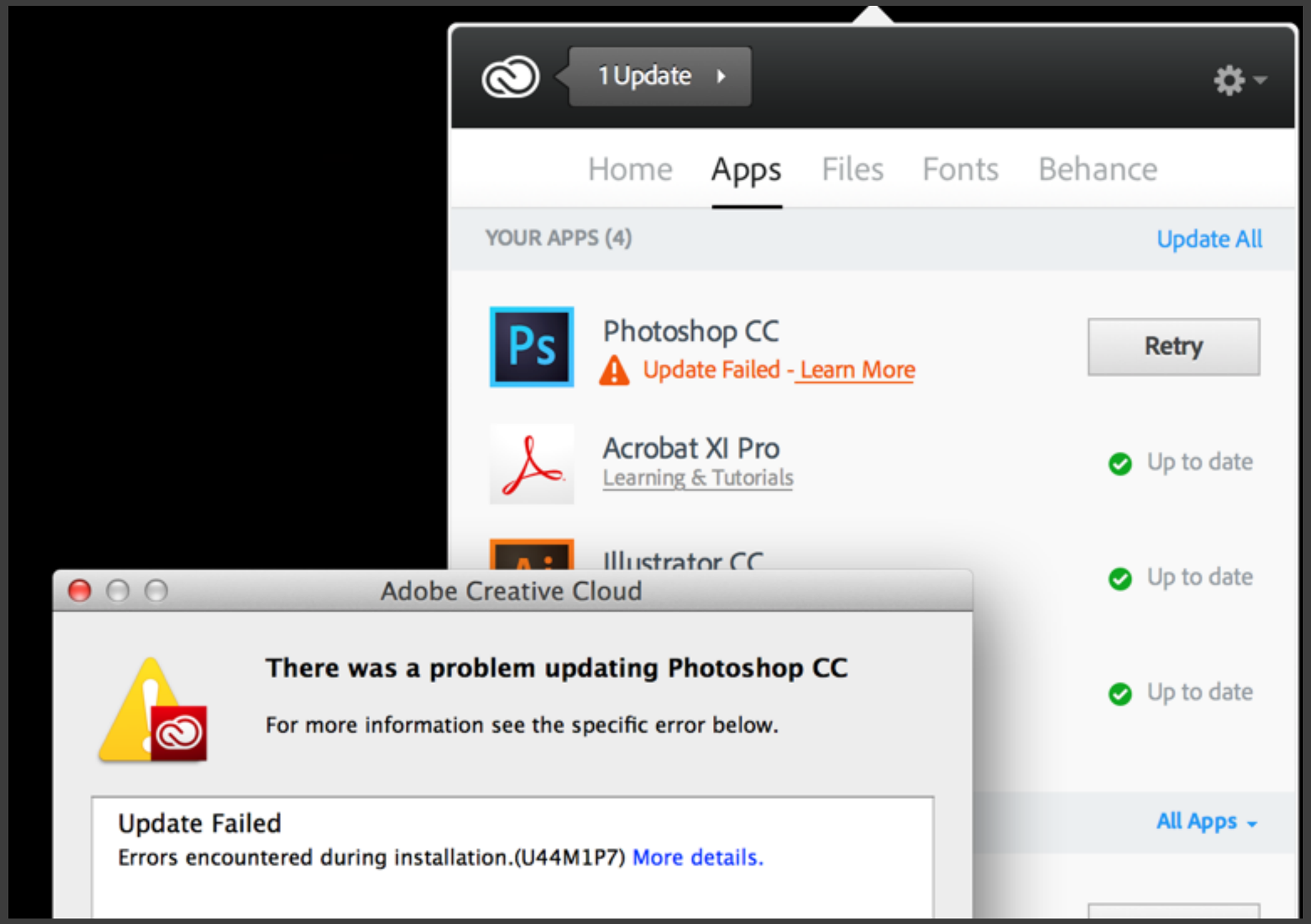


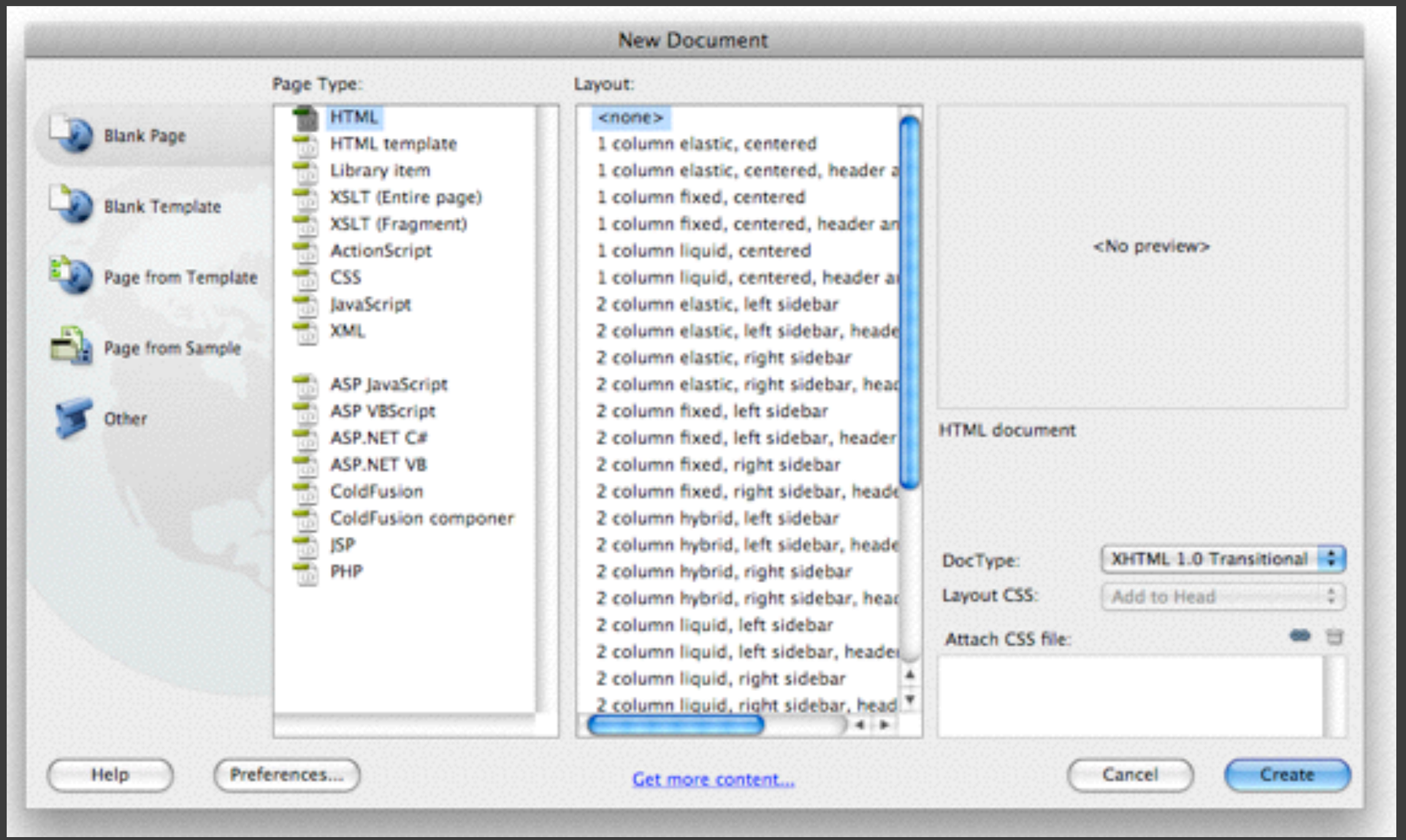
Photo by Scott Klemmer; taken at Stanford HCI lunch

Recognition: Avoid codes



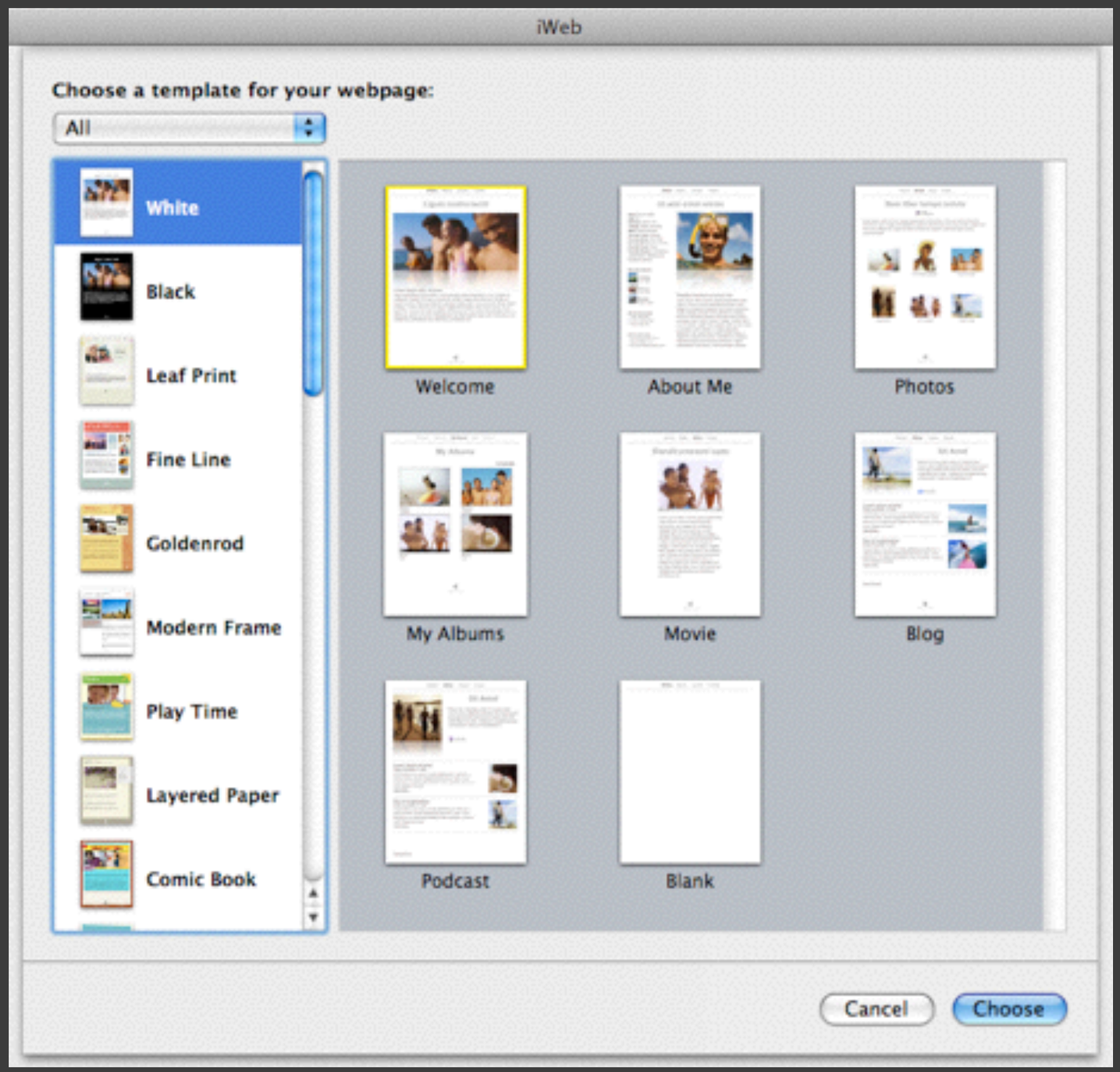
Adobe Creative Cloud updater

Recognition with previews



Adobe Dreamweaver New Document dialog

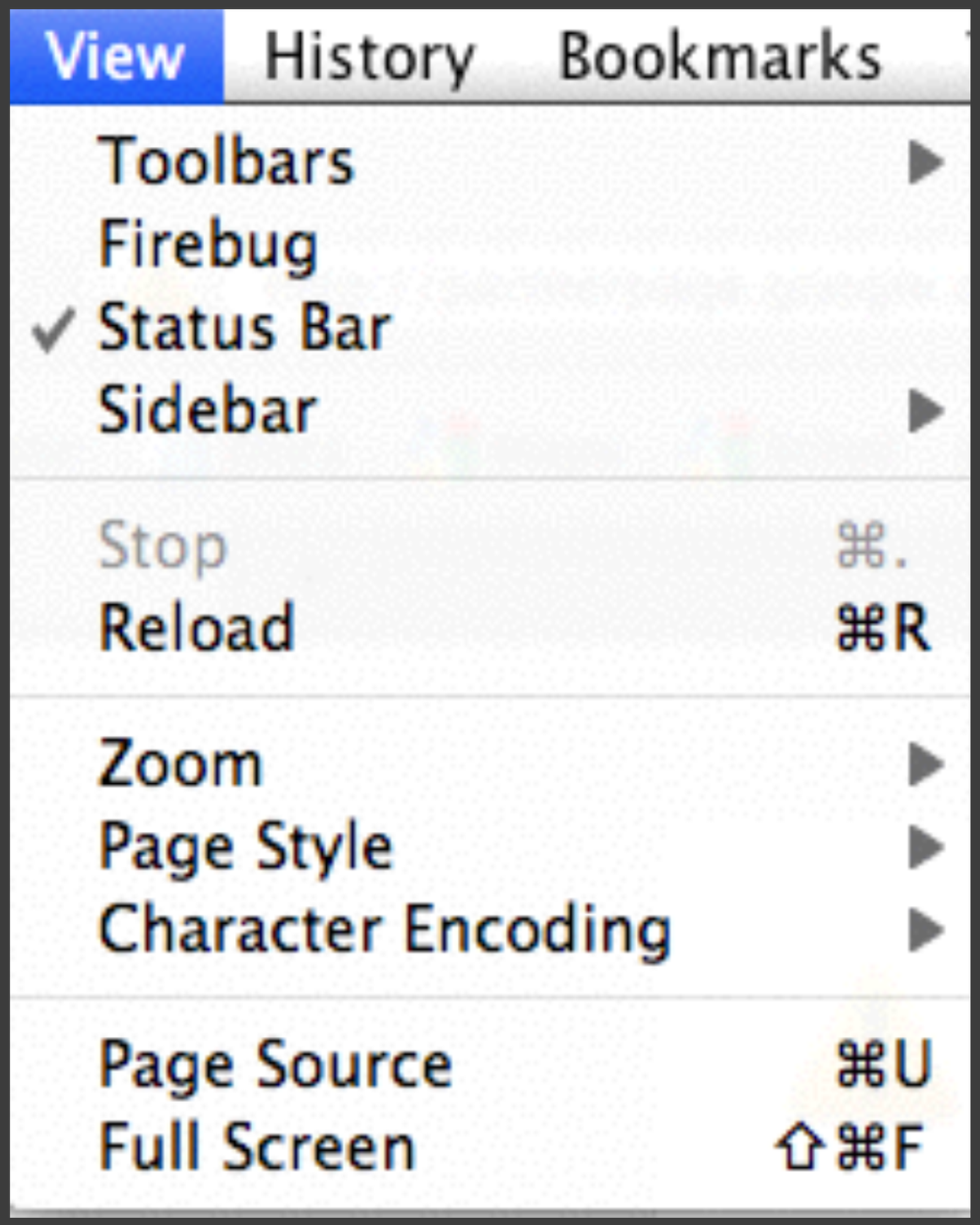
Recognition with previews



Apple iWeb Choose a template dialog

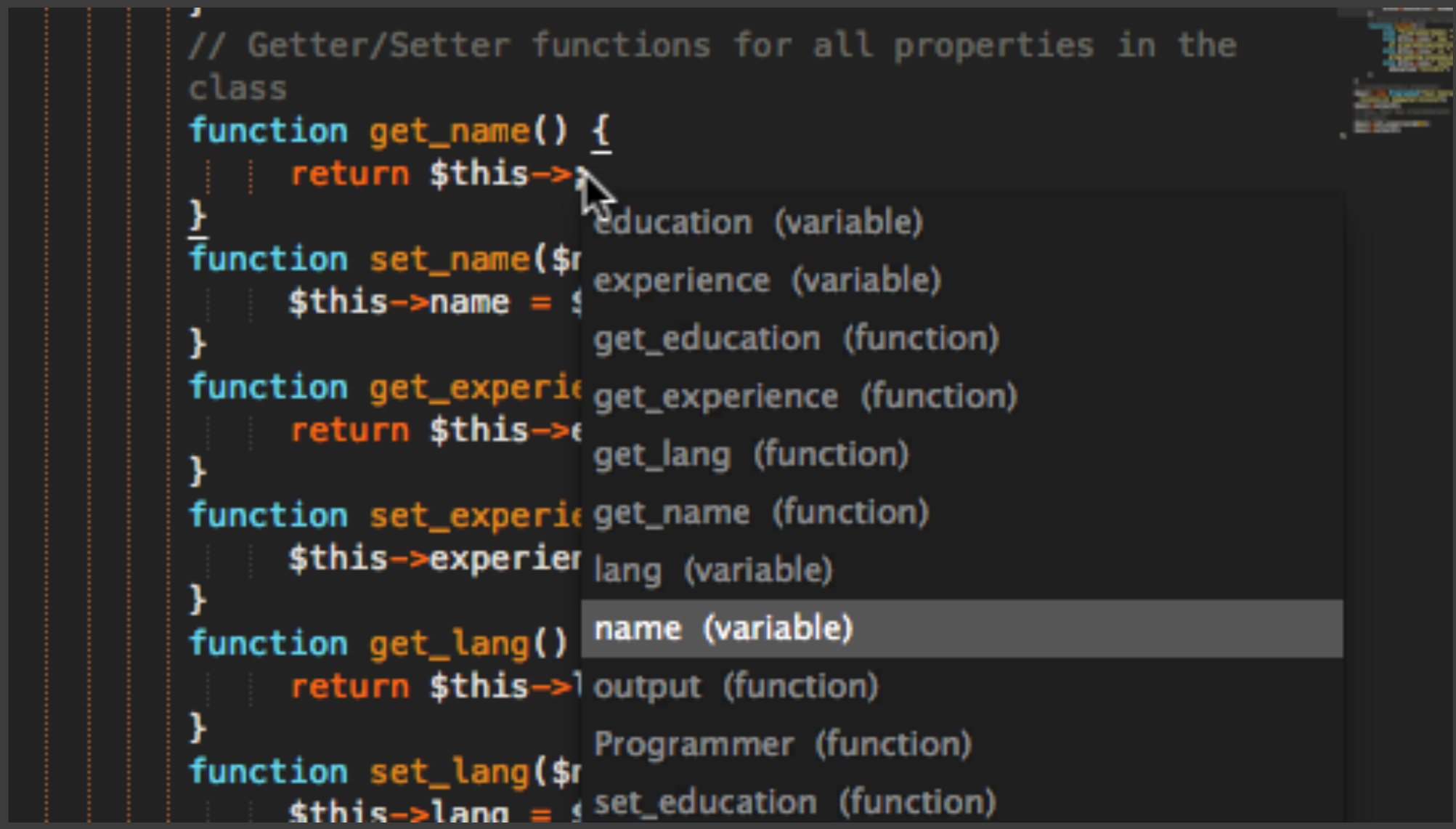
Flexibility & Efficiency

Flexible shortcuts



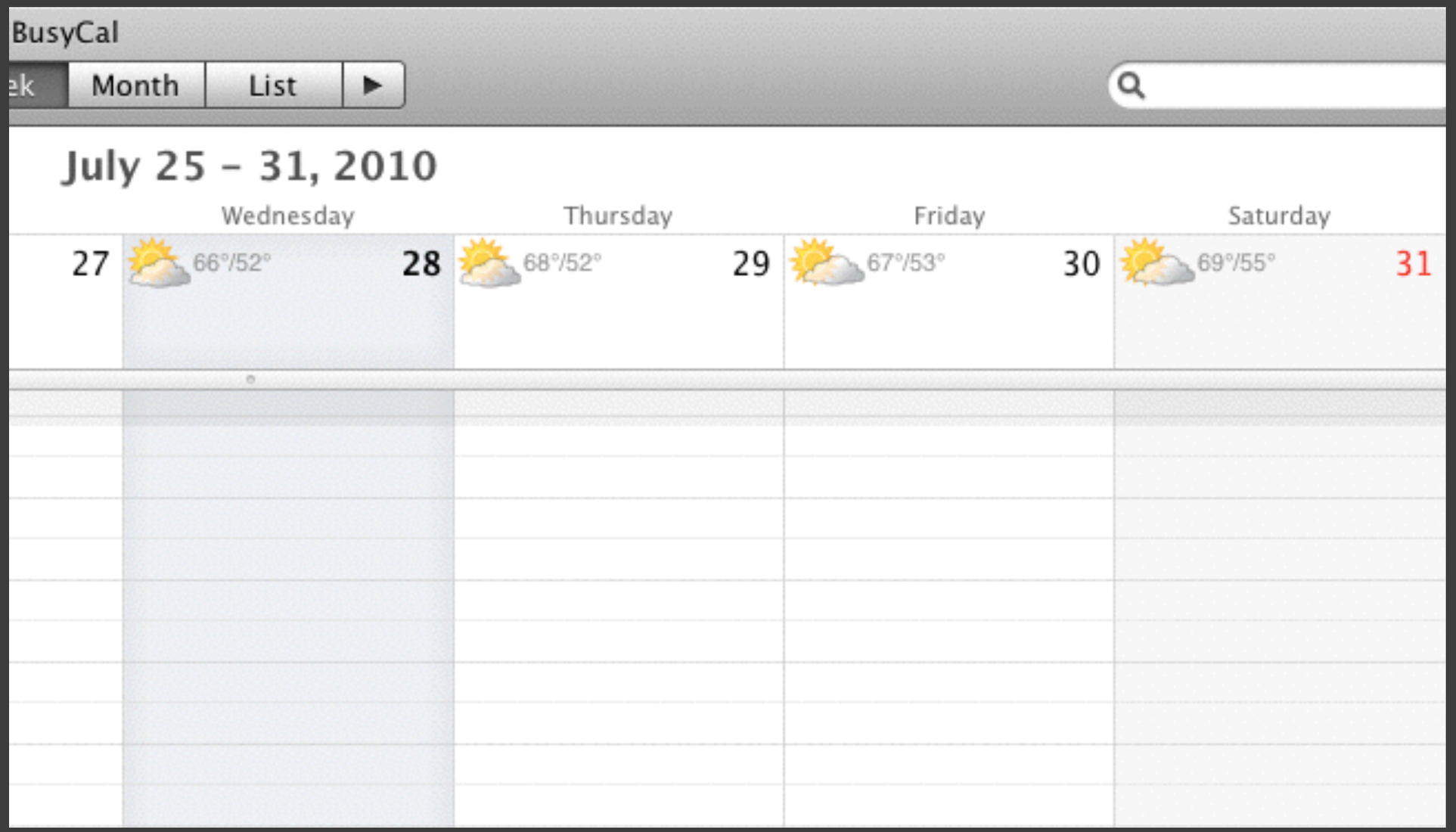
Firefox View menu

Flexible defaults with options



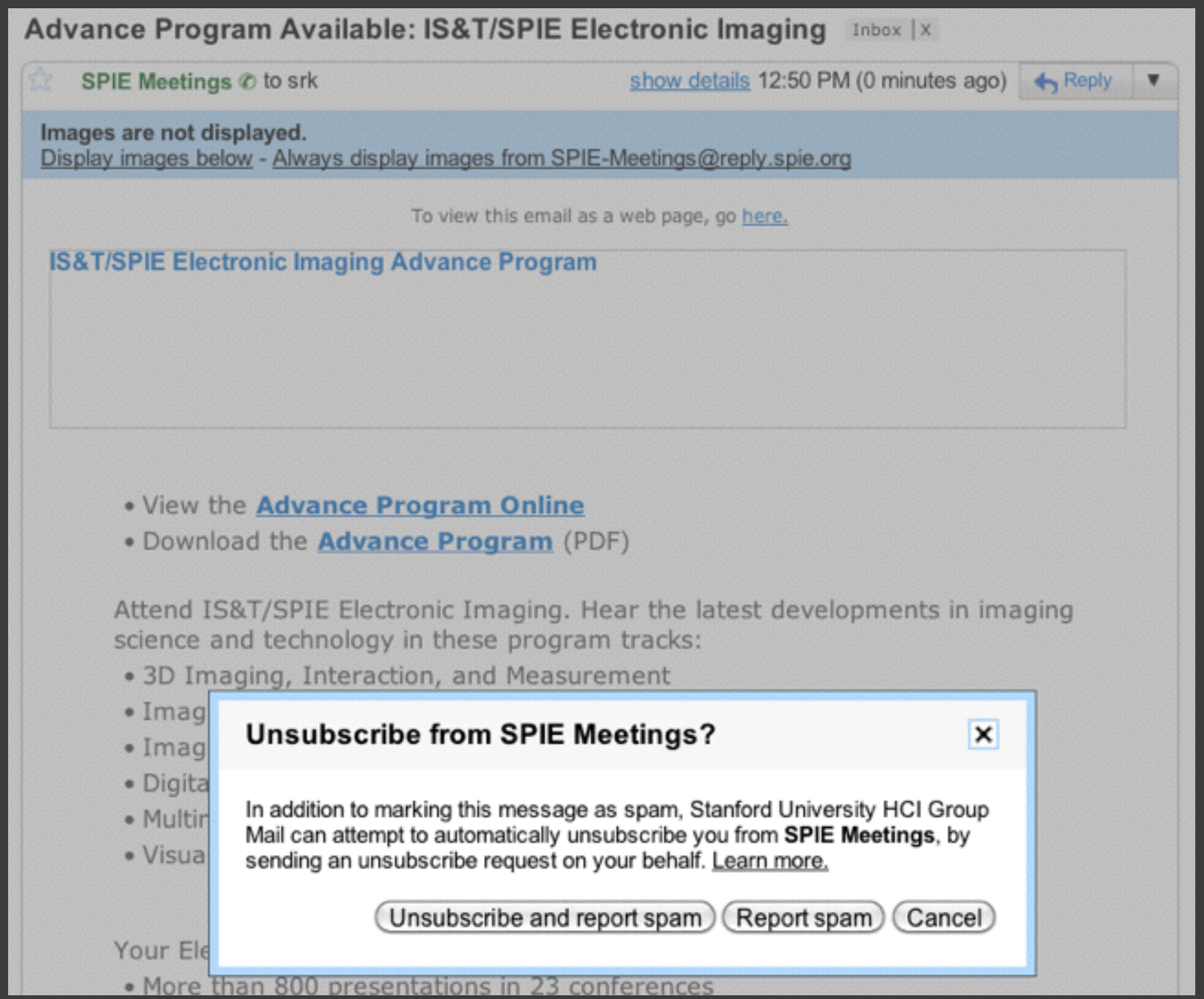
Sublime Text 2

Flexible: ambient information



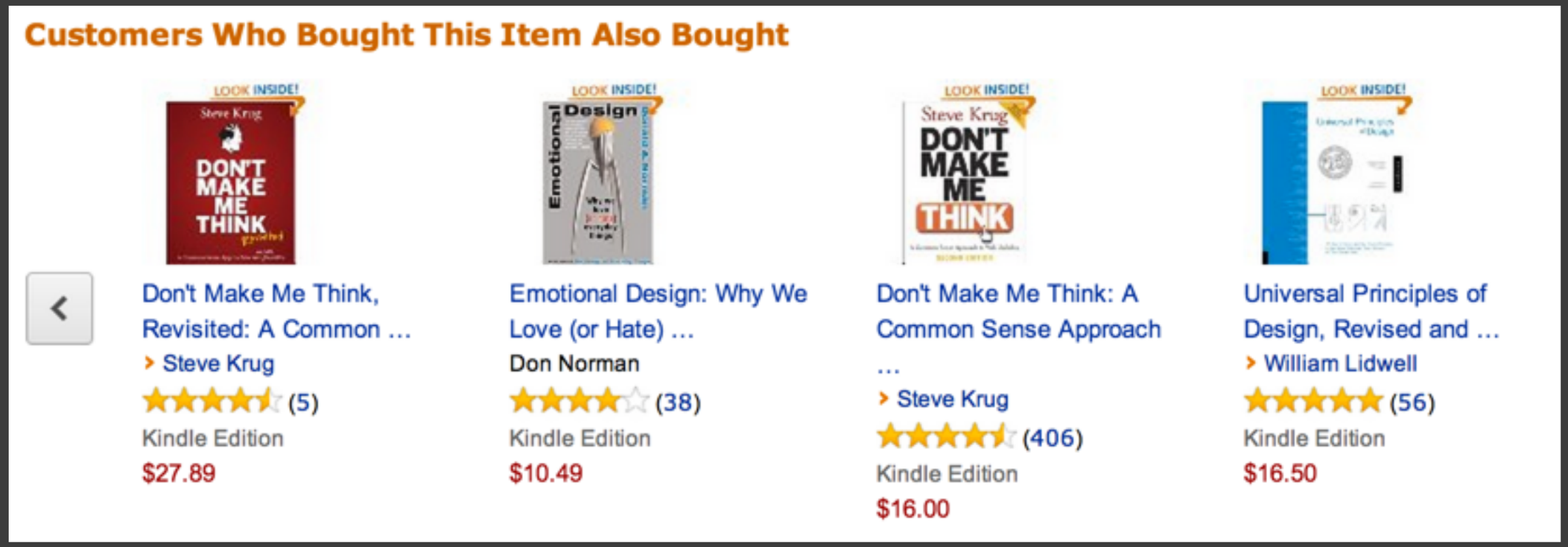
BusyCal weather in week view

Flexible proactivity



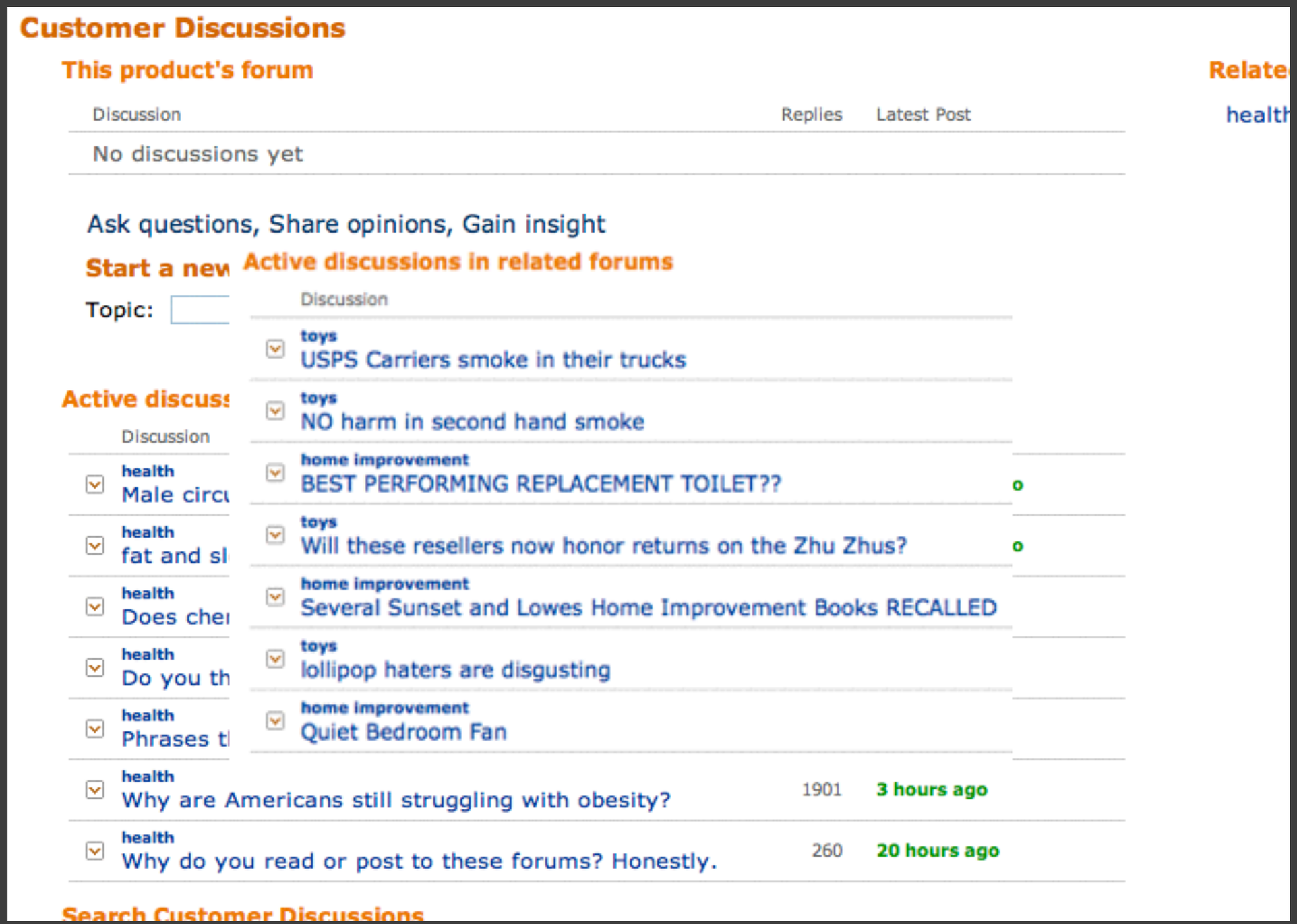
Google Gmail automatic unsubscription

Flexibility: Recommendations



Amazon recommendations on the "Design of Everyday Things" page

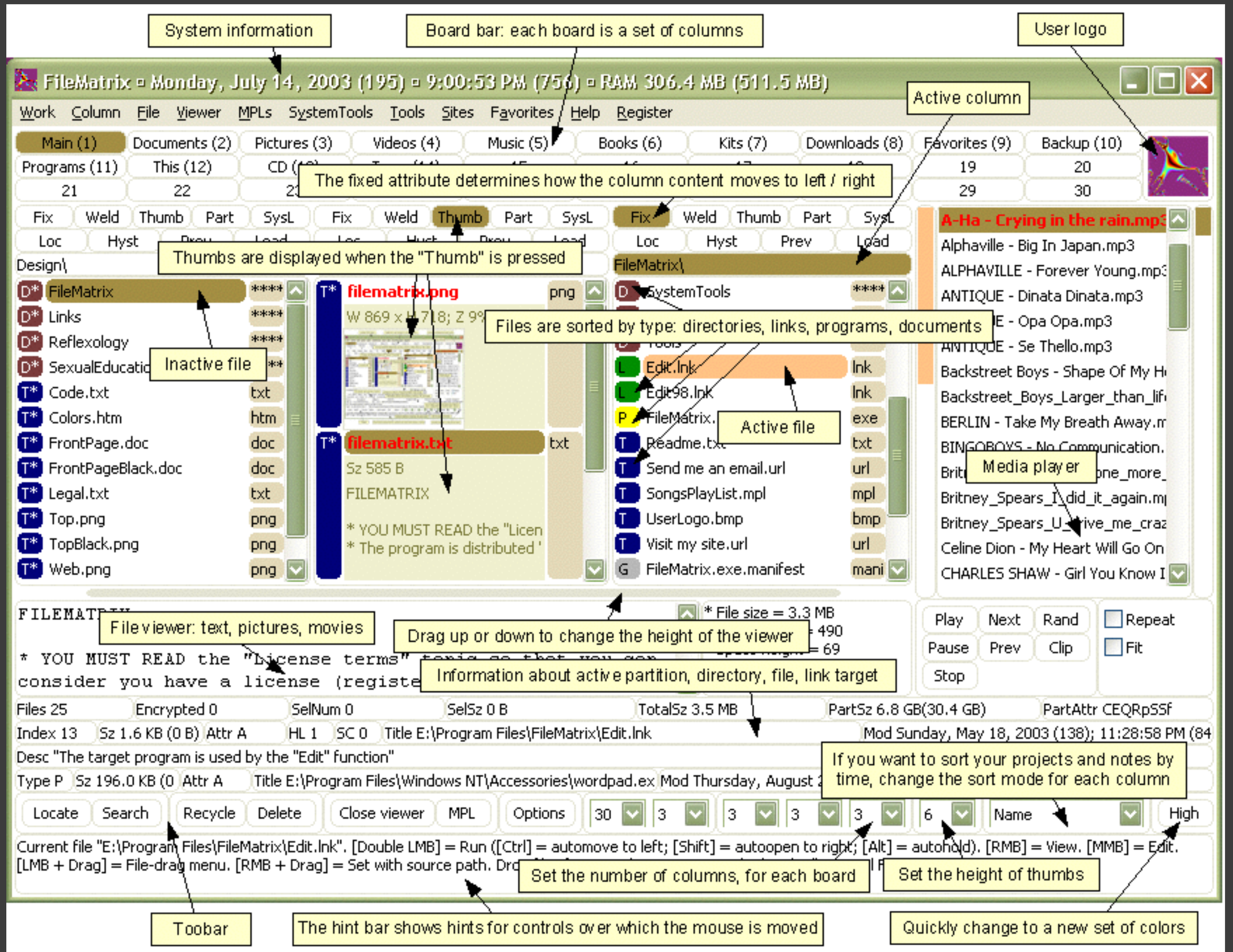
Flexibility: keep it relevant



Amazon Customer Discussions

Flexibility: keep it relevant

User-modified remote control courtesy Bill Moggridge



The FileMatrix

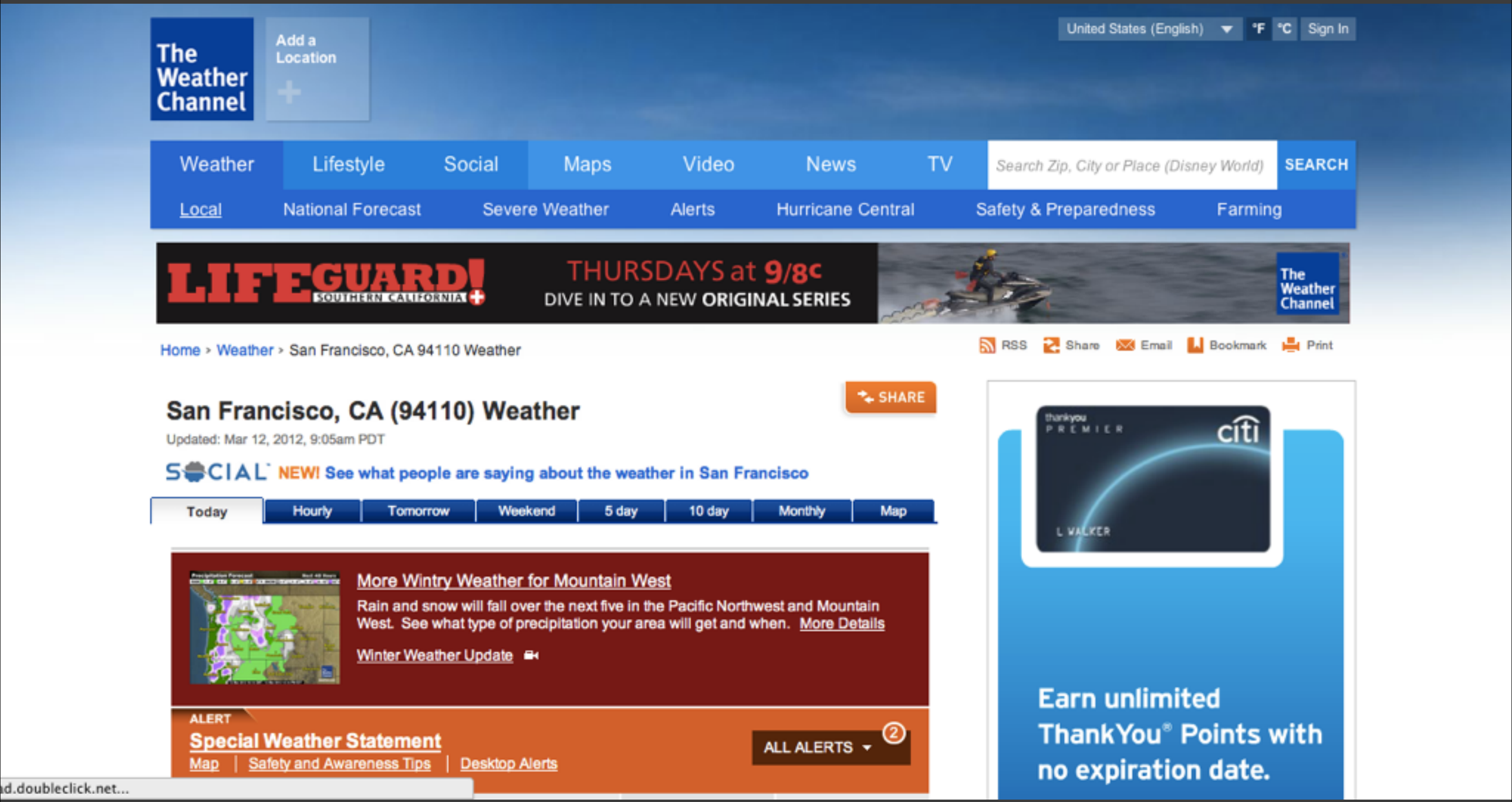
Aesthetic & Minimalist Design

8 / 10

Our ancestors

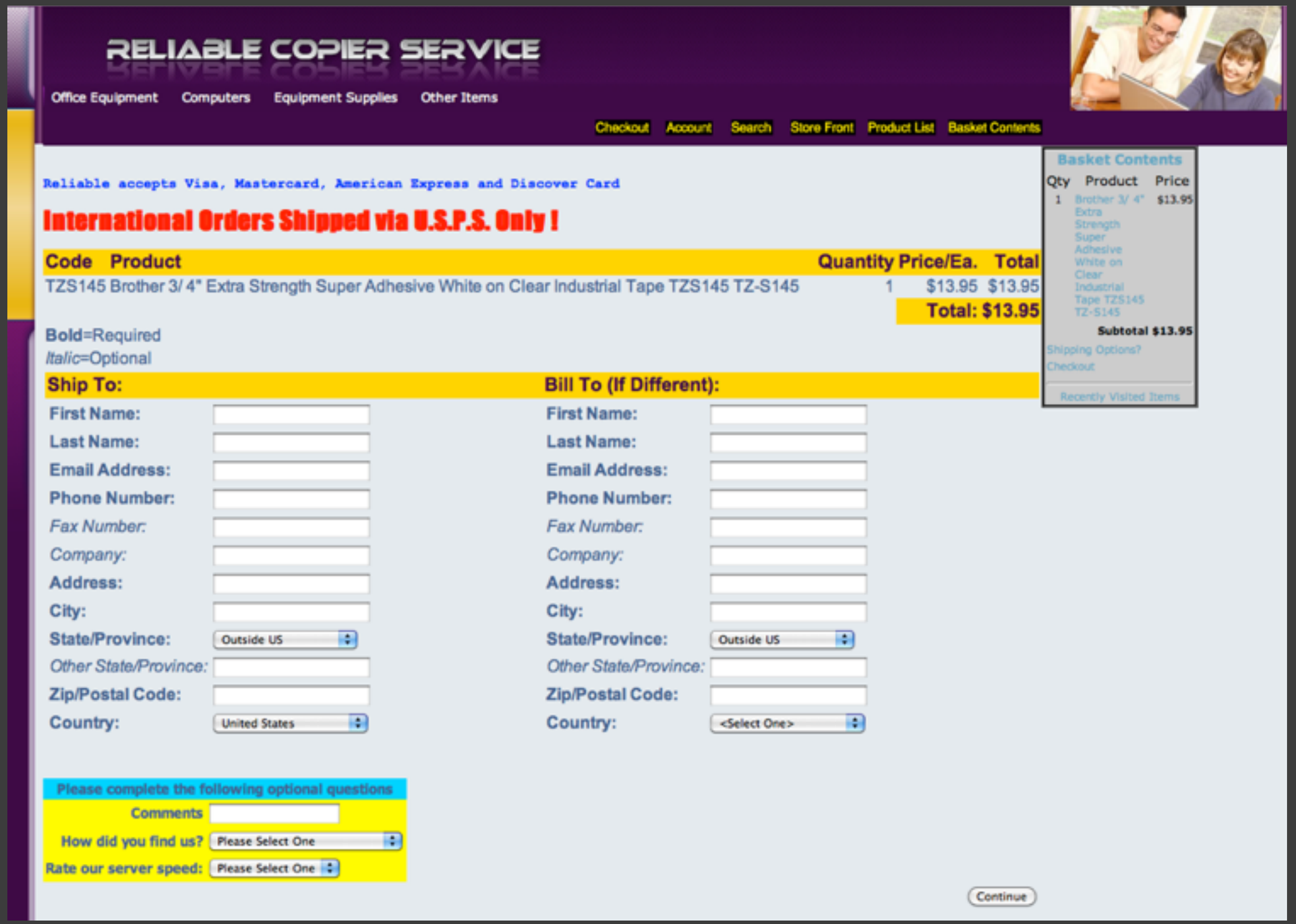
Video Sonic Labs, Inc.

Minimalism: above the fold



The Weather Channel

Minimalism: signal-to-noise



Reliable Copier Service checkout screen

Minimalism: signal-to-noise

What information were you primarily looking for during your visit?

- How to get started with AdWords
- Ad approvals and policy help
- Customer support contact information
- Billing or payment help
- Account settings help
- Campaign management help
- Ad performance help
- Google Analytics or conversion tracking help
- Other reason (please specify): landing page help

Did you find the information you were looking for?

No, I found none of it	I found part of it	Yes, I found all of it
○	◉	○

During your past visit, you browsed this help center page: https://adwords.google.com/support/aw/bin/answer.py?hl=en&answer=177673

Thinking about this page specifically, how helpful was the information on the Help Center page you saw, for the purpose of your visit? :

Not at all helpful	Not very helpful	Somewhat helpful	Very helpful	Extremely helpful
○	○	○	○	○

How clear was the information on this page (https://adwords.google.com/support/aw/bin/answer.py?hl=en&answer=177673)?

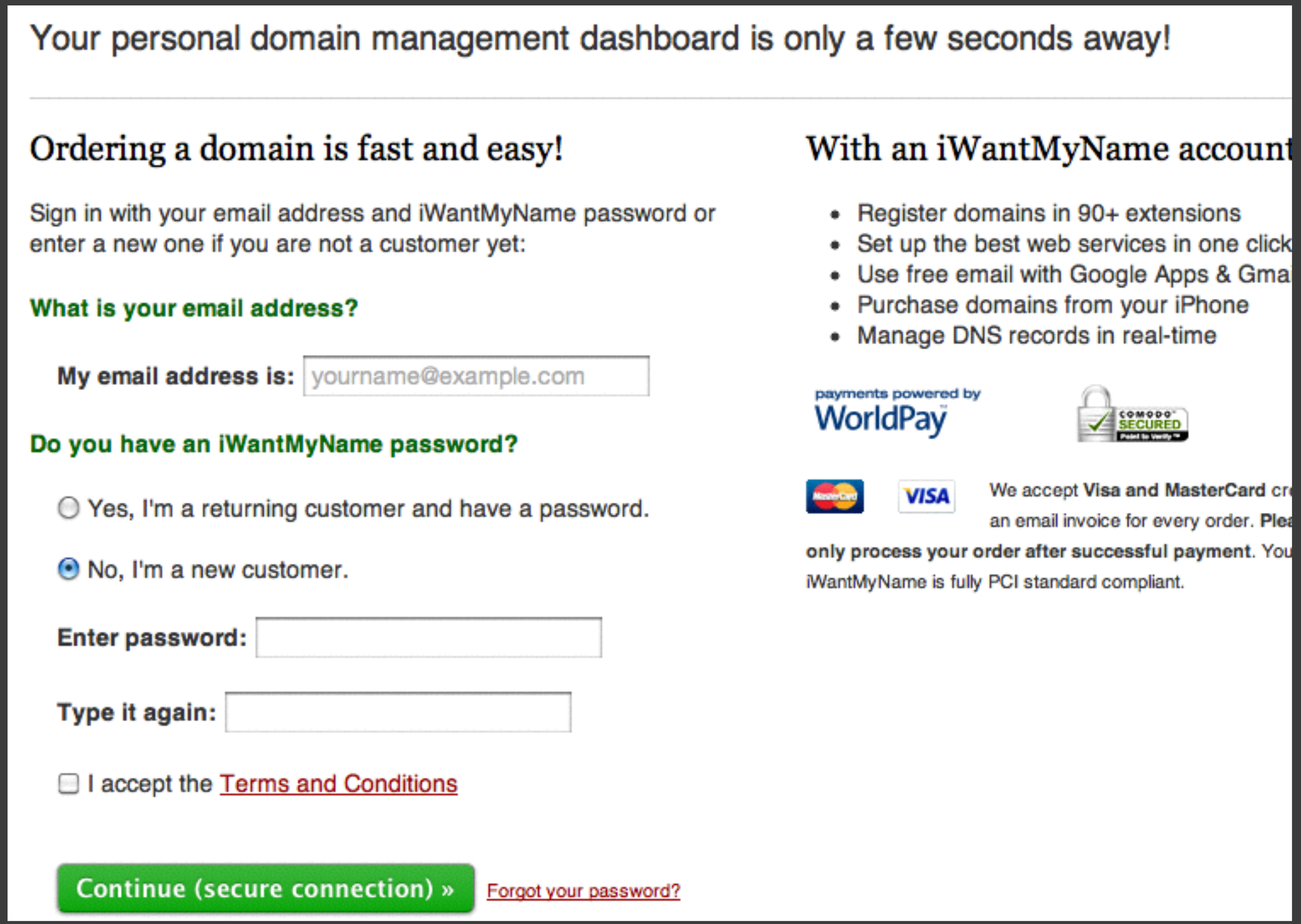
Not at all clear	Not very clear	Somewhat clear	Very clear	Extremely clear
○	○	○	○	○

Please rate the amount of information on this page (https://adwords.google.com/support/aw/bin/answer.py?hl=en&answer=177673):

Too little information	Just enough information	Too much information	I'm not sure
○	○	○	○

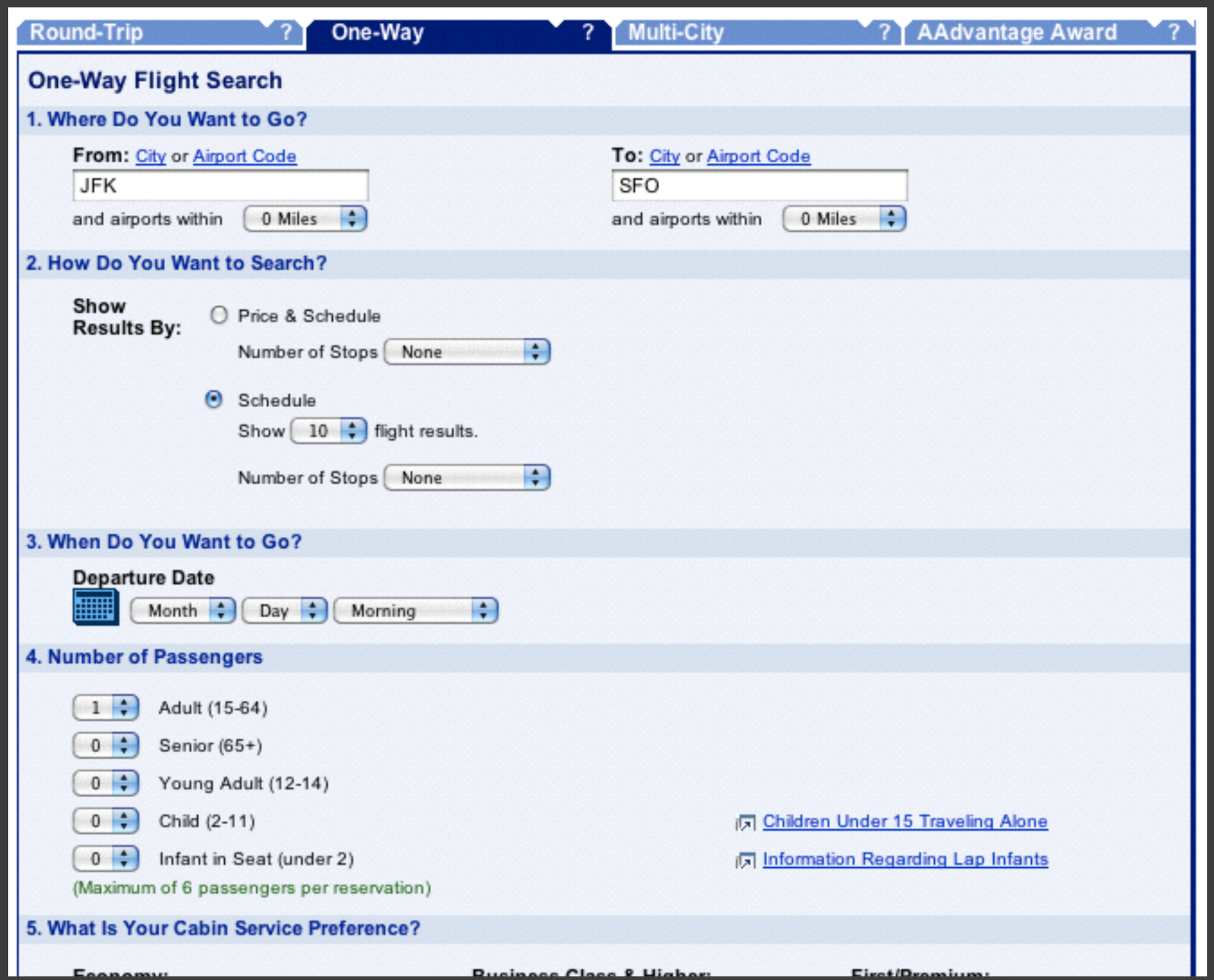
Google Help survey

Minimalist Login



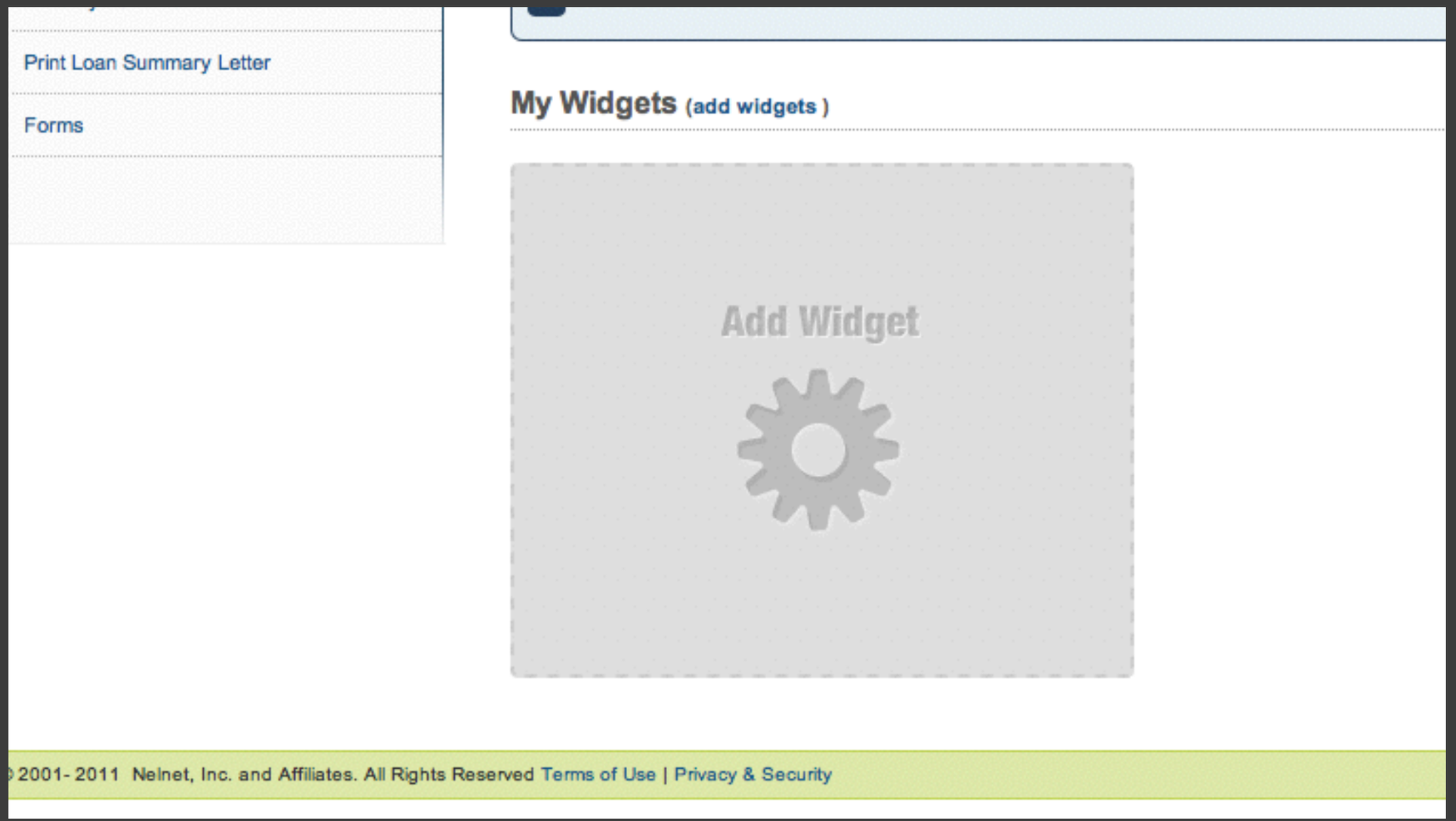
iWantMyName

Minimalism: Redundancy



American Airlines flight search

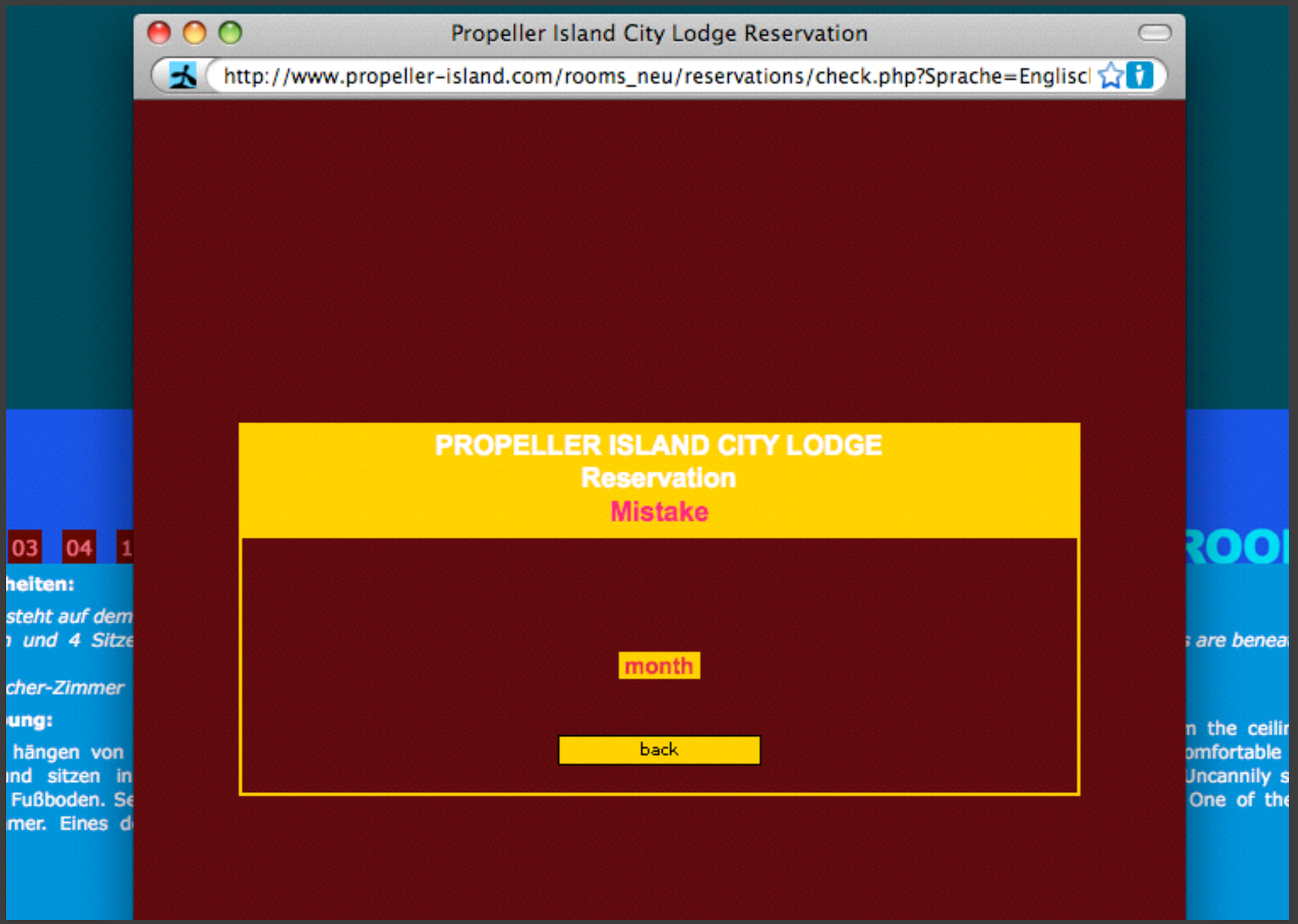
Minimalism: functionality



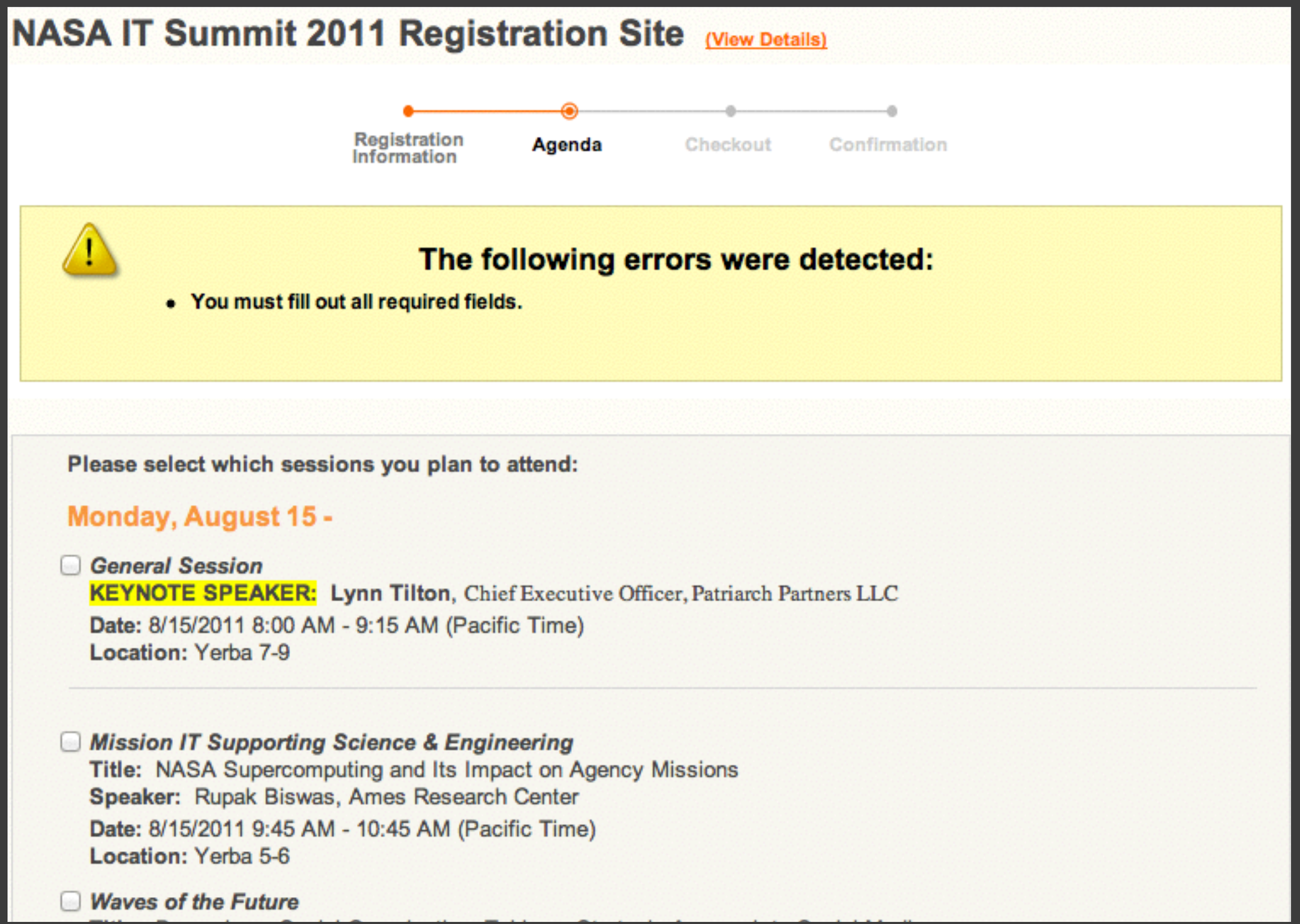
Nelnet

Recognize, Diagnose, & Recover from Errors

Errors: make problem clear

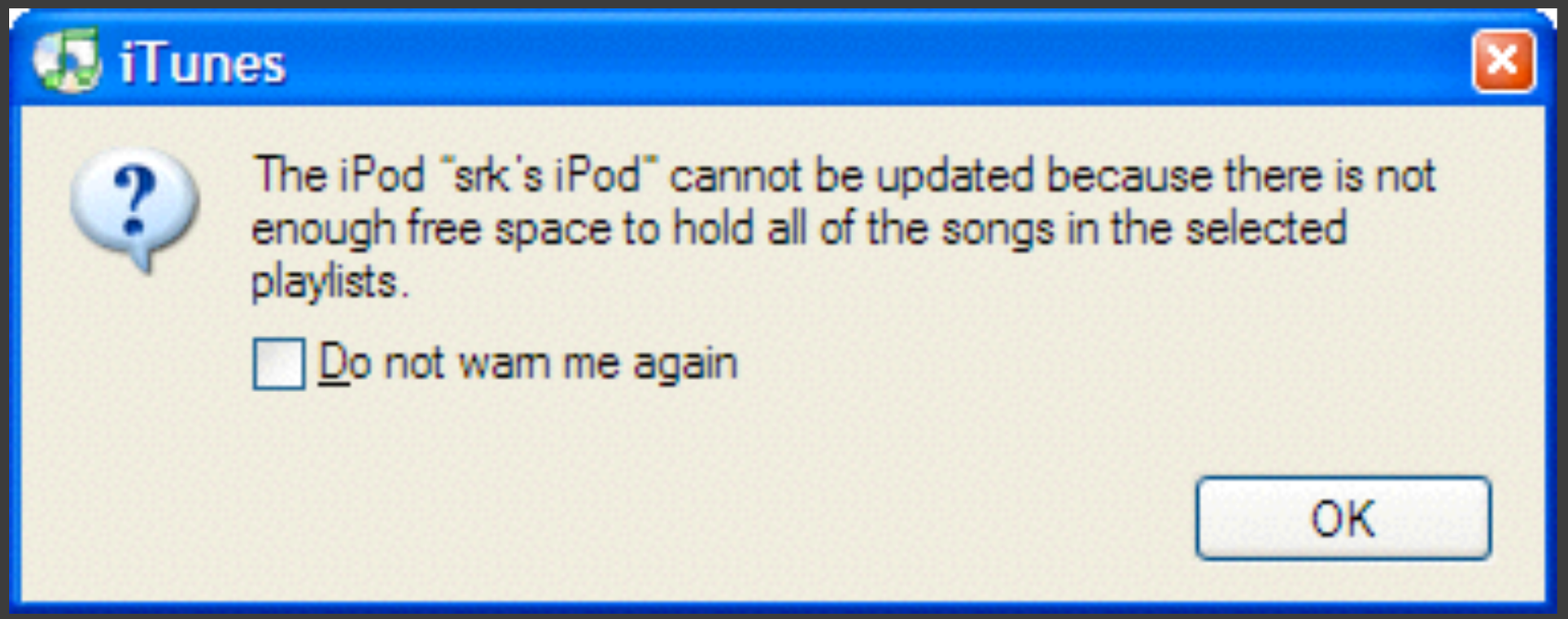


Errors: make problem clear

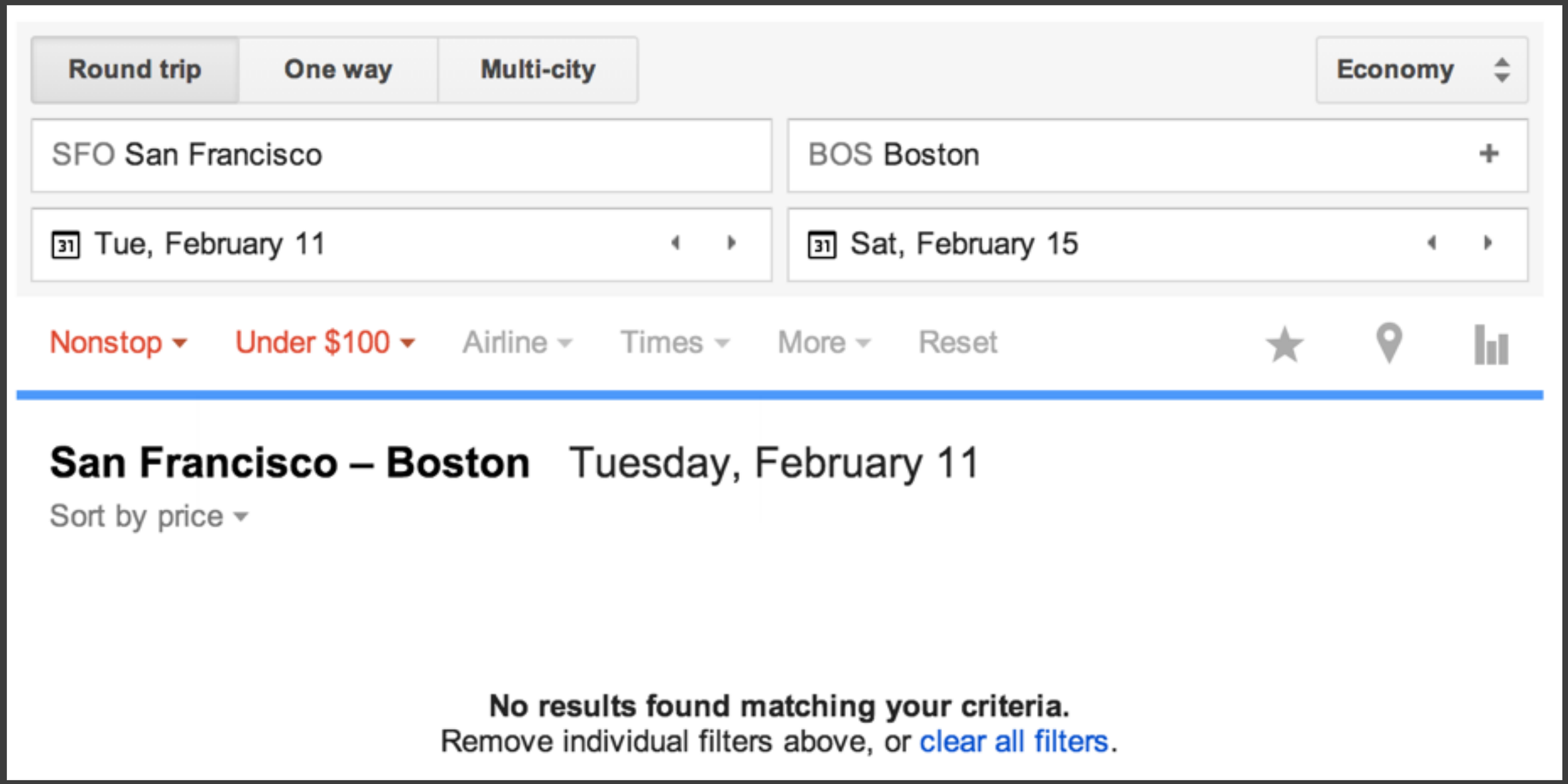


NASA event registration

Errors: Provide a solution



Errors: propose an alternative



Google flight search

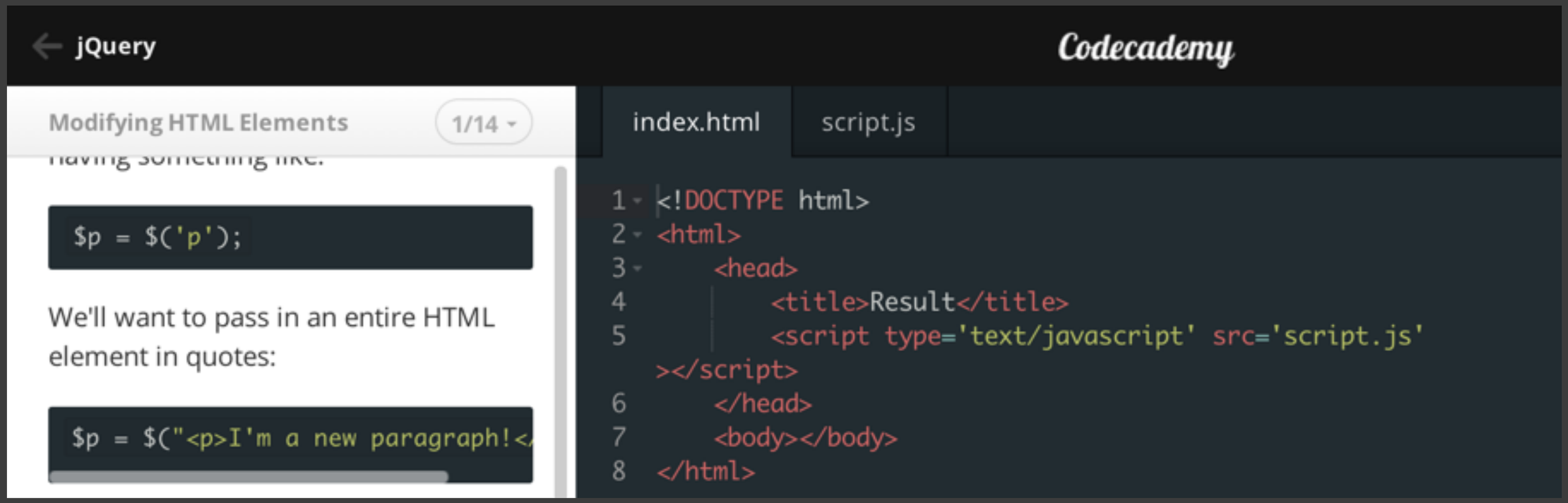
Recognize Errors

Firefox Get Me Out of Here

Help (I need somebody)

10 / 10

Help learning with examples



Help choices with examples

Sign up to receive e-mail from UPS and stay on top of the latest promotions, news, critical updates and announcements.

E-mail Options: ◆

- ○ Send me the following UPS e-mail communications:
  - ☐ New Product Announcements/Enhancements
  - ☐ Promotions and Offers
  - ☐ Newsletters
  - ☐ Service Updates / Regulatory Changes
- ◉ Remove me from UPS e-mail communications*

Need more information?

View Examples

4 Payment Defaults

How will you pay for your shipping?

No Payment Default

Note: After completing registration, you can change your payment defaults in Shipping Preferences.

5 Primary Role

Which of these statements best describes you? ◆

- ○ I don't ship daily, but when I do, I want it to be quick and informative.
- ○ I use ups.com daily and know several shortcuts to save time.
- ○ I use ups.com to troubleshoot and to report on shipping activity.
- ○ I focus on the big picture and monitor shipping operations performance.
- ○ I prefer to use the web only when necessary. My job is easier without it.

You can manage the e-mail communications you receive from UPS. To receive the types of communications that are of interest to you, choose any of the following options:

New Product Announcements/Enhancements

Select **New Product Announcements/Enhancements** to keep up to date with new product announcements and enhancements to existing products.

Promotions and Offers

Select **Promotions and Offers** to receive communications regarding available UPS promotions and special offers that best suit your business needs.

Newsletters

Select **Newsletters** to receive the latest information, exclusive news, and feature stories.

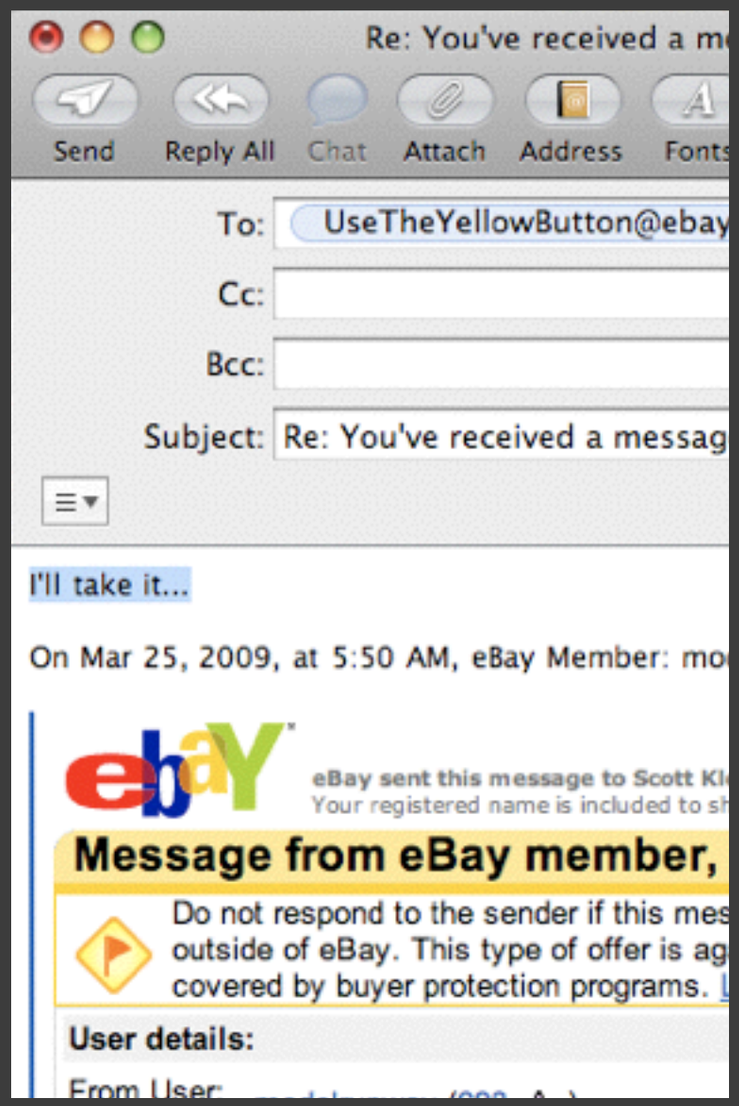
Service Updates/Regulatory Changes

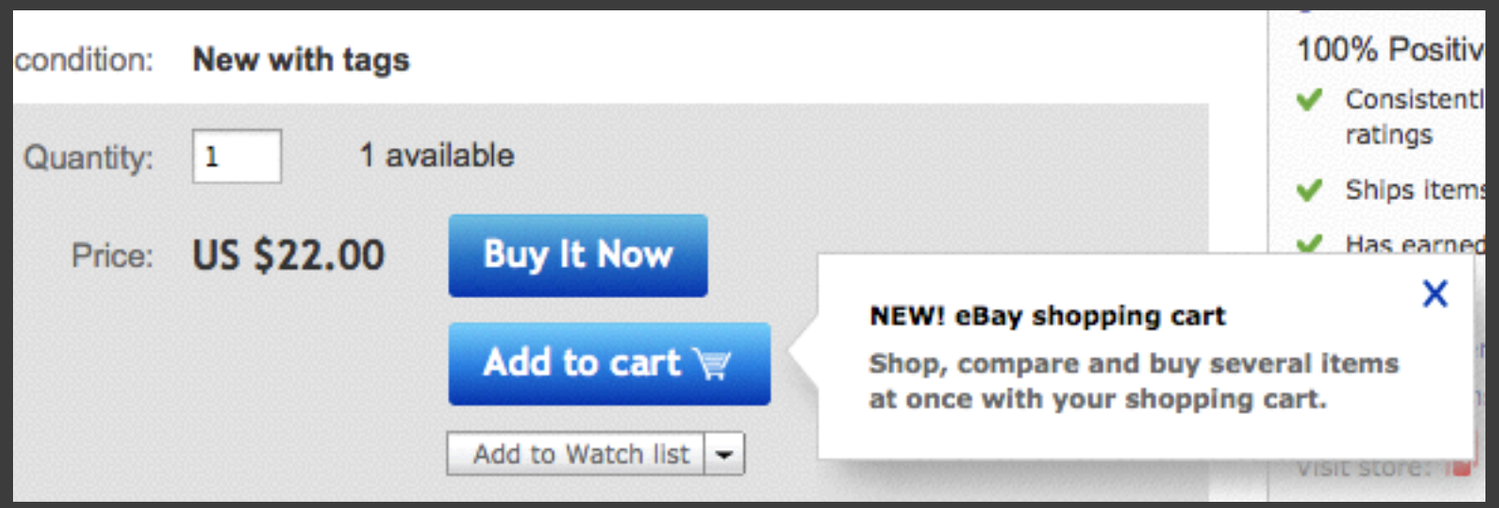
Select **Service Updates/Regulatory Changes** to receive alerts about service changes or announcements of proposed regulatory changes.

UPS

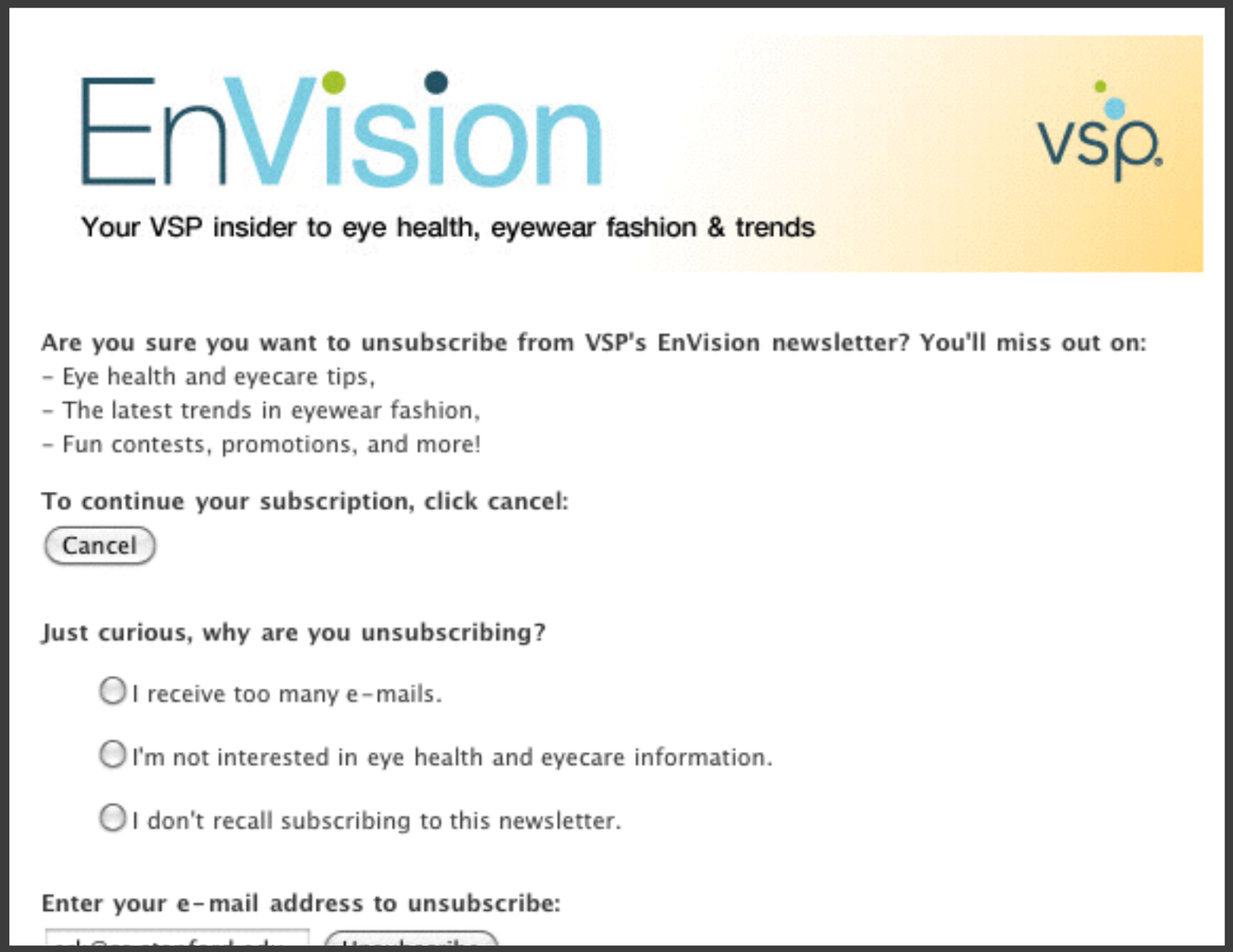
Help show the steps

Help point things out





Help provide more information


EnVision

vsp

Your VSP insider to eye health, eyewear fashion & trends

Are you sure you want to unsubscribe from VSP's EnVision newsletter? You'll miss out on:

- Eye health and eyecare tips,
- The latest trends in eyewear fashion,
- Fun contests, promotions, and more!

To continue your subscription, click cancel:

Cancel

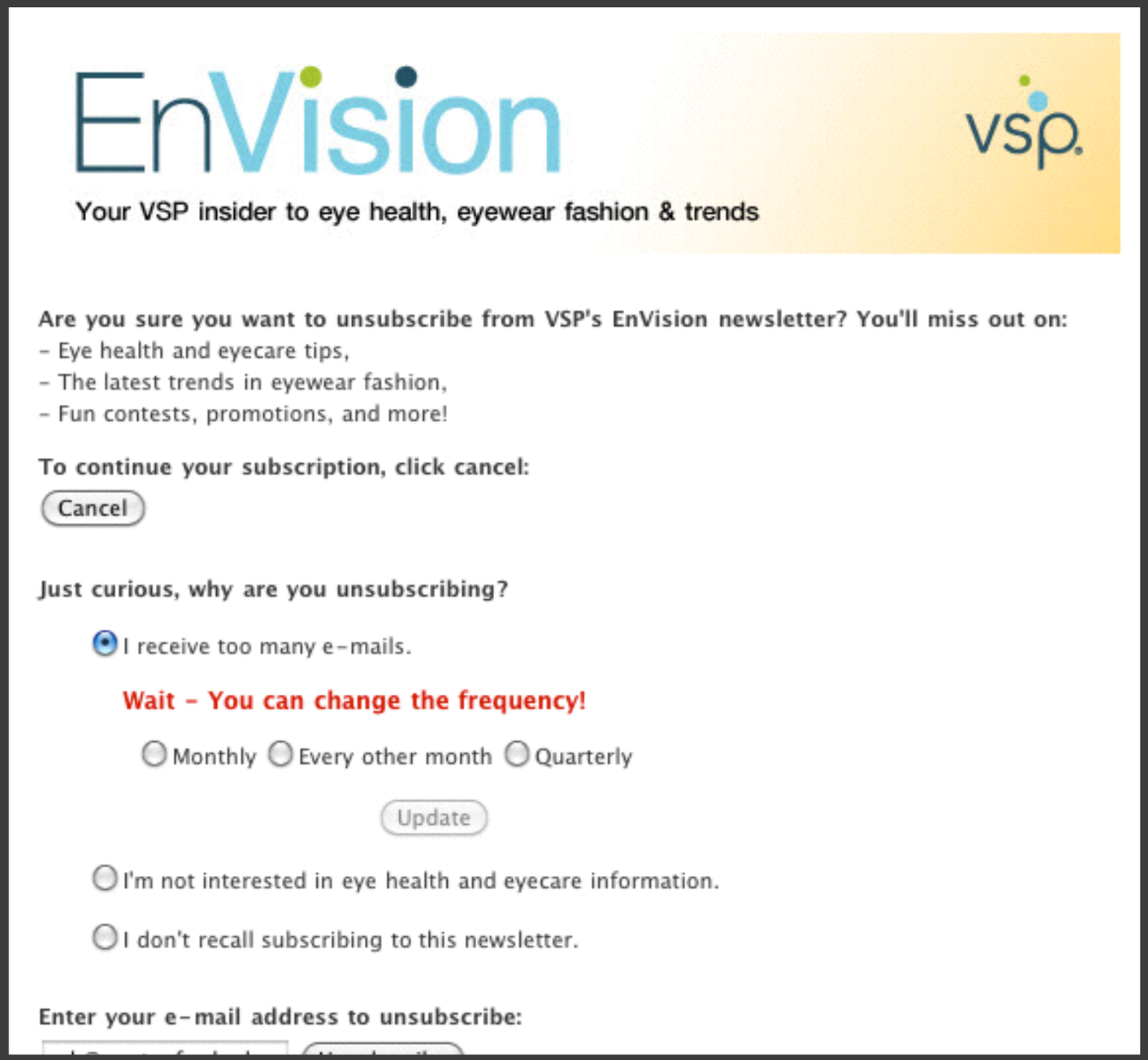
Just curious, why are you unsubscribing?

- I receive too many e-mails.
- I'm not interested in eye health and eyecare information.
- I don't recall subscribing to this newsletter.

Enter your e-mail address to unsubscribe:

EnVision mailing list

Help provide more information



EnVision

Your VSP insider to eye health, eyewear fashion & trends

vsp

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To continue your subscription, click cancel:

Cancel

Just curious, why are you unsubscribing?

- (•) I receive too many e-mails.

  Wait - You can change the frequency!

  ( ) Monthly ( ) Every other month ( ) Quarterly

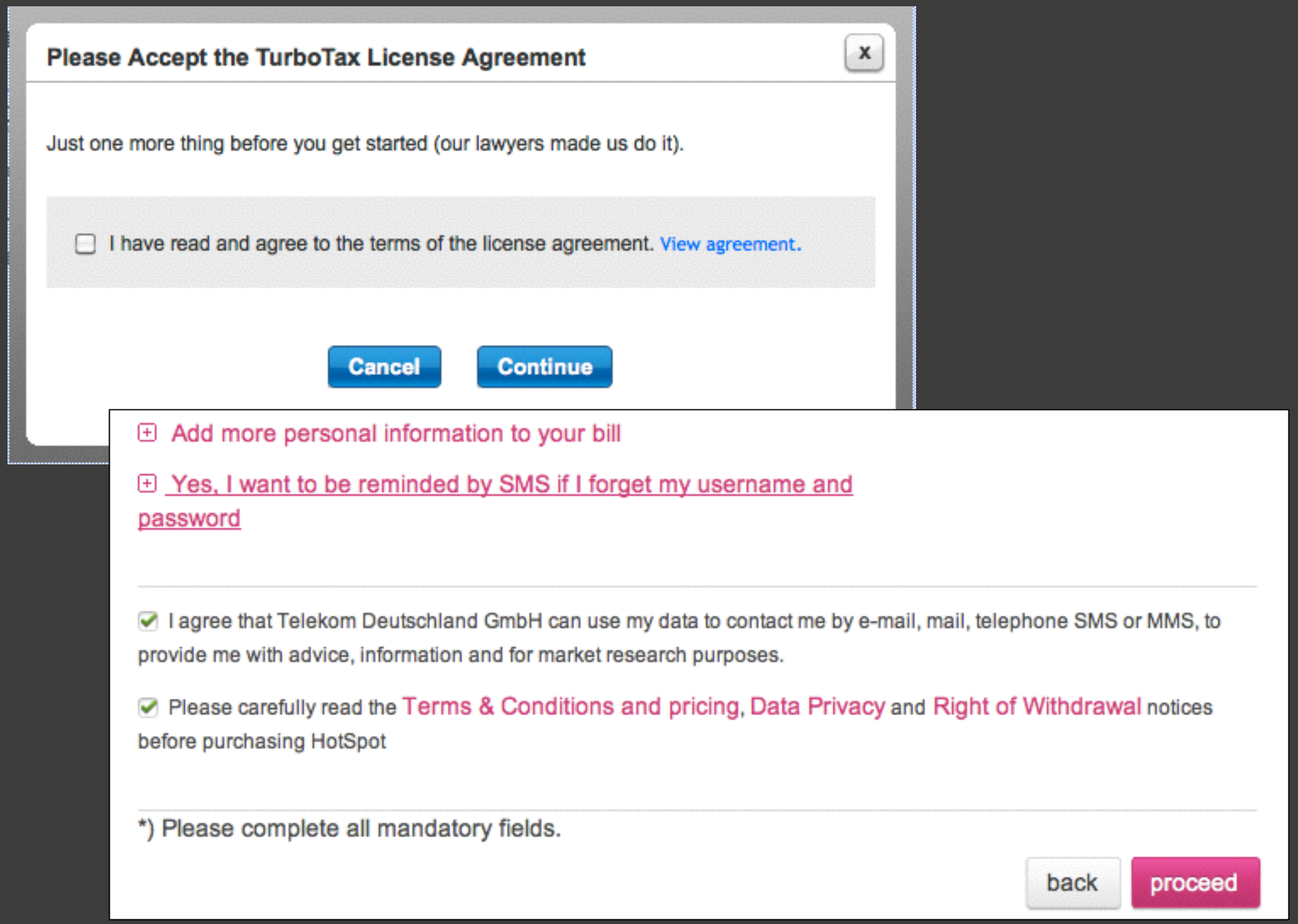
  Update

- ( ) I'm not interested in eye health and eyecare information.
- ( ) I don't recall subscribing to this newsletter.

Enter your e-mail address to unsubscribe:

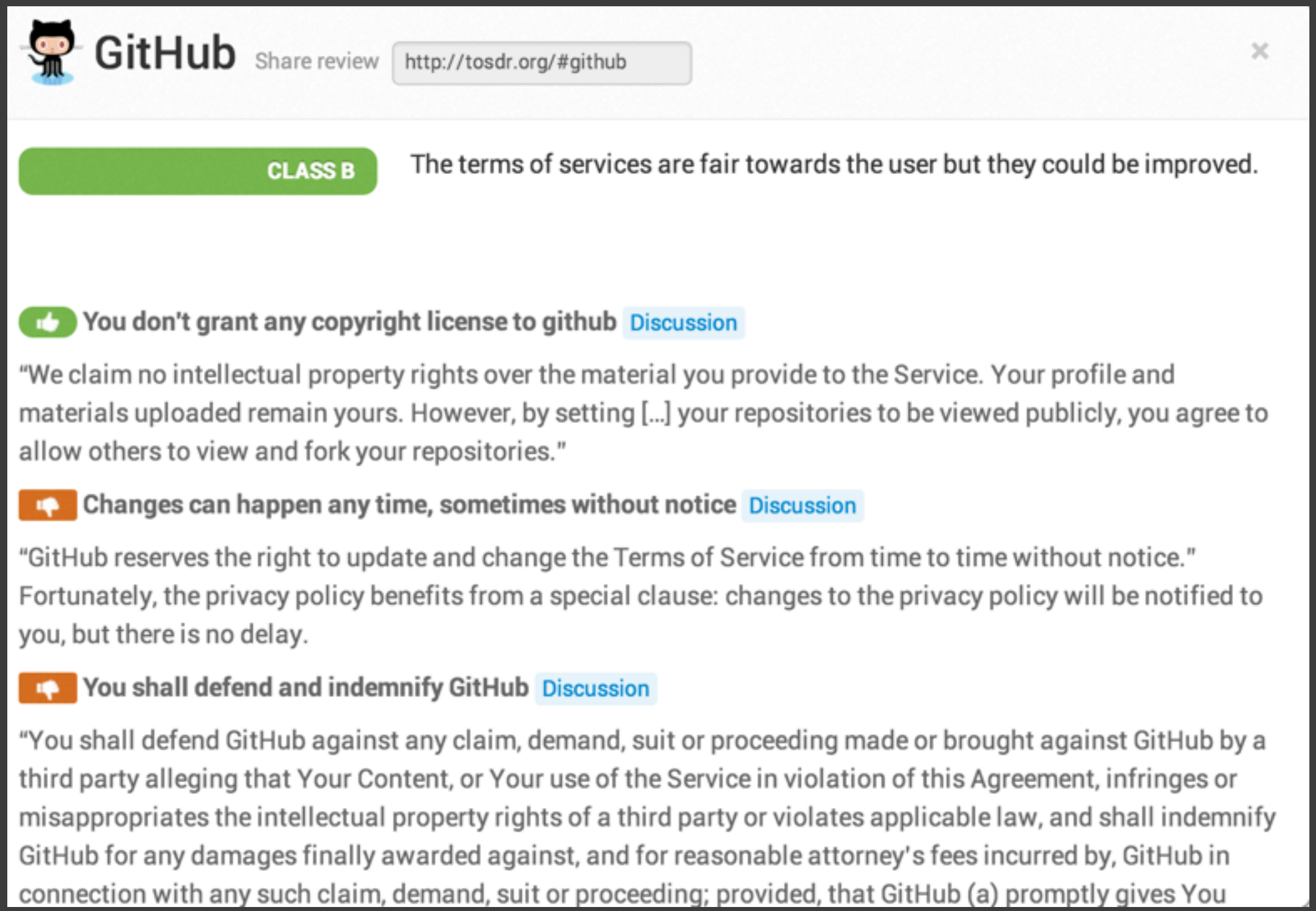
EnVision mailing list

Help clearly



EULA approval for TurboTax, T-Mobile Germany

Help clearly



TOS;DR

Help share what others know

```
2
3  # Annotations in the Codex IDE
4
5
6  # Creating a nested hash
7
8  choices = Hash.new { |h,k| h[k] = {} }
9
10
```

Creating a Nested Hash

Total Count 75 **Project Count** 17

```
new do |var0, var1|
  var0[var1] = {}
end
```

Projects: cassandra fakeweb fog jruby

```
4  "a string".split("\n").to_s
5
6
7
```

Function to_s has appeared 12 times and split has appeared 29 times, and they've appeared 0 times together.

Codex by Ethan Fast, Daniel Steffee, Lucy Wang, Joel Brandt and Michael Bernstein [CHI 2014]

Heuristic evaluation is a hill-climbing technique

Heuristic evaluation gives you terms for intuitive ideas

it is a suite of unit tests for user interfaces