MONASH University

Information Technology

FIT2001 – Systems Development

Seminar 8: Designing the User Interface (HCI)

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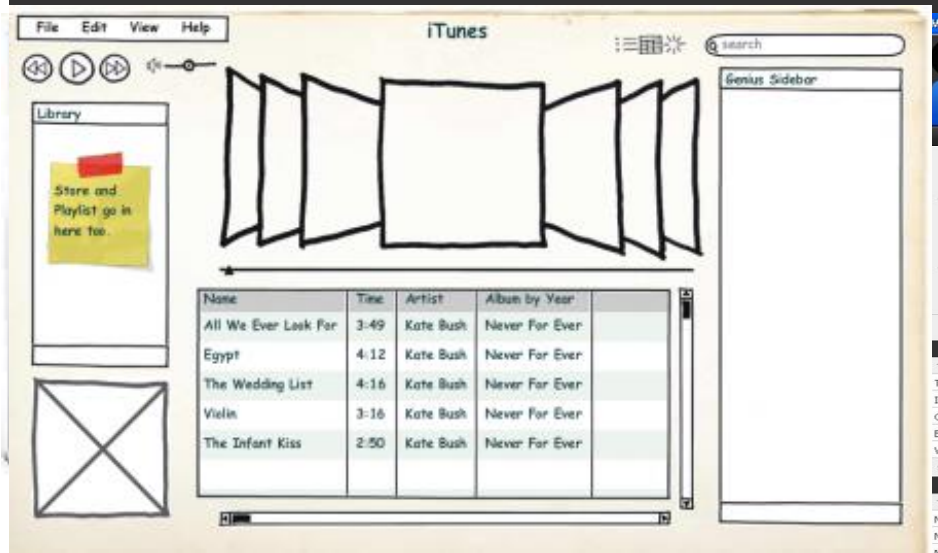
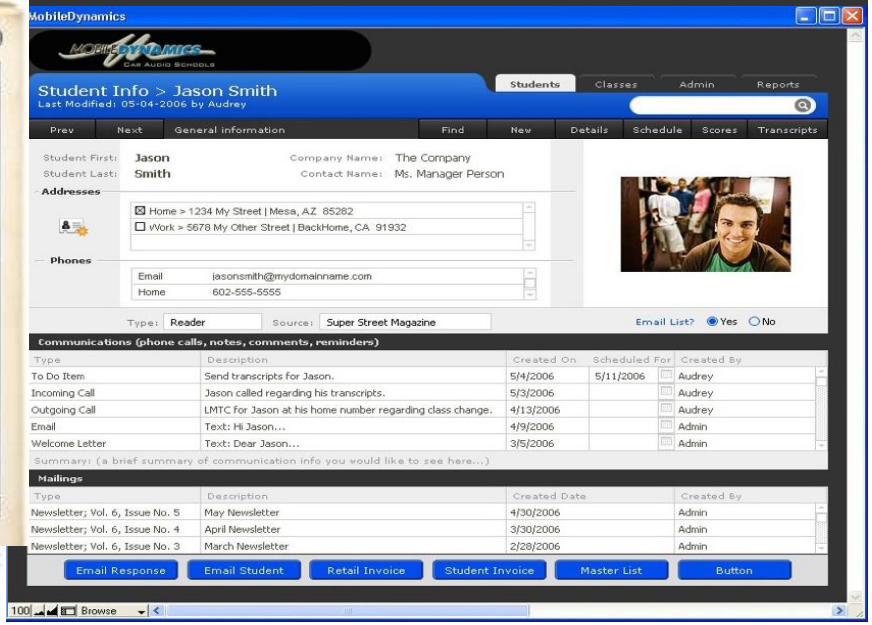




Our road map

- What are Information Systems?
- How do we develop them? Systems Development (SDLC) – key phases
- Traditional vs. Agile approaches to developing systems
- Some System Development roles and skills
- Understand the requirements gathering process
- Managing stakeholders
- A range of Requirements gathering and documentation techniques
- An overview of Design activties
- Designing systems that our clients want - Usability

Designing systems that our clients want

- Interface Design principles
- Interface Design Tips

At the end of this topic you will be able to:

- Use the persona method to explore users of the system to assist with interface design
- Understand the principles of good interface design
- Use best practice tips for interface design

Lecture Outline:

1. Design Introduction
2. User Interfaces – Overview
3. UI Design Guidelines
    - 3.1 User centred approach, Personas
    - 3.2 Ben Shneiderman: 8 Golden Rules
    - 3.3 Jakob Nielsen: 10 heuristics for Interface Design
    - 3.4 Metaphors
    - 3.5 Affordance & Visibility
    - 3.6 Example
4. Practical Interface Design Tips to review in your own time

User Interface (UI) - Definition

- "All components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system."

ISO 9241-11

- "That part of a computer system with which a user interacts in order to undertake his or her tasks and achieve his or her goals"

Stone et al, User Interface Design and Evaluation, 2005

User interfaces

- Usability can be drastically enhanced by carefully designing user interfaces
- **User interface**
  - require human interactions
  - varies depending on:
    - purpose (input, dialog box, report)
    - user characteristics (users with disability, novice/experienced)
    - device (e.g. mobile phone screen size)

Guidelines for designing UI

A wide range of guidelines available. Some important ones:

- User Centred Design
- Ben Shneiderman – The eight golden rules of interface design
- Jakob Nielsen – 10 usability heuristics for interface design
- Donald Norman's guidelines based on Affordance and Visibility

Use a User-centred design approach

Three key principles:

- Early and continuous focus on users and their work … Personas are a useful tool
- Evaluate all designs to ensure usability
    - *Use prototypes to observe behaviour*
- Design iteratively

Personas - Designing for your users

- The personas method allows you to explore the psychology of an imagined user's interaction with the product.
- Creating products for specific NOT generic users, provides a clear vision rather than unfocussed goal

What is a Persona?

- “Archetypical descriptions of user behaviour patterns into representative profiles, to humanise design focus, test scenarios, and aid design communication.” Cooper, A. (2004)

- Create representations of key audience segments for reference throughout the design process

How do you create Personas?

1. Collect information about your users
   - understand the target audience's mindsets, motivations, and behaviours .. Use research - interviews, workshops, questionnaires
2. Identify behavioural patterns from research data
   - find patterns in data to help group users
3. Create personas and prioritise them
   - assemble personas around patterns – add just enough detail to characterise the user base
   - if you have multiple personas define the primary persona (the most relevant) and follow the rule "*design for the primary – accommodate the secondary*."
4. Identify relevant scenarios for the personas
   - by pairing the personas with the scenarios, you can gather requirements and design relevant solutions
5. Share your findings and socialise personas among stakeholders
   - team should see the value in them, they should be front and centre of the design process

Persona – What information do you include?

- *Persona Name and photo*
- *Demographics - Gender, age, place of residence, Profession and field of work, Marital status, Financial status – fictional personal details to make more realistic*
- *Personality - Hobbies, Favourite brands, Do they follow trends?, Media consumption habits, hours spent online, What kind of gadgets do they use and how? Quote or slogan that captures the personality*
- *Behaviour patterns, Goals, Skills, Attitudes, Frustrations or pain points, Environment they operate in*
- *Product context information - Do they have previous knowledge about the product? In what context do they use the product? What are their motivations? Why would they use the product? Context specific details eg. For a banking app financial details*

Persona example for Travel booking site

"I'm Looking for a site that will simplify the planning of my business trips.

Bio

Stella is a Regional Director who travels 2-3 times each month for work. She has a specific region in which she travels to & often visits the same cities and stays in the same hotel. She's frustrated by the fact that no matter how frequent she takes similar trips, she spends hours of her day booking a reservation. She expects her travel solutions to be organized as she is.

Goals

1. To spend less time booking a reservation.
2. To save her searches & favourite hotels.
3. To narrow her options when needing to search.
4. To see recommendations based on her past bookings and interests.
5. To book the reservation through customised budget plans.

Personality

Extrovert	Introvert
Sensing	Intuition
Thinking	Feeling
Judging	Perceiving

Type of Travel Planner

Premium	Deal Seeker
plans Ahead	Last minute Traveler
Travel Alone	Travel with friends
Desktop/Notebook	Mobile

Demographics

Age :	35
Occupation :	Regional Director
Status :	Married
Location :	united States
Tier :	Frequent Traveler
Archetype :	The Planner

Frustrations

- Too much time spent on booking.
- Always need to search for favourite hotels.
- Planning the proper timeline for the total journey

Motivations

Price · Speed · Comfort · Preferences · Timeline

Why are Personas important?

Build Empathy

- Helps users seem more real - designers empathise and build for their users

Provide Direction For Making Design Decisions

- Helps focus design decision on users – don't build it for yourself or a generic user

Communicate Research Findings

- Team on the same page, communicates information in an easy to understand format

Why Personas can fail

Personas were created but the team did not use them

- If team have had a bad experience they see them as a waste of time and are loathe to try again

No buy-in from the team

- They think they know their users well so don't need it

Personas were not developed collaboratively

- If users and team not involved they think you have created pretty pictures of fake people

Communication failure

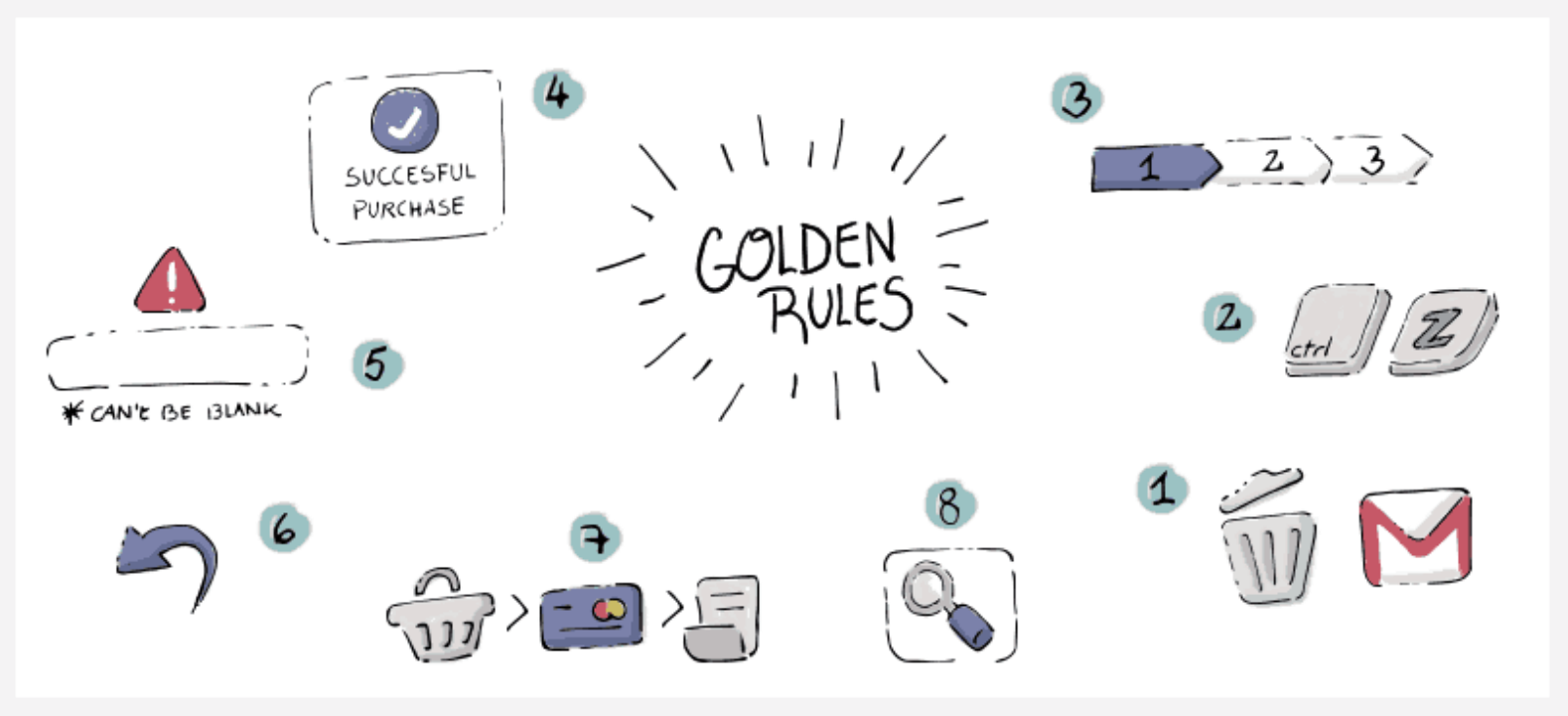
- The team does not understand what Personas are or their purpose

The personas are flawed

- The persona is not built to reflect the scope of work it is meant to impact.

Ben Shneiderman's 8 Golden Rules

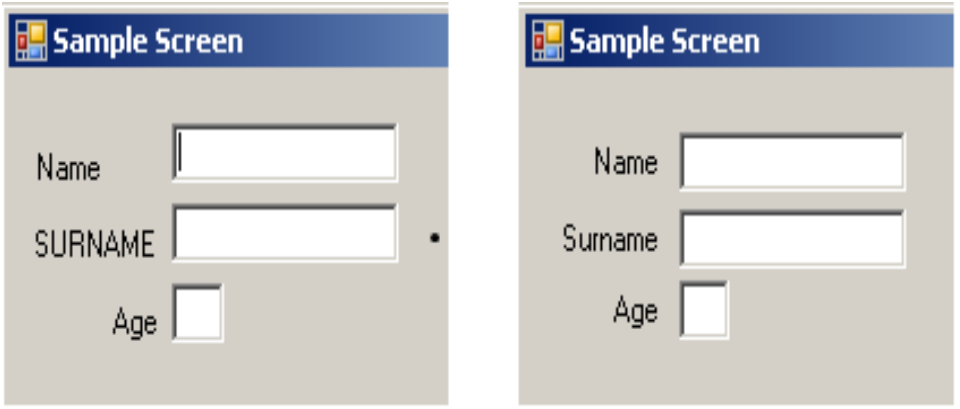
Ben was asked to distill effective user interface design into a few key principles – this was the birth of the 8 Golden rules



1. Strive for consistency

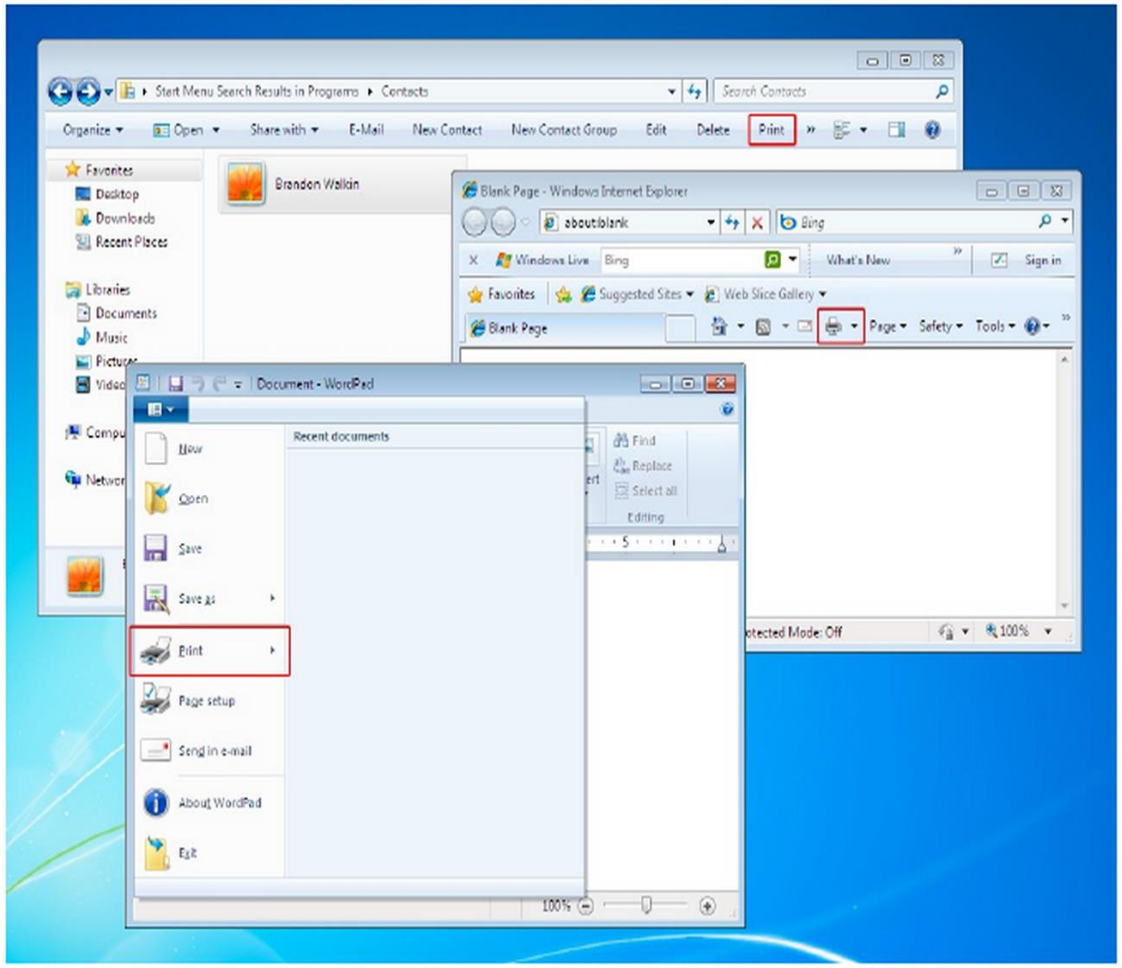
- Consistency refers:
  - to the way information is arranged on forms
  - the names, and arrangement of menu items
  - the size and shape of icons
  - and the *sequence followed* to execute tasks should be consistent throughout the system

- Inconsistency in interface results
  - Longer time to learn
  - Will be harder for users to remember



Just small changes can lead to feeling unsettled when using an interface

Inconsistent examples



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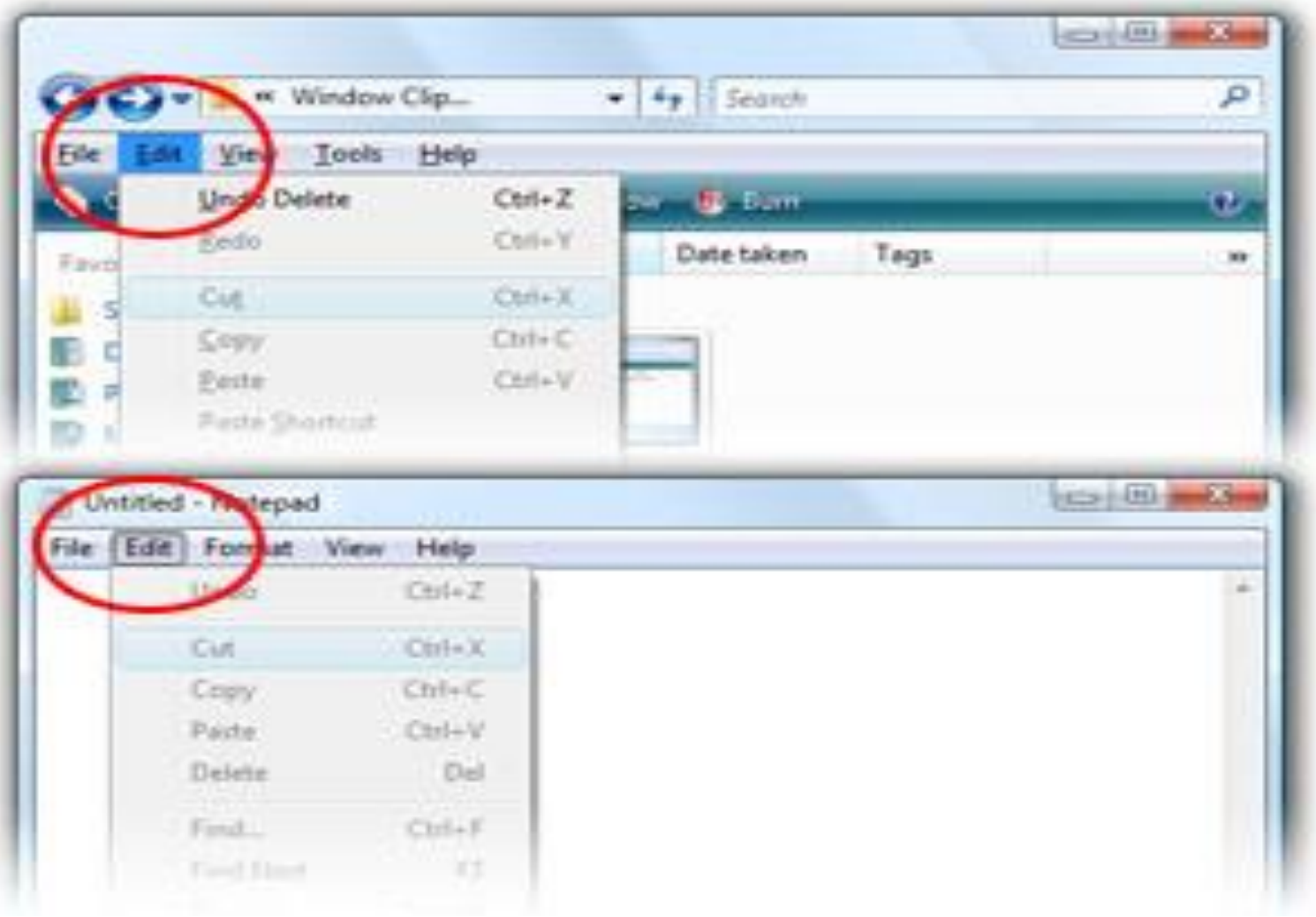
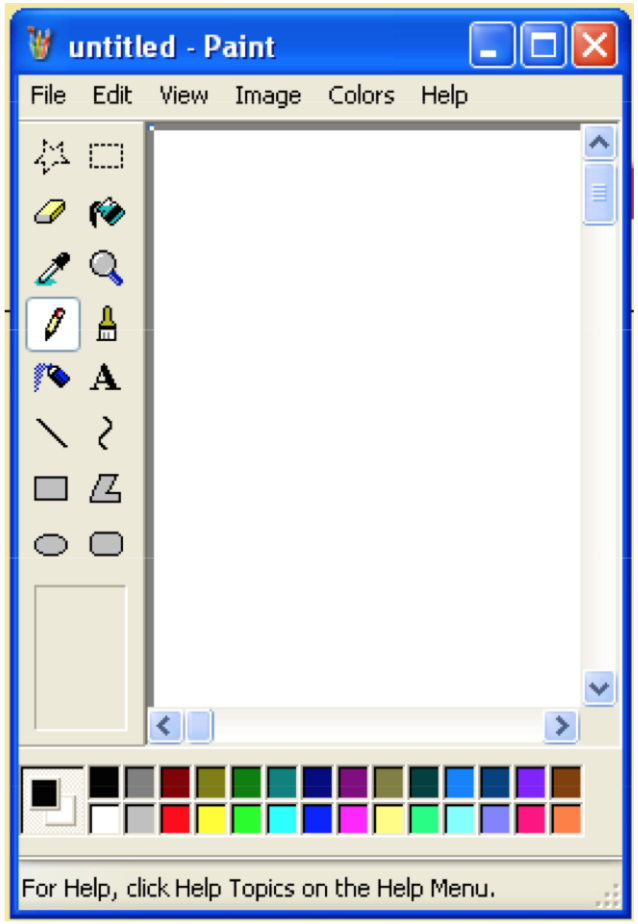
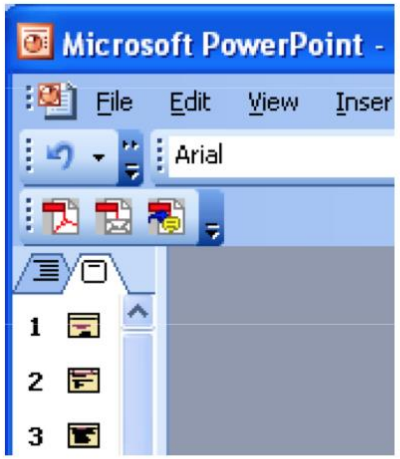
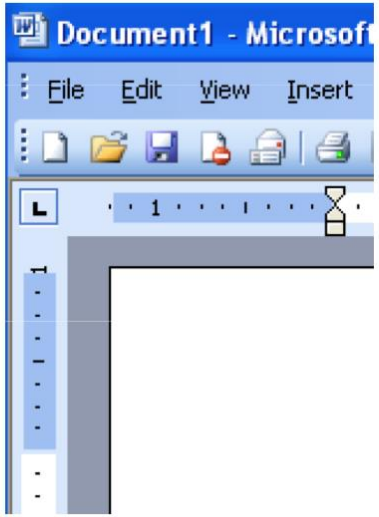
Inconsistent examples



Consistency example - Windows





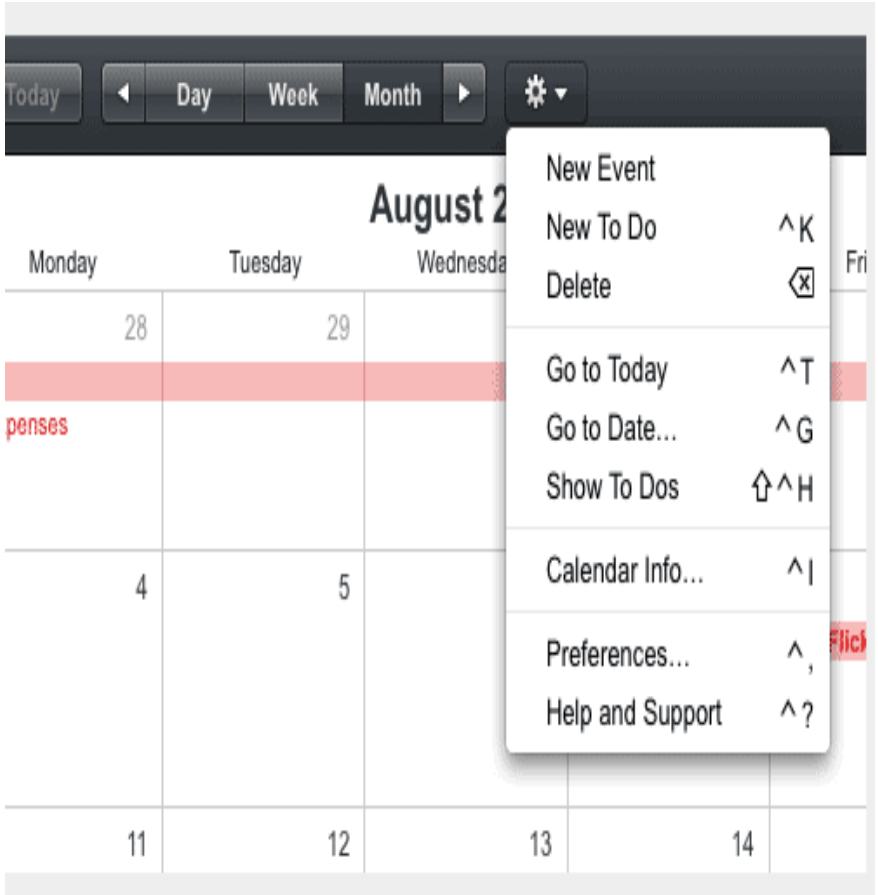


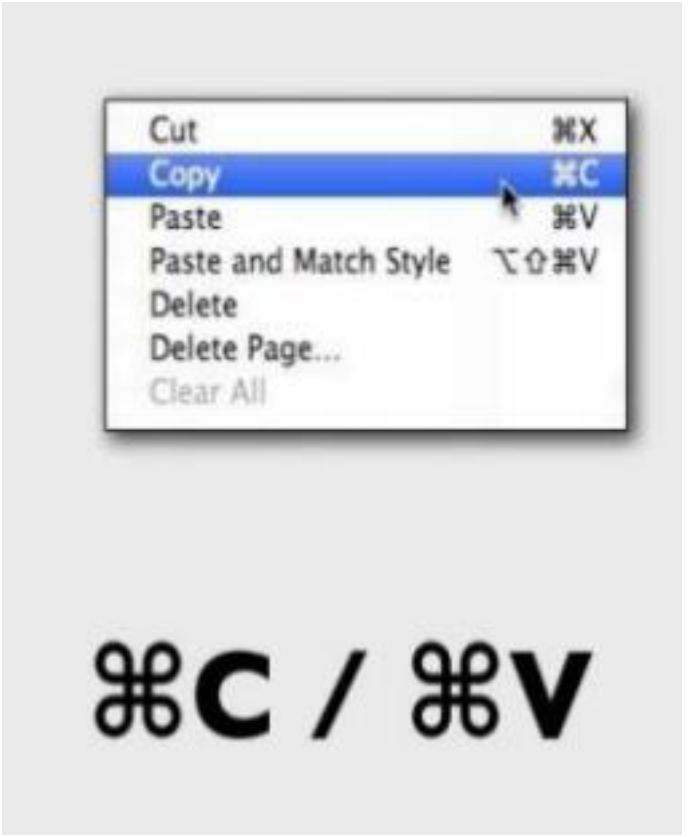
Windows consistent menus – File, Edit, View

Even for new applications user knows where to go to load and save files, cut and paste, change view, etc.

2. Cater for diverse users

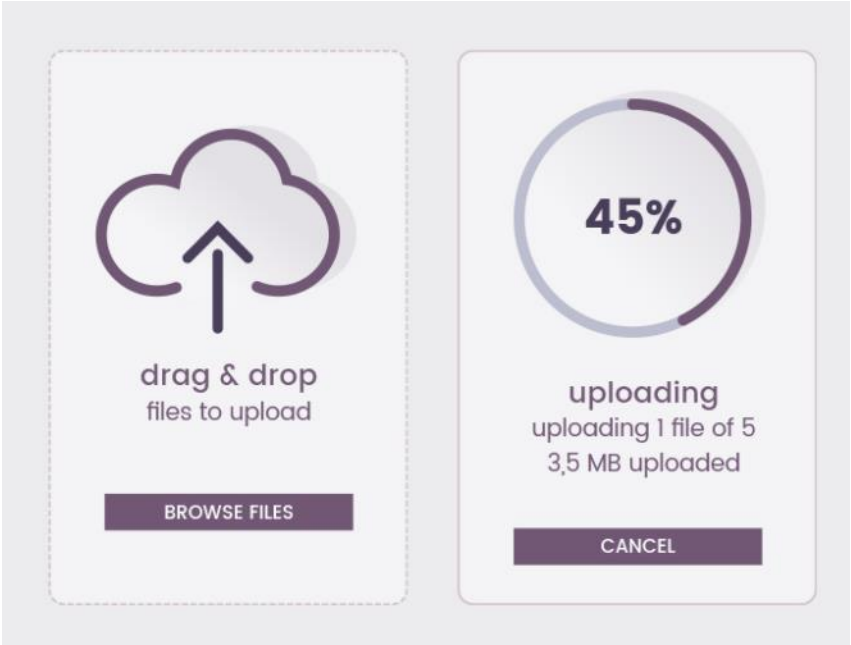
Eg. Offer experienced, frequent users shortcuts



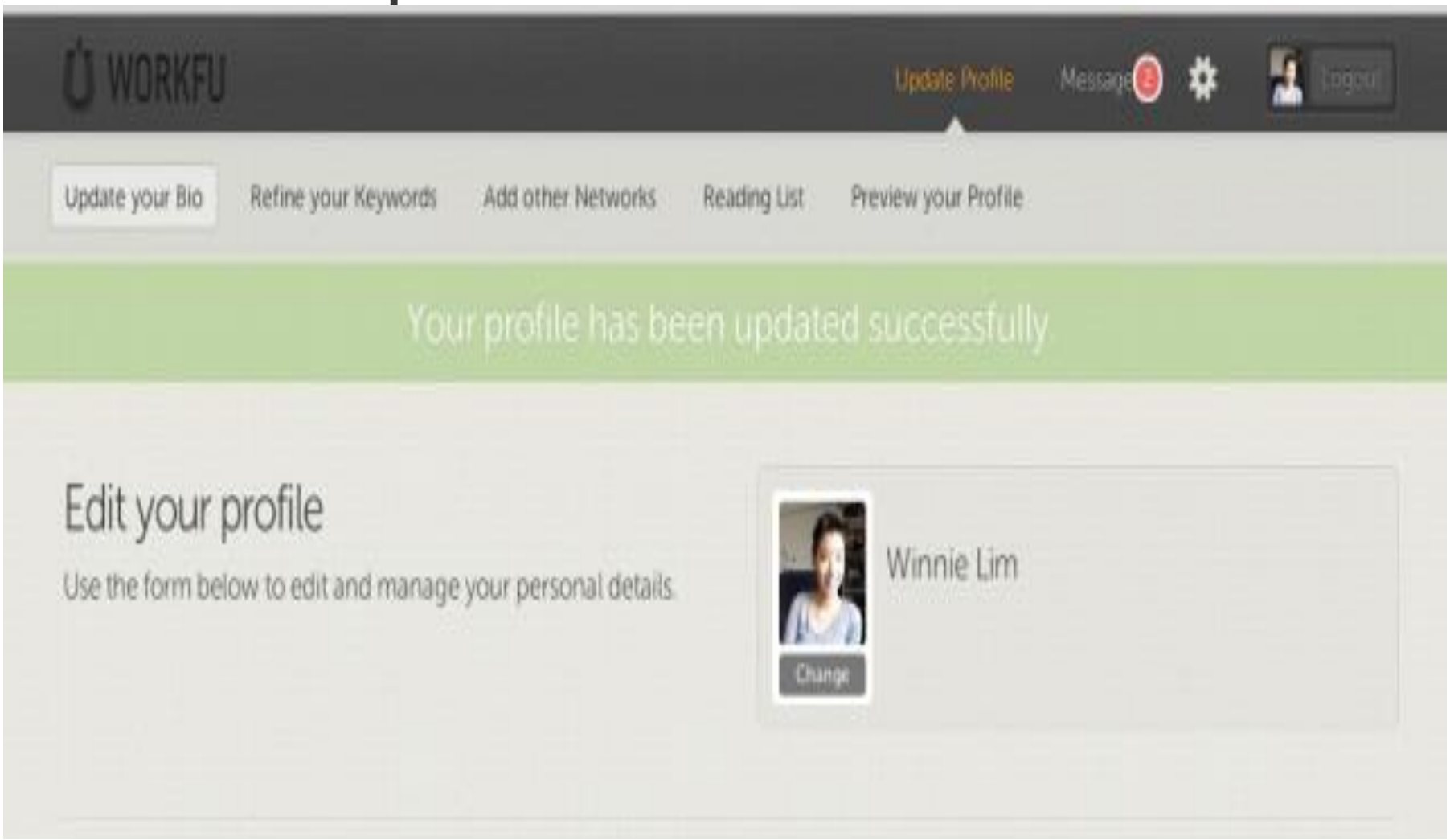


3. Offer informative feedback

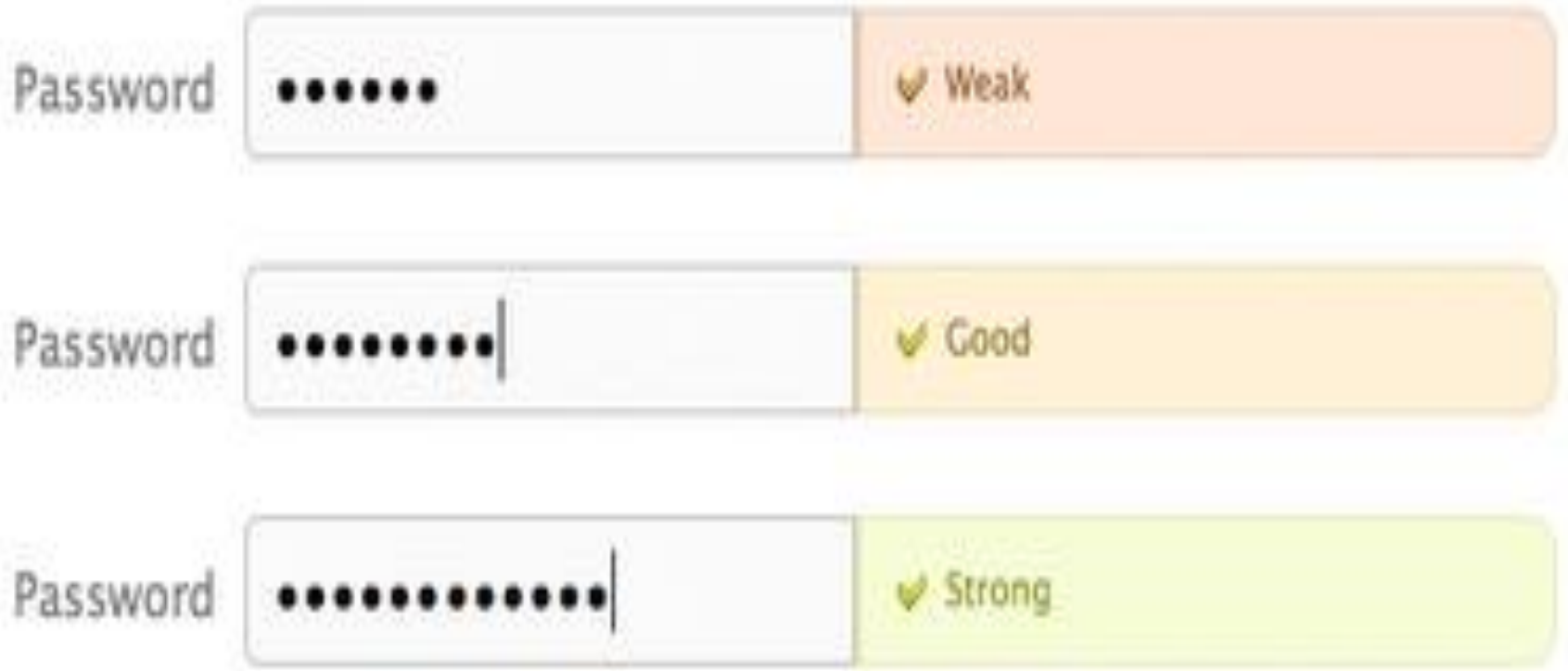
- Inform user that their actions was received
- Include feedback when something is complete
- Make sure that the feedback is:
  - Informative
  - Clear
  - Concise



Feedback examples

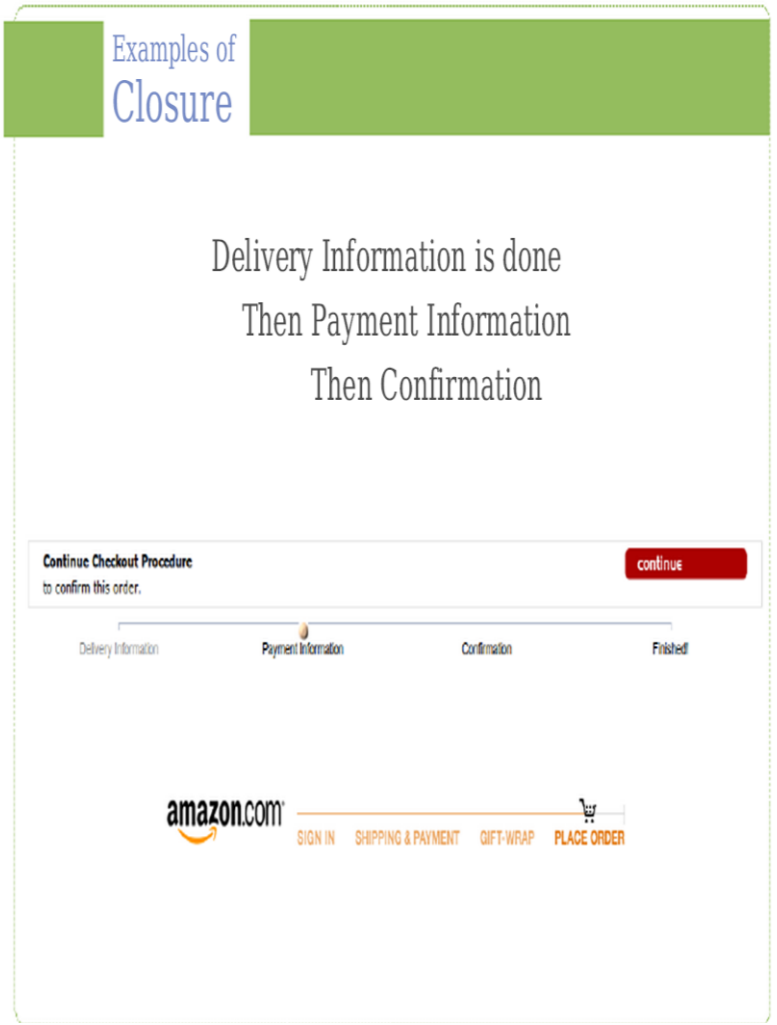


Feedback examples



4. Design dialogues that yield closure

- Organise sequences of actions:
  - Beginning
  - Middle
  - End
- Ensure that users know when a conversation or task is at end:
  - Users should know when a task is completed
  - User should be put at ease



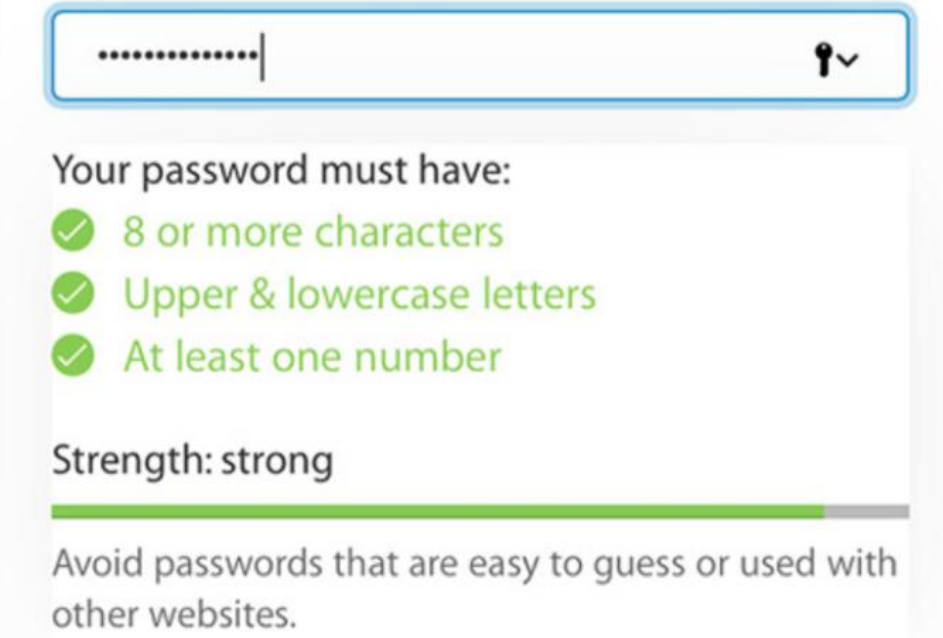
5. Prevent errors

Message types

- **Error messages:** alerts users of *a problem that has already occurred*.
- **Warning:** alerts users of a *condition that might cause a problem in the future*.
- **Information:** highlights a statement or fact

Effective error messages:

- Inform users that a problem occurred
- Explain why it happened and provide a solution so users can fix the problem



Error 404

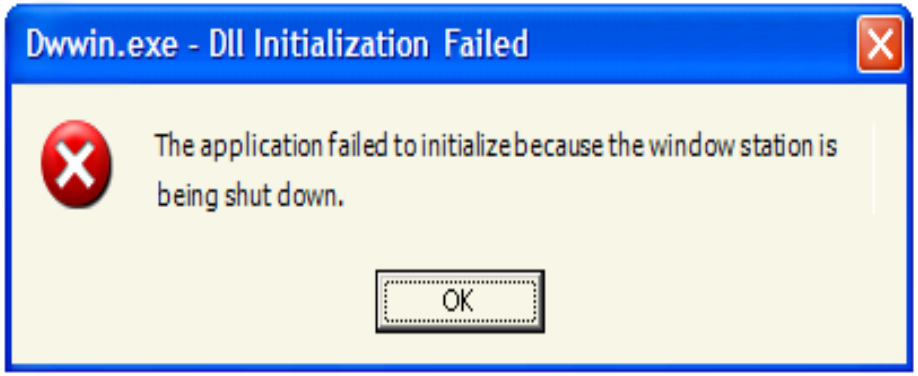
http://www.ted.com/talks/renny_gleeson_404_the_story_of_a_page_not_found

”Little things done right matter

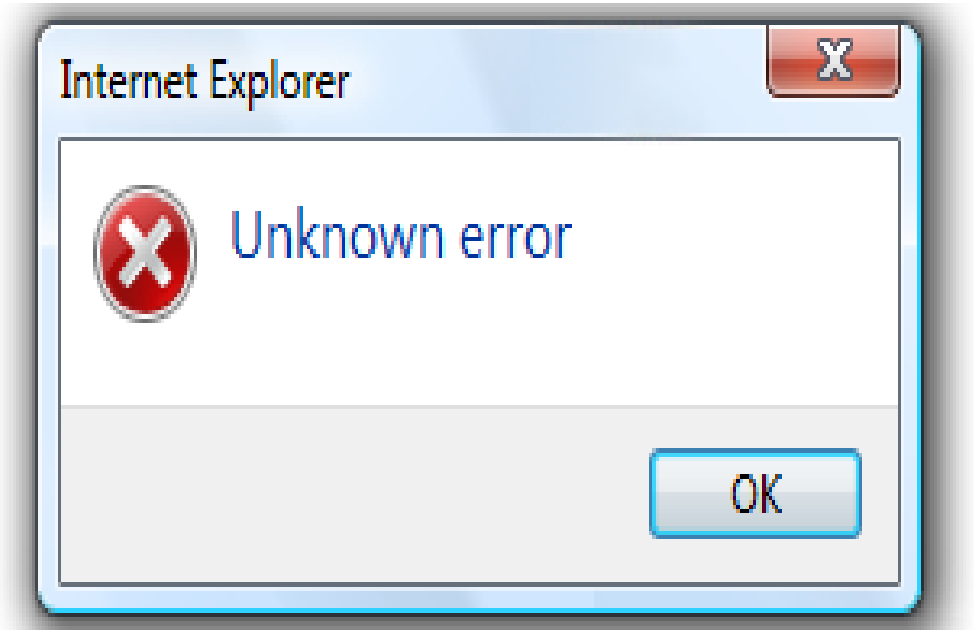
… Well designed moments build brands”

Characteristics of poor error messages

- **Unnecessary error messages**

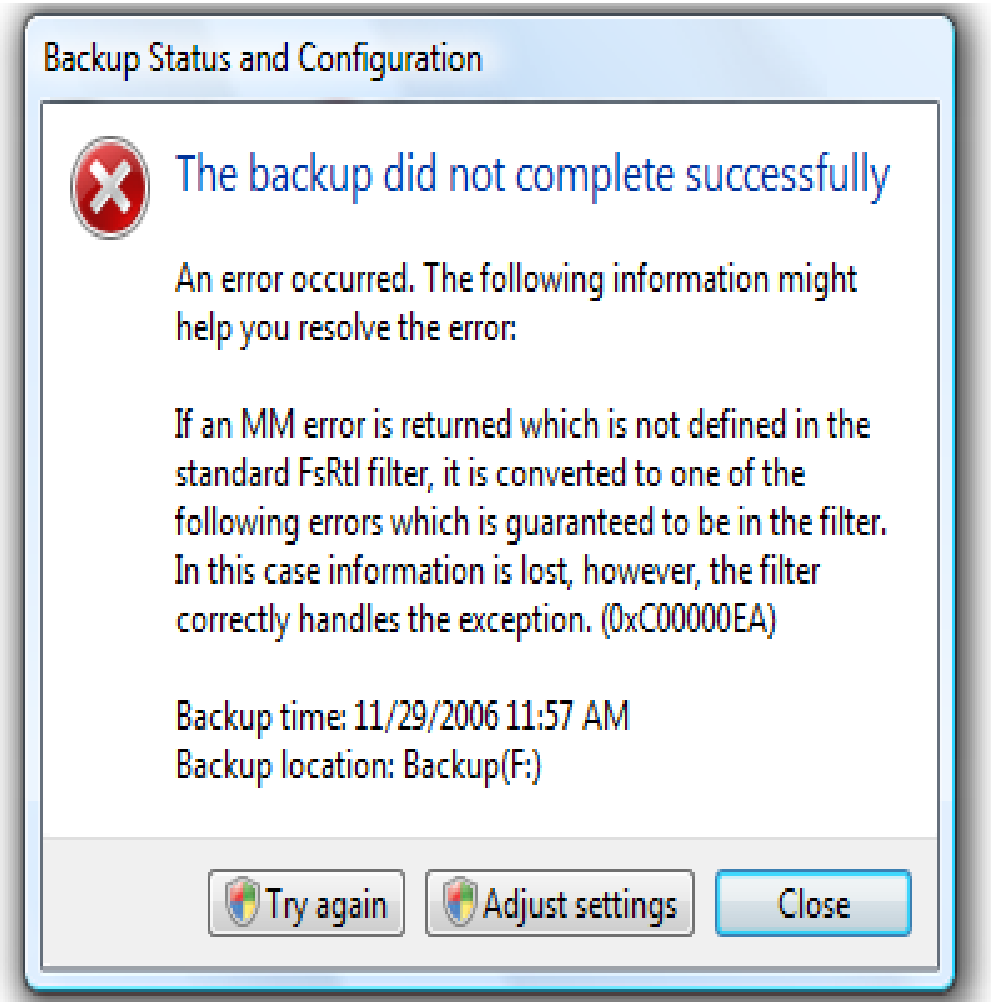


- **Meaningless message -** users learn that there is an error but:
  - has no idea what it is
  - or what to do about it



Characteristics of poor error messages

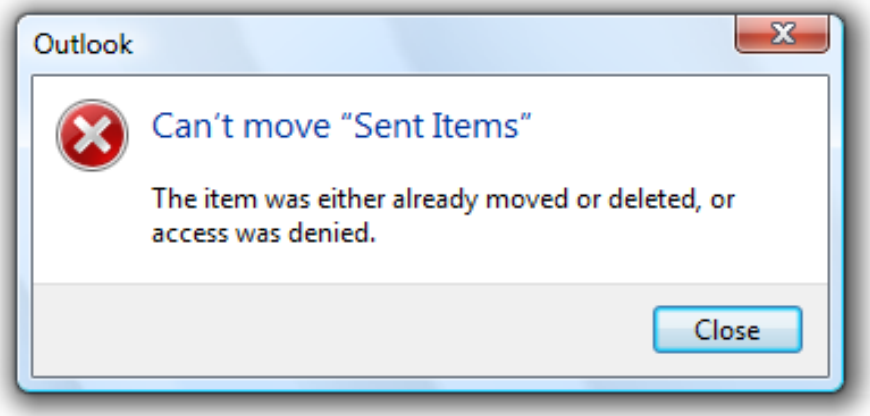
- **Incomprehensible error messages**



Characteristics of poor error messages

- **Irrelevant issues in problem statement**

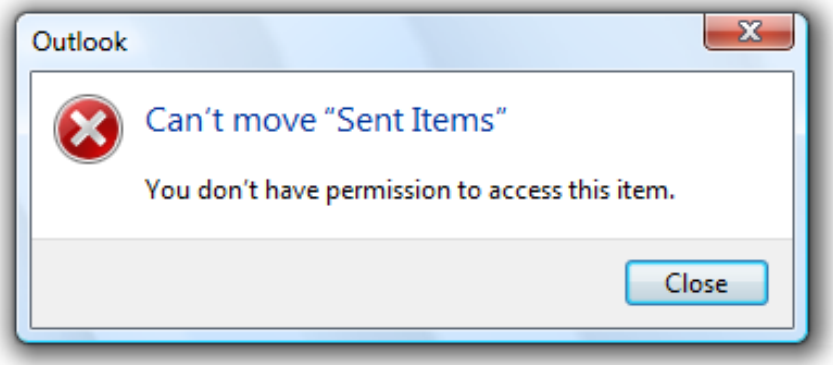
Incorrect error message



A better way:

The program can determine if access was denied, so this problem should be reported with a specific error message.

Correct error message



Characteristics of poor error message

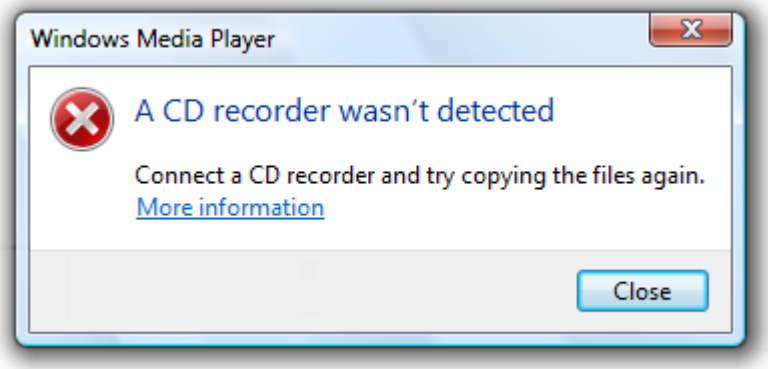
- **Avoid over-communicating**
  - Generally, users don't read, they scan
  - reduce the text down to its essentials
  - Should not require motivation to read

A better way:

The program can determine if access was denied, so this problem should be reported with a specific error message.

Incorrect error message

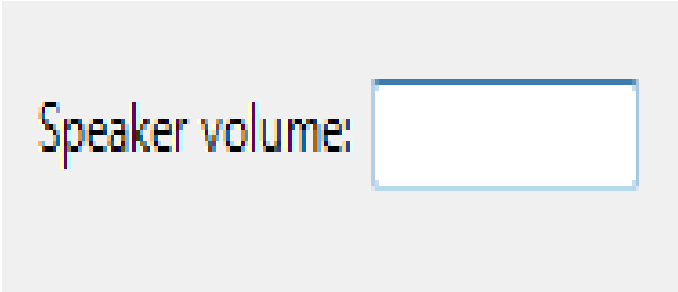
Correct error message



User input errors

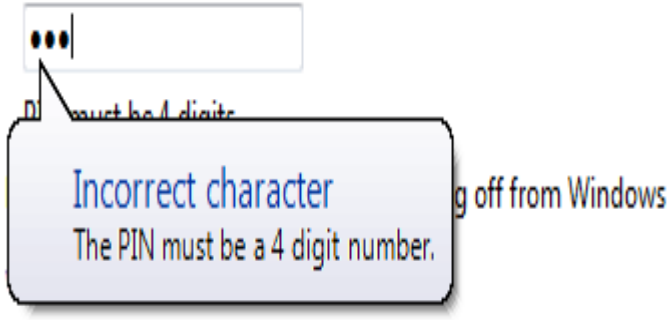
- **Whenever possible, prevent or reduce user input errors by:**
  - Using controls that are constrained to valid values
  - Providing good format examples

Example 1: Incorrect input
(No control)



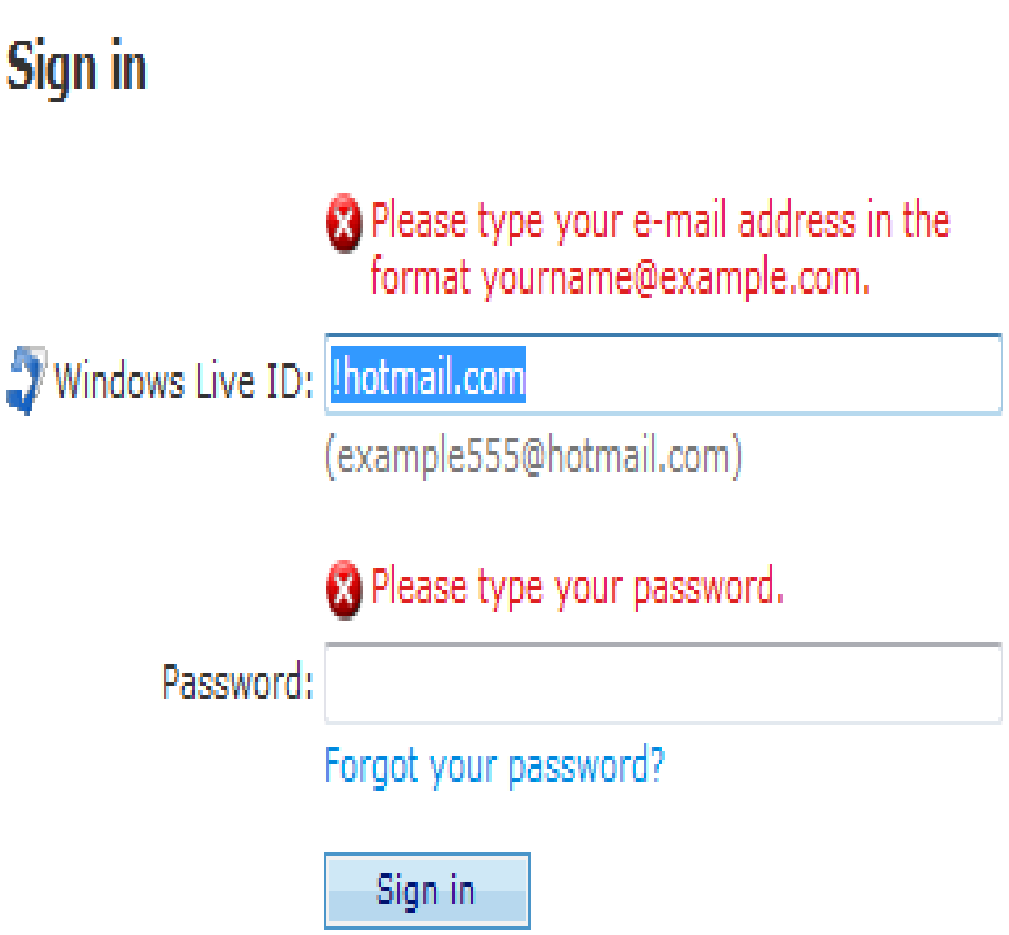
- **Use balloons for non-critical, single-point user input problems detected while in a text box.**
  - If error message placed immediately after the text box difficult to see.

Example 2: Incorrect input



User input errors

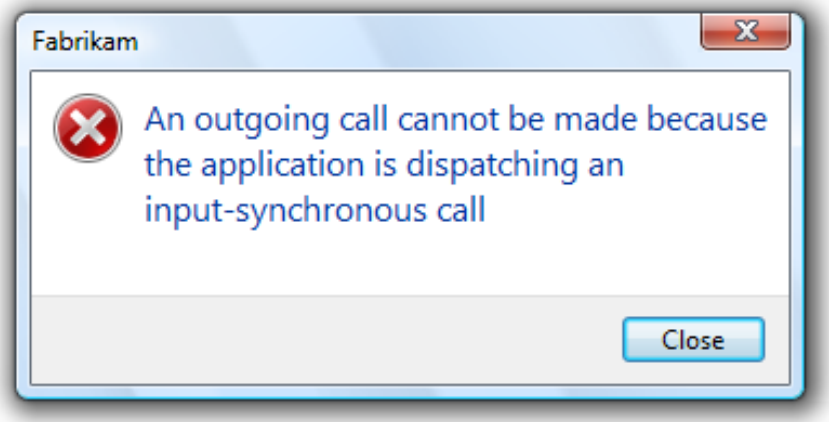
- Use in-place errors for delayed error detection
- There can be multiple in-place errors at a time



The use of sound and text in error messages

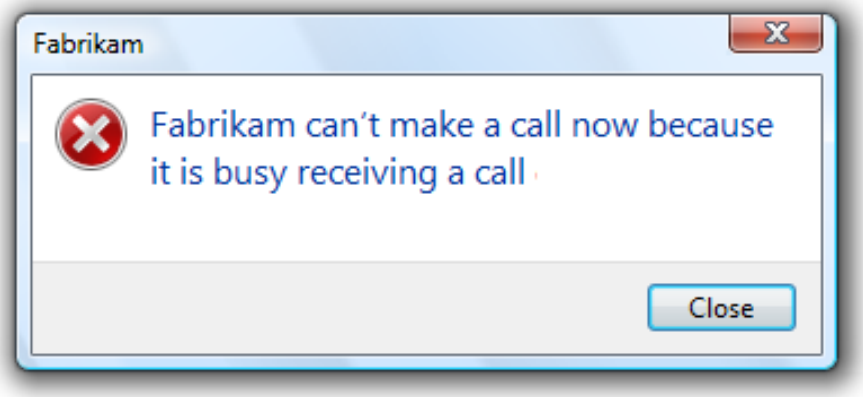
- **Sound**
  - Generally, error messages should not be accompanied with a sound effect or beep
  - Doing so is jarring and unnecessary

Incorrect error message



- **Text**
  - Remove any redundant text
  - Avoid technical jargon

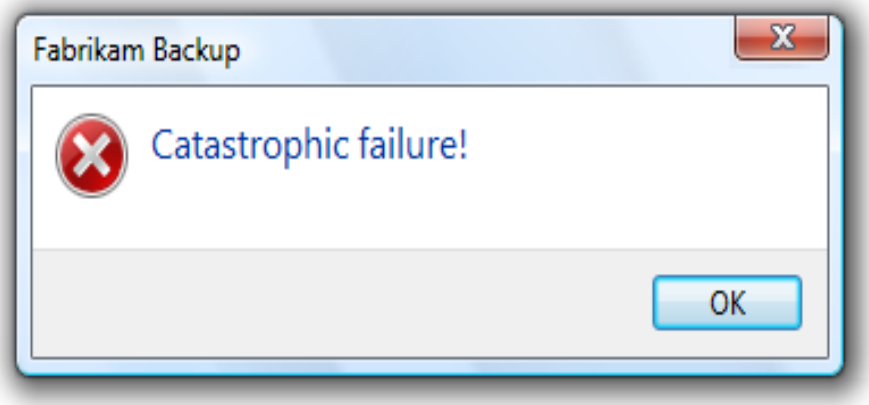
Correct error message



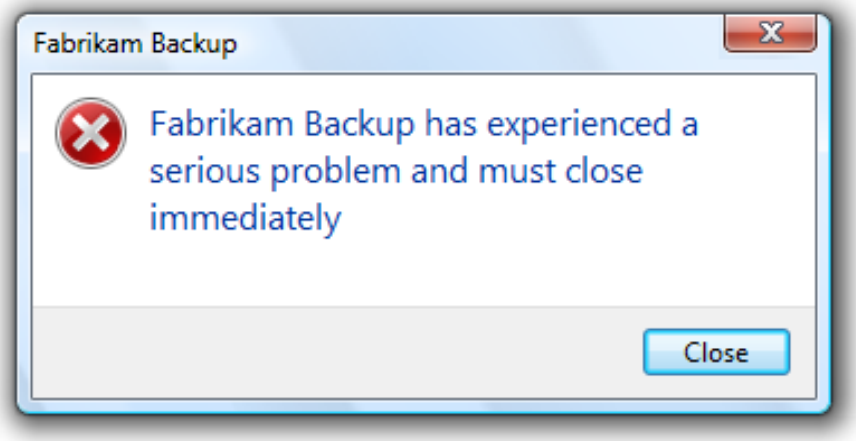
The use of text in error messages

- When designing error messages, *use an **ENCOURAGING** tone*
- Avoid using the following words:
  - Error, failure
    .. use *problem*
  - Failed to
    .. use *unable to*
  - Illegal, invalid, bad
    .. use *incorrect*
  - Abort, kill, terminate
    .. use *stop*
  - Catastrophic, fatal
    .. use *serious*

Example: Inappropriate error message



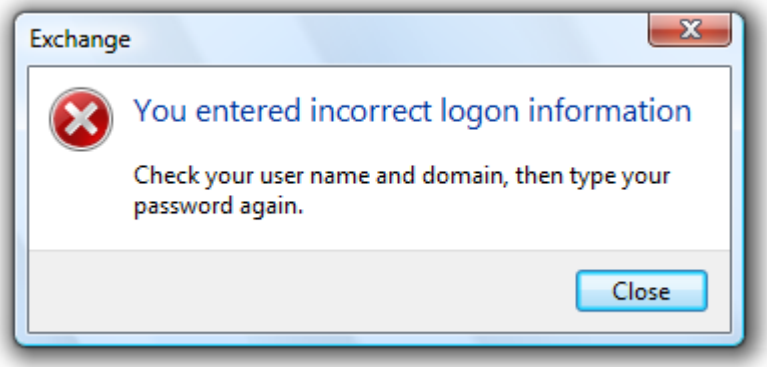
Example: More appropriate error message



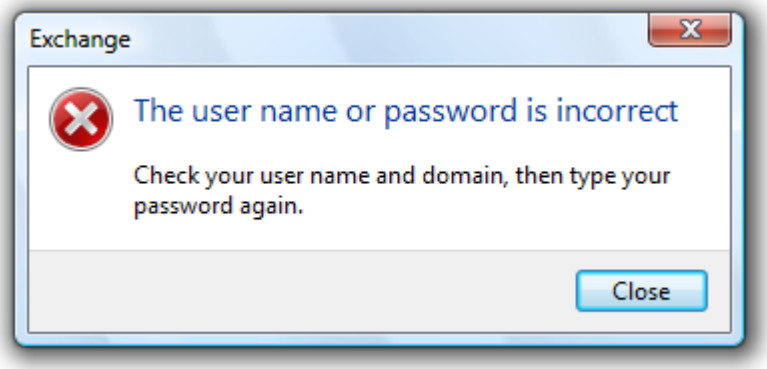
The use of text in error messages

- Don't use phrasing that ***blames*** the user
- Avoid using ***you*** and ***your*** in the phrasing.
- Use the passive voice when the user is the subject

Example: Inappropriate error message – it blames the user by using the active voice



Example: Appropriate error message



7. Reduce short-term memory load

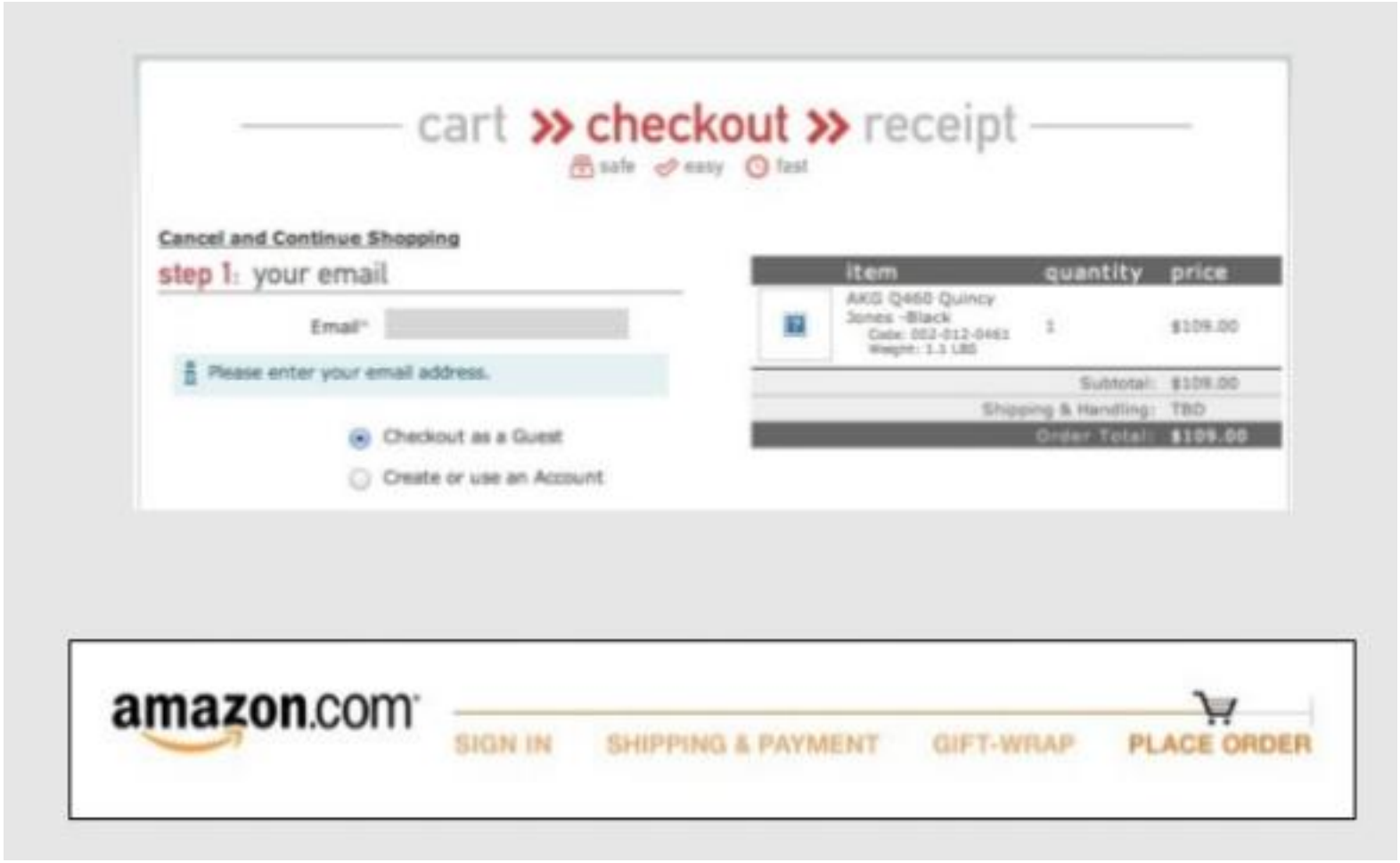
Humans have limited capacity for processing info in short-term memory

- 7 +/- 2 chunks of information, 20-30 seconds

- Avoid interfaces where users have to remember information from one screen to the next

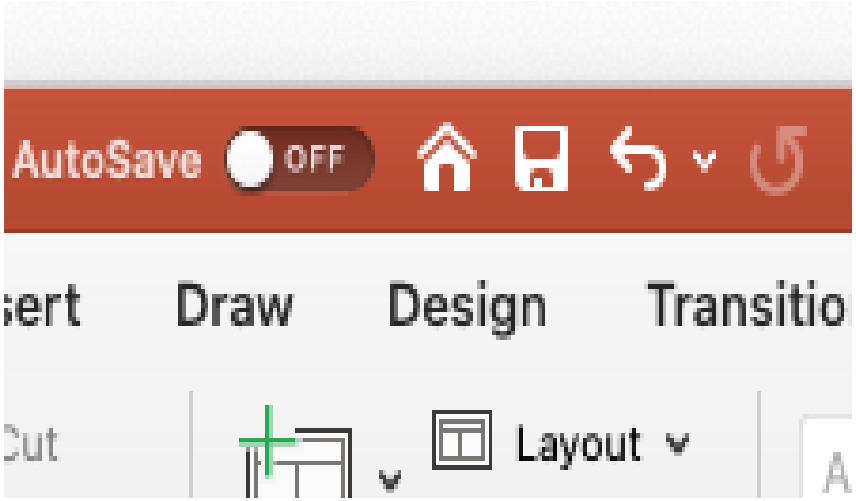
Short-term memory: Implications for UI design

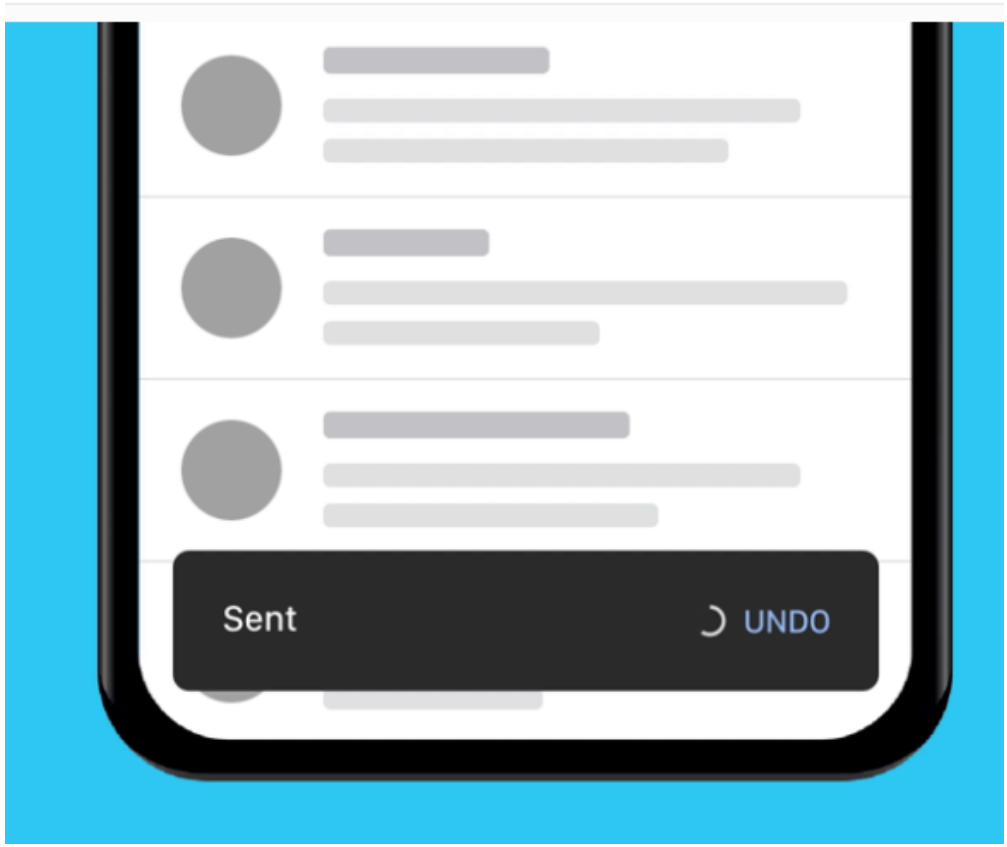
- Highlights where you are and shows sequence of actions



6. Permit easy reversal of actions

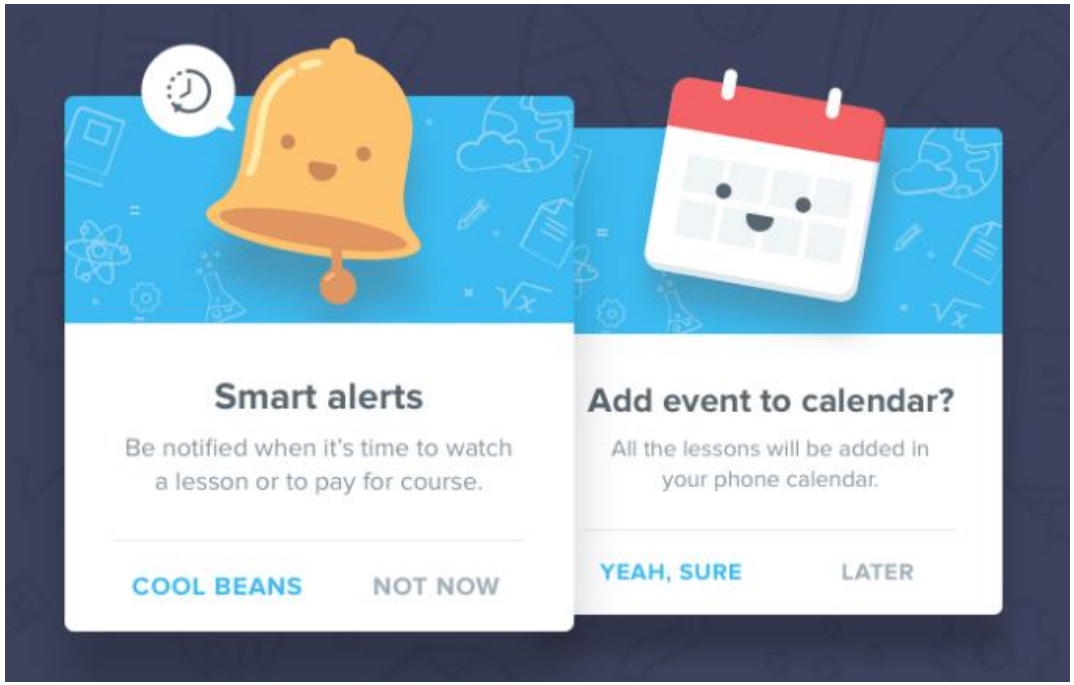
- Users need to feel that they can cancel or reverse an action
- Provide tools for reversal of their actions – buttons or menu bar options





8. Support internal locus of control

- Experienced users want to be *in charge while interacting* with the system



- They do not like:
  - Tedious data entry
  - Surprising system actions
  - No help messages
  - Complex error message
  - Being forced to remember

The user decides what to do next

Jakob Nielsen has 10 heuristics for Interface Design (a few similar to the 8 Golden rules)

- Visibility of system status (3)
- Match between system and the real world
- User control and freedom (8)
- Consistency and standards (1)
- Error prevention (5)
- Recognition rather than recall (7)
- Flexibility and efficiency of use (2)
- Aesthetic and minimalist design
- Help users recover from errors (5)
- Help and documentation

… and some other things to think about

Match between the system and the real world

Metaphors

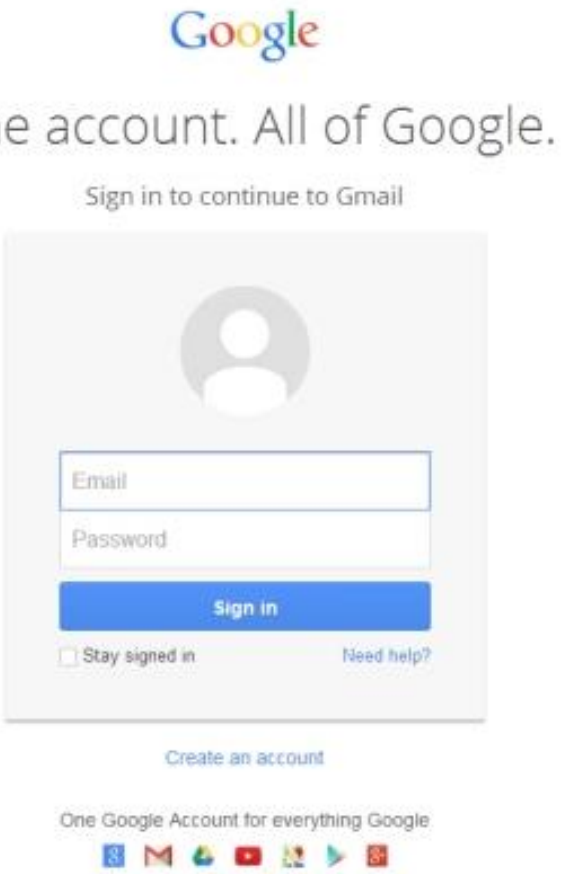
- Metaphors are *analogies between features of the UI and some aspects of physical reality* that users are familiar with.
- Use of a concept or word from one setting (e.g., real world) to convey meaning in another (e.g., digital world)
  - physical analogies (e.g., trash, spreadsheet, file cabinet)
  - cultural standards (e.g., colour, words)
- Help reduce cognitive load for user and improves ease of learning

Examples of Metaphors in GUI

- MacIntosh's bin icon to delete files
- Form fill-ins (paper-based forms as a metaphor)
- Digital camera software (photo album as a metaphor)
- Tabs in a GUI (physical filing system as a metaphor)
- To-do list
- Calendar
- Shopping cart metaphor for e-commerce applications

Aesthetics and Minimalist design - Bad

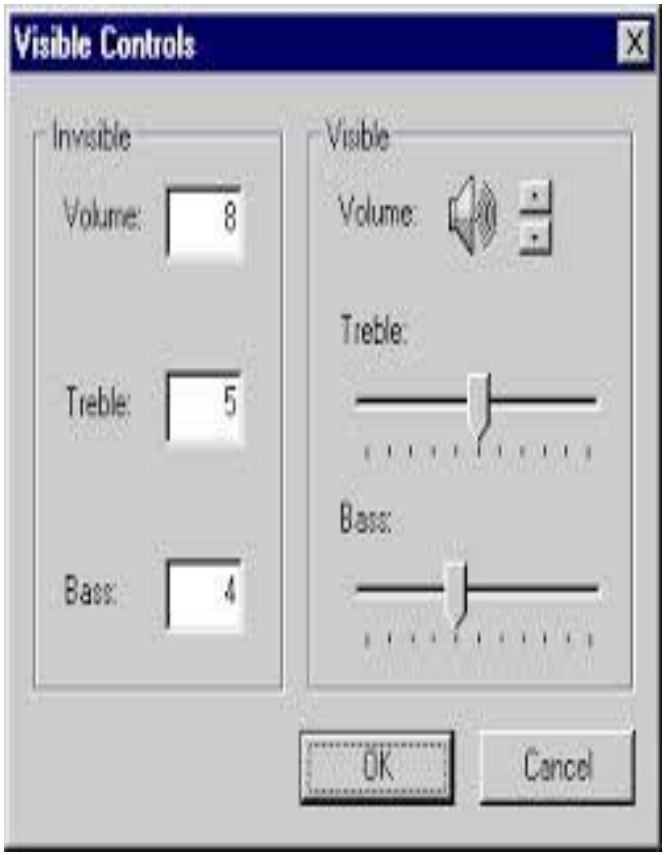
Aesthetics and Minimalist design - Good



Guidelines for designing UI

Donald Norman advises designing UI based on: Affordance and Visibility

- **Affordance**
  - the *appearance* of a specific control should suggest the purpose for which it is used (i.e. functionality)
- **Visibility**
  - The user shown know how to operate something by just looking at it
  - All controls must provide immediate feedback to indicate control is responding



Assess this online form

https://register.monash.edu.au/enquiry/

Design principles

- Minimise the pain
  - No one likes filling in forms
  - Smart defaults, inline validation, forgiving inputs
- Illuminate a path to completion
- Consider the context
  - Familiar vs. foreign
  - Frequently used vs. rarely uses
- Ensure consistent communication
  - Errors, Help Success
  - Single voice despite many stakeholders

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Don't make me think

- Eliminate questions in user's heads like:
  - Why did they call it *that*? Names of things should be obvious
  - Is it clickable? Buttons should look like buttons; links should look like links.
  - How to search? – use a search box labeled Search or a box with a button that says "Search" next to it.
  - Where am I?
  - Where should I begin?
  - Where did they put _____?
  - What are the most important things on this page?

Points from Steve Krug's book: *Don't make me think*

Workshop Preparation

Make sure to look at the additional material at the end of the seminar

Thanks for watching

Resources:

Satzinger, J. W., Jackson, R.B., Burd, S.D. and R. Johnson (2016) Systems Analysis and Design in a Changing World, 7th Edition, Thomsen Course Technology, *Chapter 8*

- Jakob Nielsen - 10 Heuristics for Interface design
  http://www.nngroup.com/articles/ten-usability-heuristics/
  http://www.whatwasithinking.co.uk/2009/02/27/explaining-usability-heuristics-a-quick-guide/#.Uy-NjNwVdFw
  http://designingwebinterfaces.com/6-tips-for-a-great-flex-ux-part-5

- Ben Shneiderman – 8 Golden rules for Interface design
  http://www.cs.umd.edu/~ben/goldenrules.html
  https://www.interaction-design.org/literature/article/shneiderman-s-eight-golden-rules-will-help-you-design-better-interfaces

- Examples: http://designingwebinterfaces.com/6-tips-for-a-great-flex-ux-part-5

Practical Interface Design Tips

by Luke Wroblewski

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Design principles

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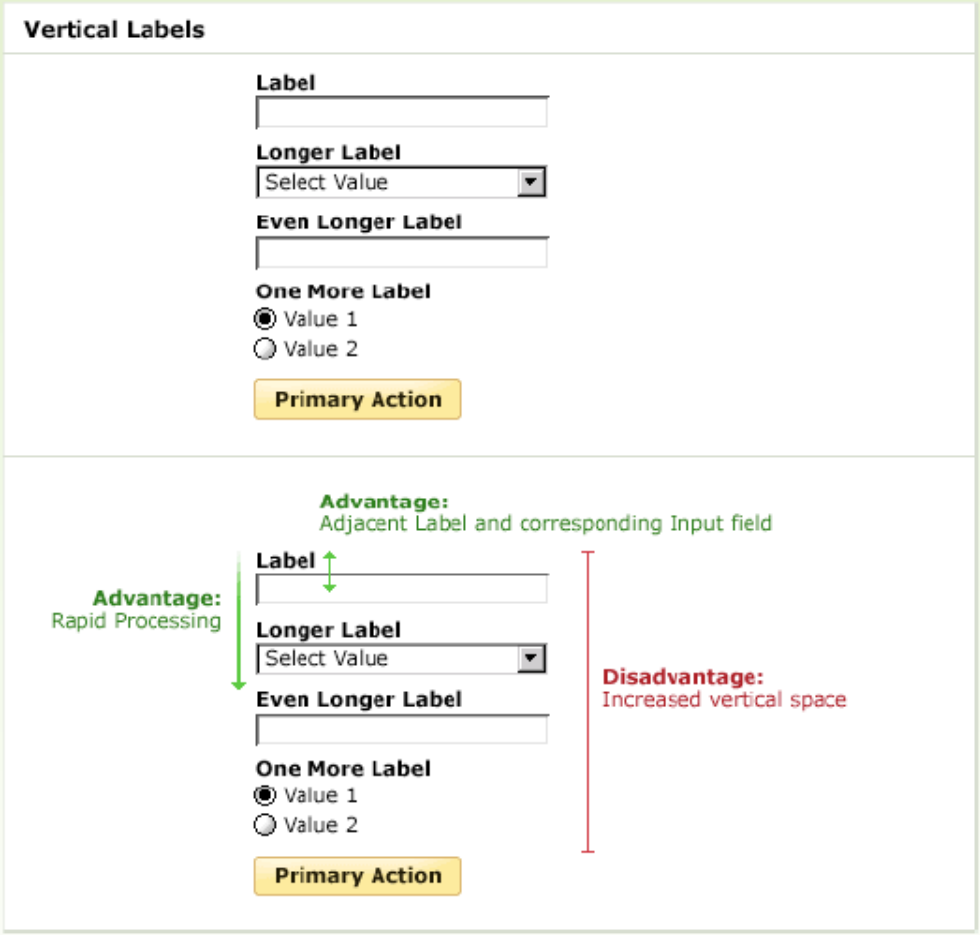
Top aligned labels

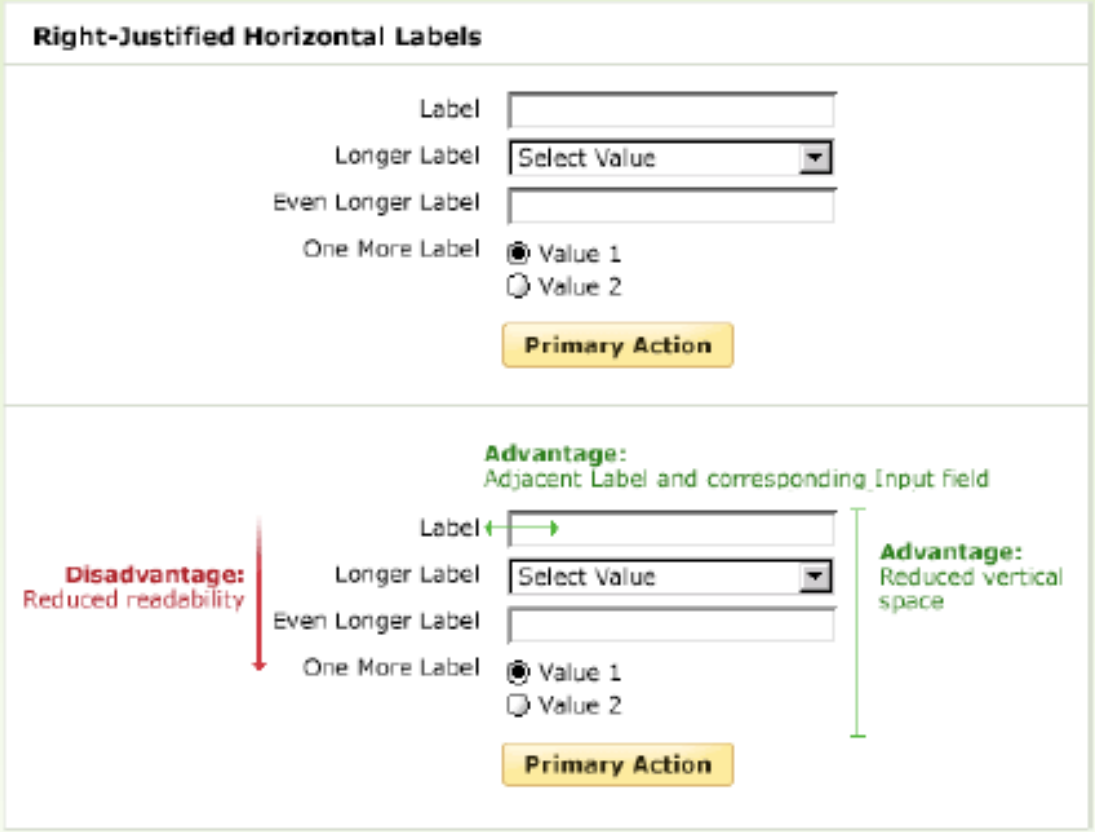
- When data being collected is familiar
- Minimize time to completion
- Require more vertical space
- Spacing or contrast is vital to enable efficient scanning
- Flexibility for localization and complex inputs



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Right aligned labels

- Clear association between label and field
- Requires less vertical space
- More difficult to just scan labels due to left rag
- Fast completion times



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Left aligned labels

- When data required is unfamiliar
- Enables label scanning
- Less clear association between label and field
- Requires less vertical space
- Changing label length may impair layout

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Labels: Best practice

- **Left-aligned labels**
  - Easily associated labels with the proper input fields
  - Excessive distances between labels inputs forced users to take more time
- **Right-aligned labels**
  - Reduced overall number of fixations by nearly half
  - Form completion times were cut nearly in half
- **Top-aligned labels**
  - Permitted users to capture both labels & inputs with a single eye movement'
  - Fastest completion times

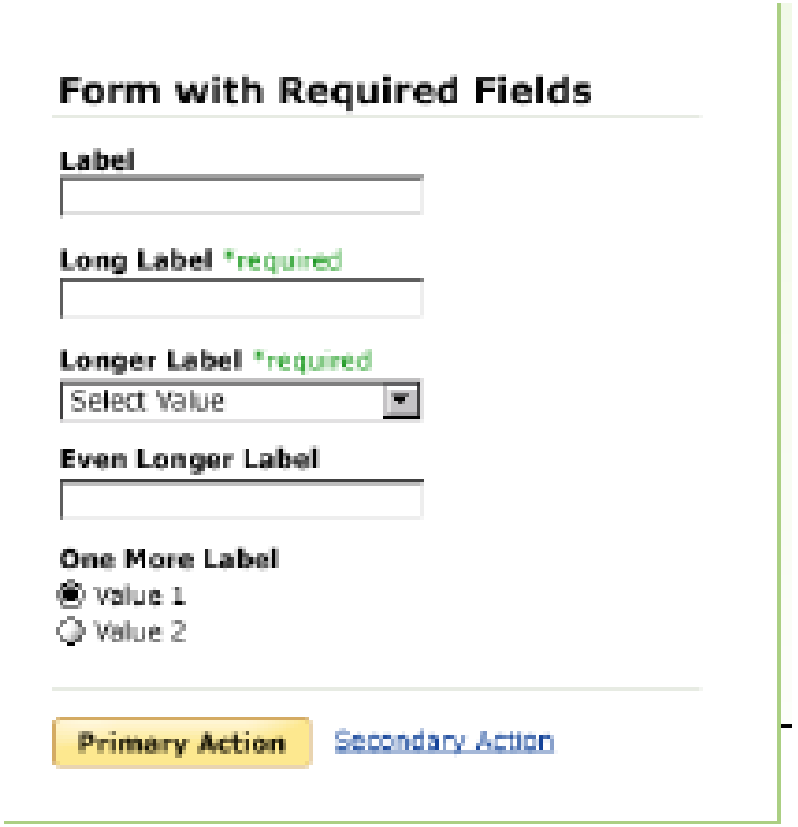
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

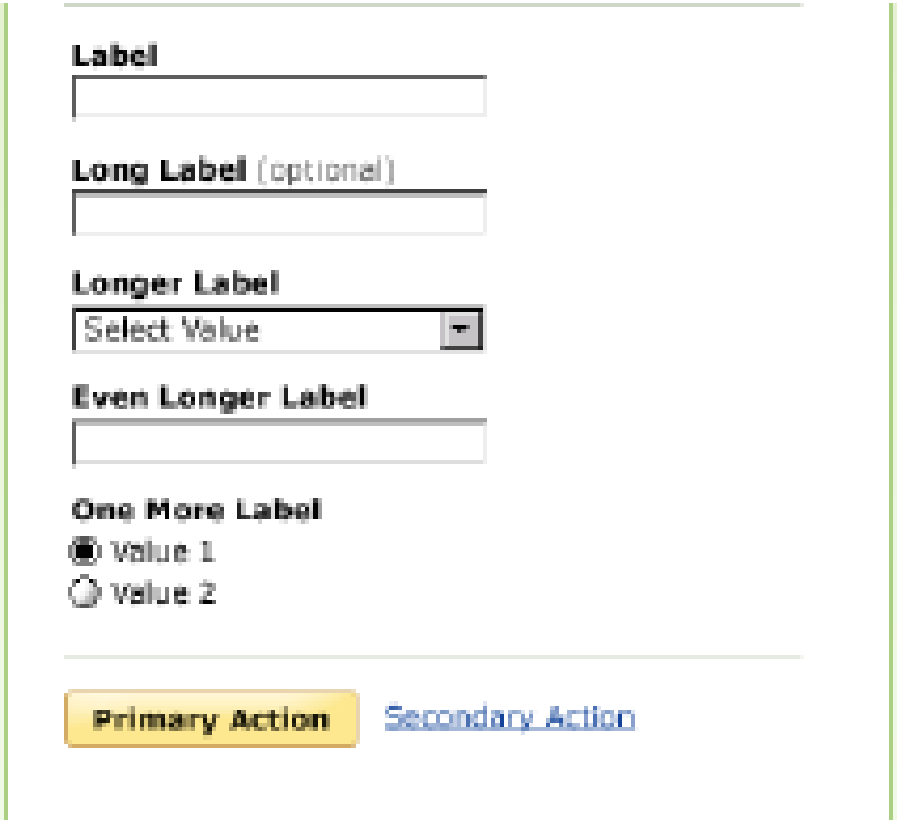
Required/Optional form

- Indication of required fields is most useful when
  - There are lots of fields
  - But very few are required
  - Enables users to scan form to see what needs to be filled in
- Indication of optional fields is most useful when
  - Very few fields are optional
- Neither is realy useful when
  - All fields are required

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Required/Optional form fields - Example





Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

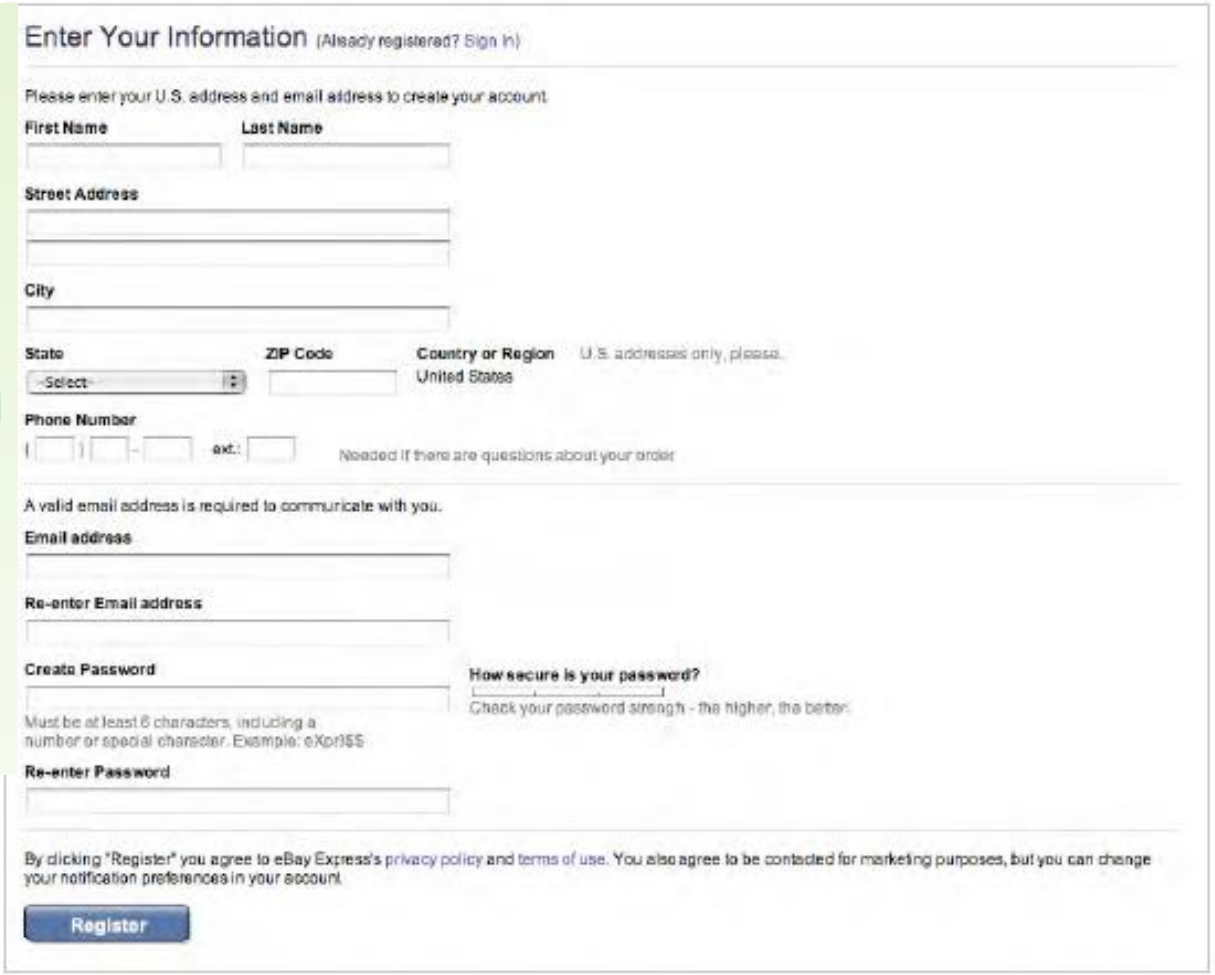
Required/Optional form fields: Best Practice

- Try to avoid optional fields
- If most fields are required: indicate optional fields
- If most fields are optional: indicate required fields
- Text is best, but * often works for required fields
- Associate indicators with labels

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Field Lengths

- Field lengths can provide valuable affordances
- Appropriate field lengths provide enough space for inputs
- Random field lengths may add visual noise to a form



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

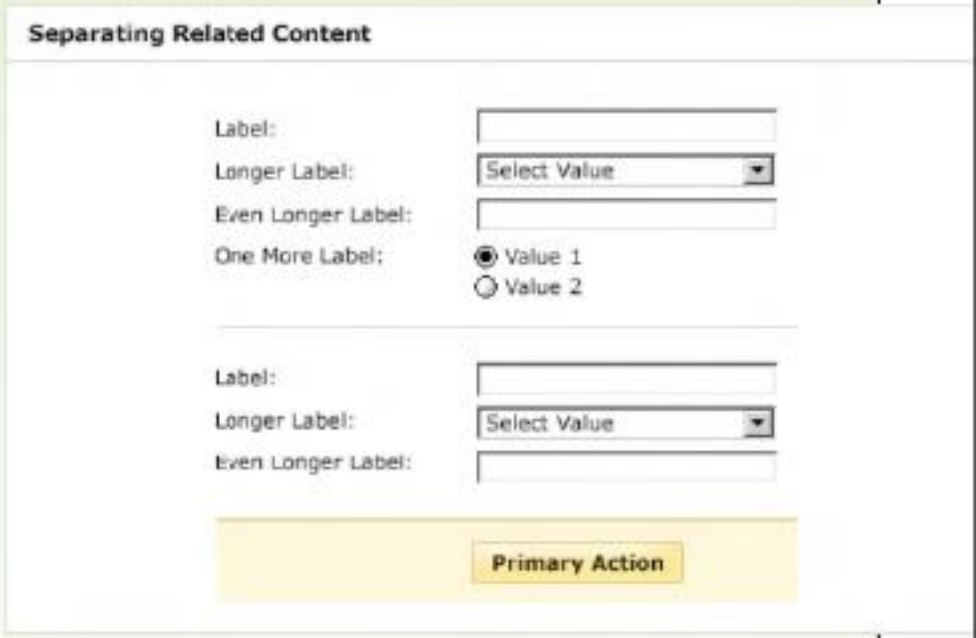
Field Lengths: Best Practice

- When possible, use field length as an affordance
- Otherwise consider a consistent length that provides enough room for inputs

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

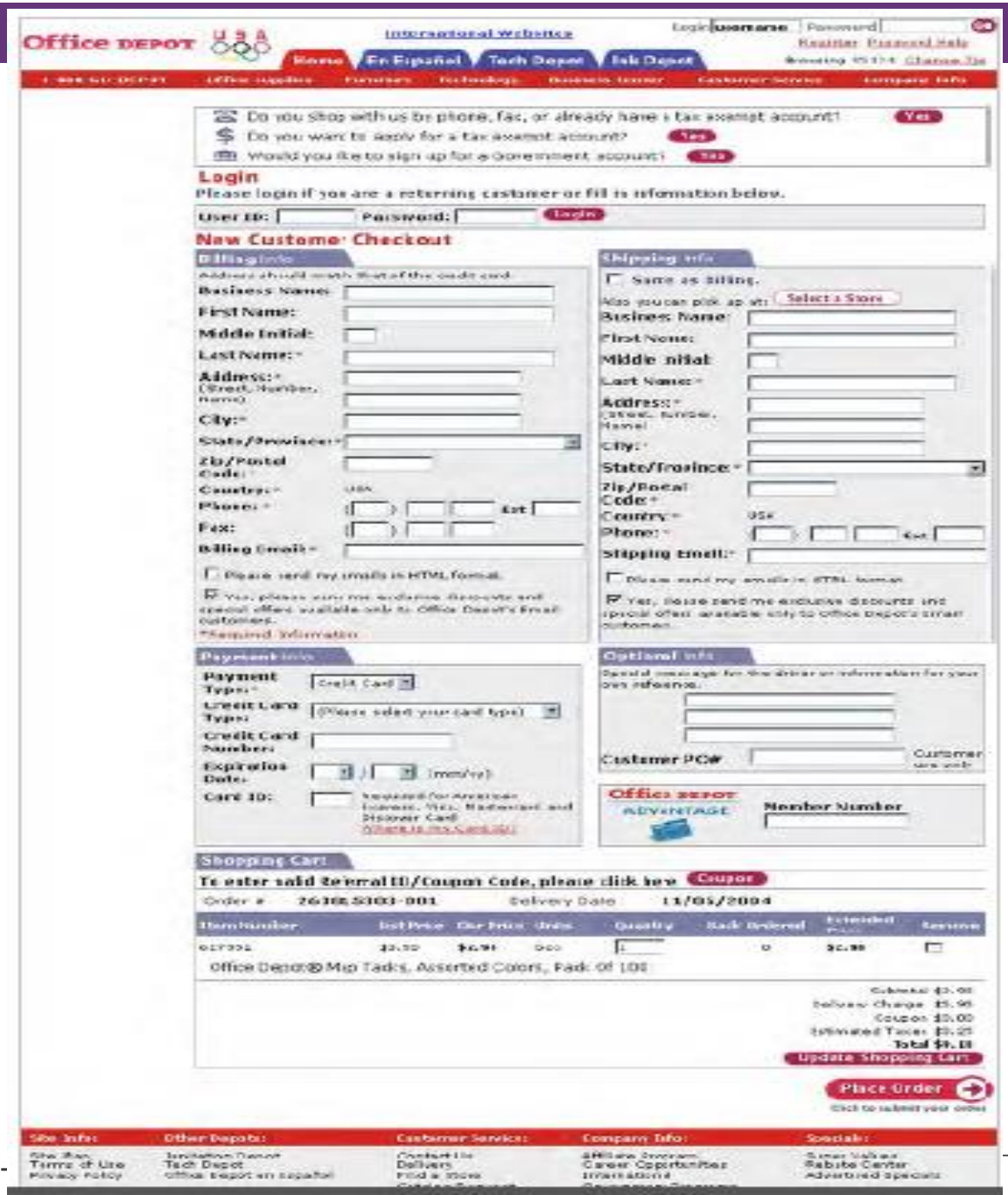
Content Grouping

- Content relationships provide a structured way to organize a form
- Groupings provide
  - A way to scan information required at a high level
  - A sense of how information within a form is related



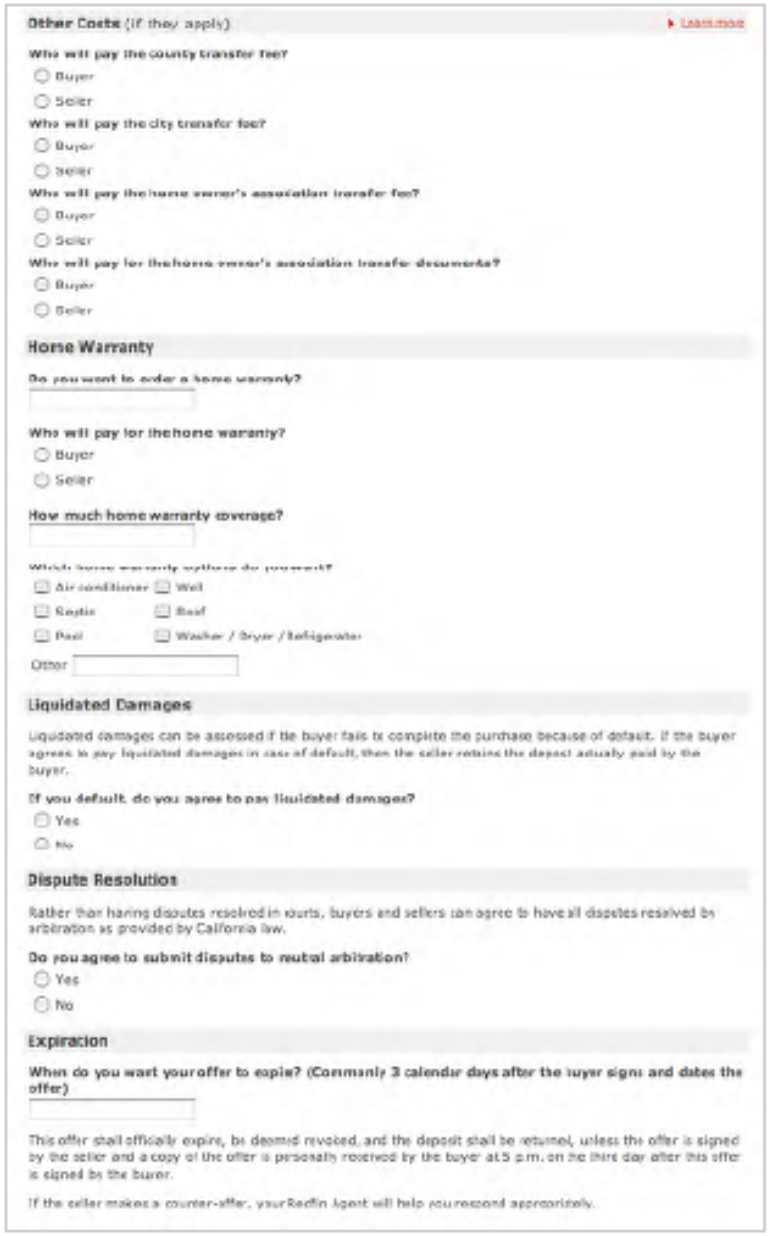
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Bad example – too much visual noise



Ref: form-

Good example



Ref: http://www.sl
form-design-81133

Content Grouping: Best Practice

- Use relevant content groupings to organize forms
- Use the minimum amount of visual elements necessary to communicate useful relationships

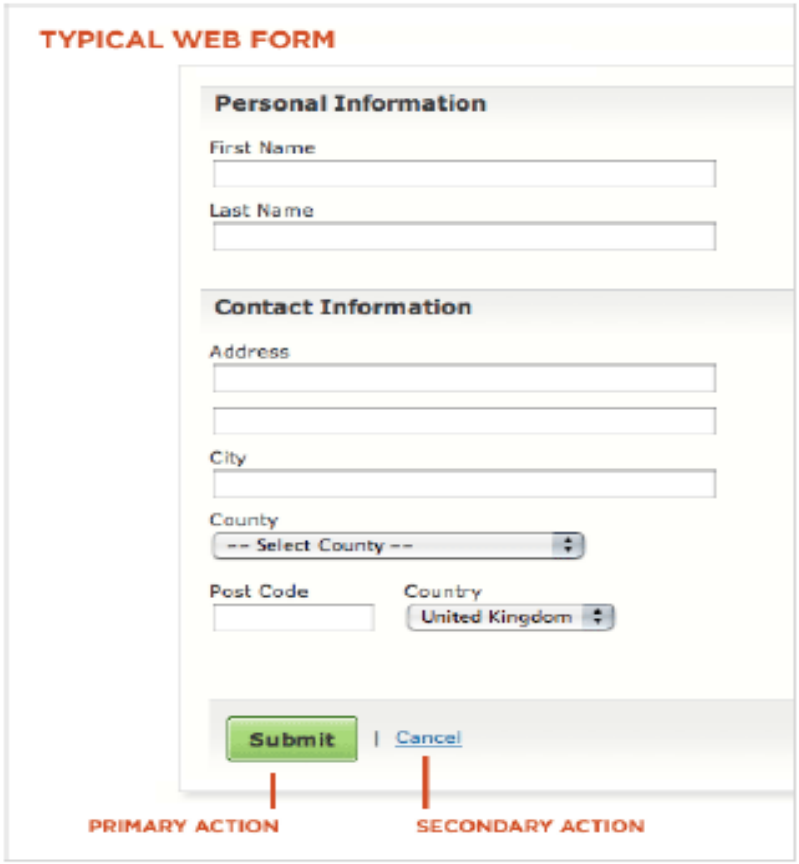
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

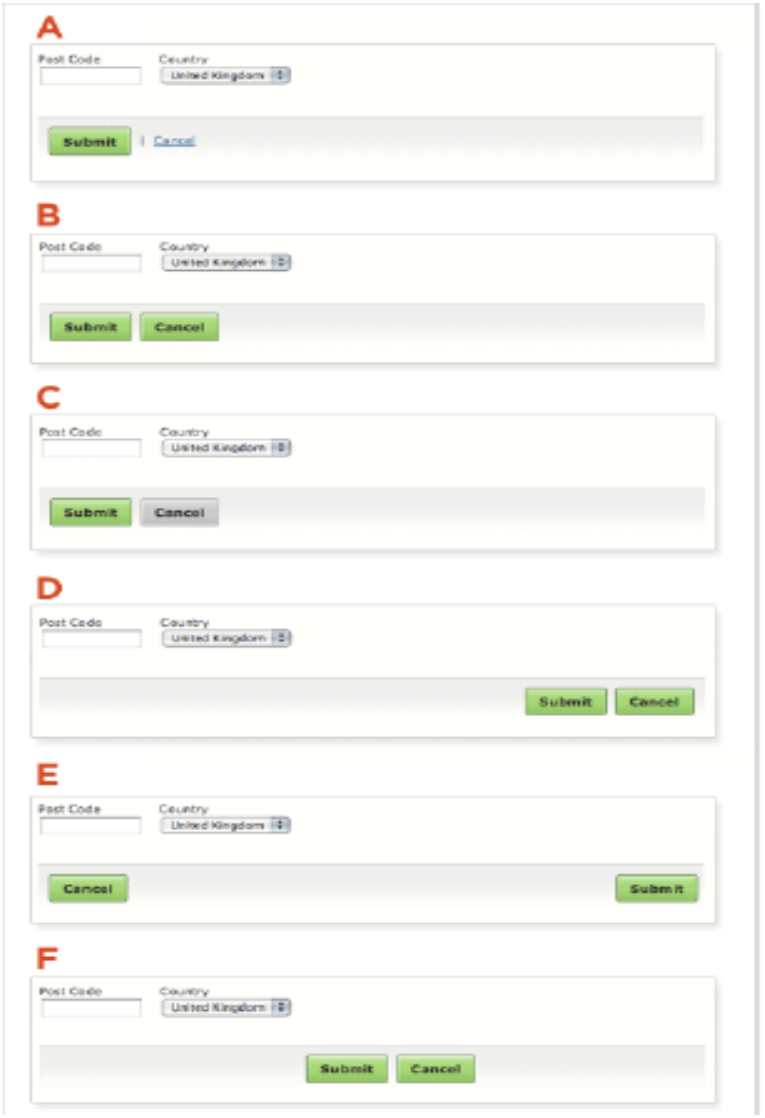
Actions

- Not all form actions are equal
  - Reset, Cancel, & Go Back are secondary actions: rarely need to be used (if at all)
  - Save, Continue, & Submit are primary actions: directly responsible for form completion
- The visual presentation of actions should match their importance

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

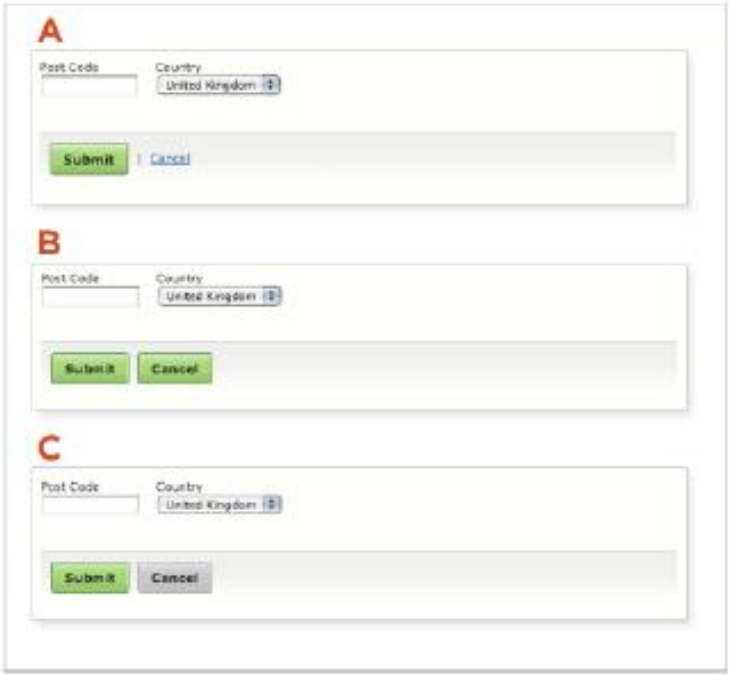
Actions - Examples

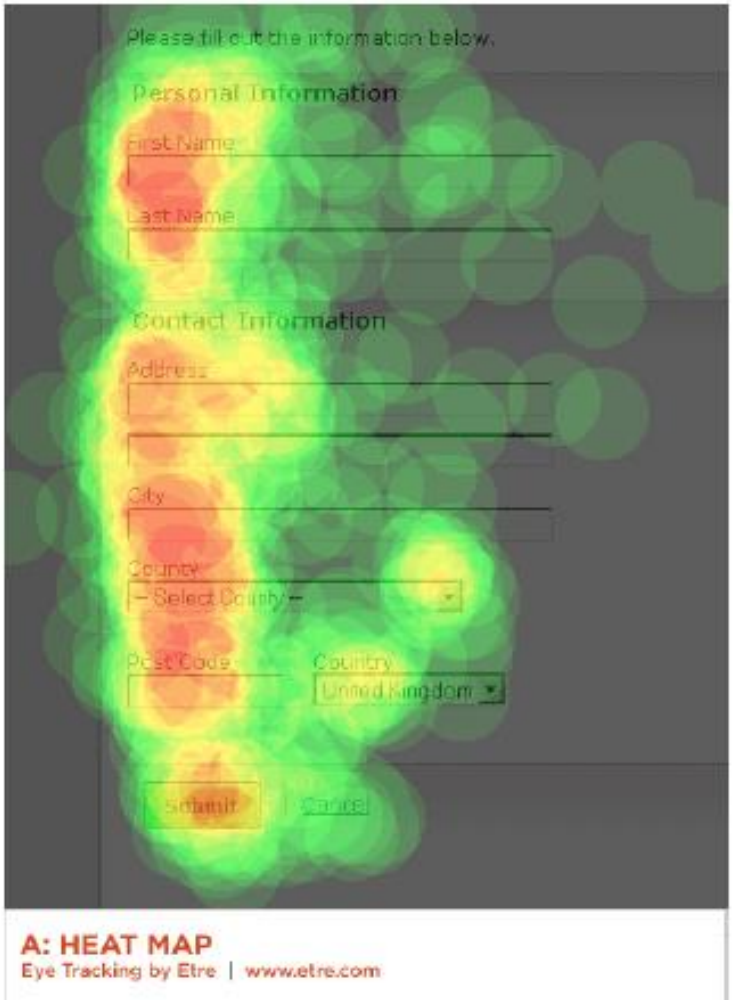




Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Actions – Heat tracking map





Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Actions: Best practice

- Avoid secondary actions if possible
- Otherwise, ensure a clear visual distinction between primary & secondary actions
- Align primary actions with input fields for a clear path to completion

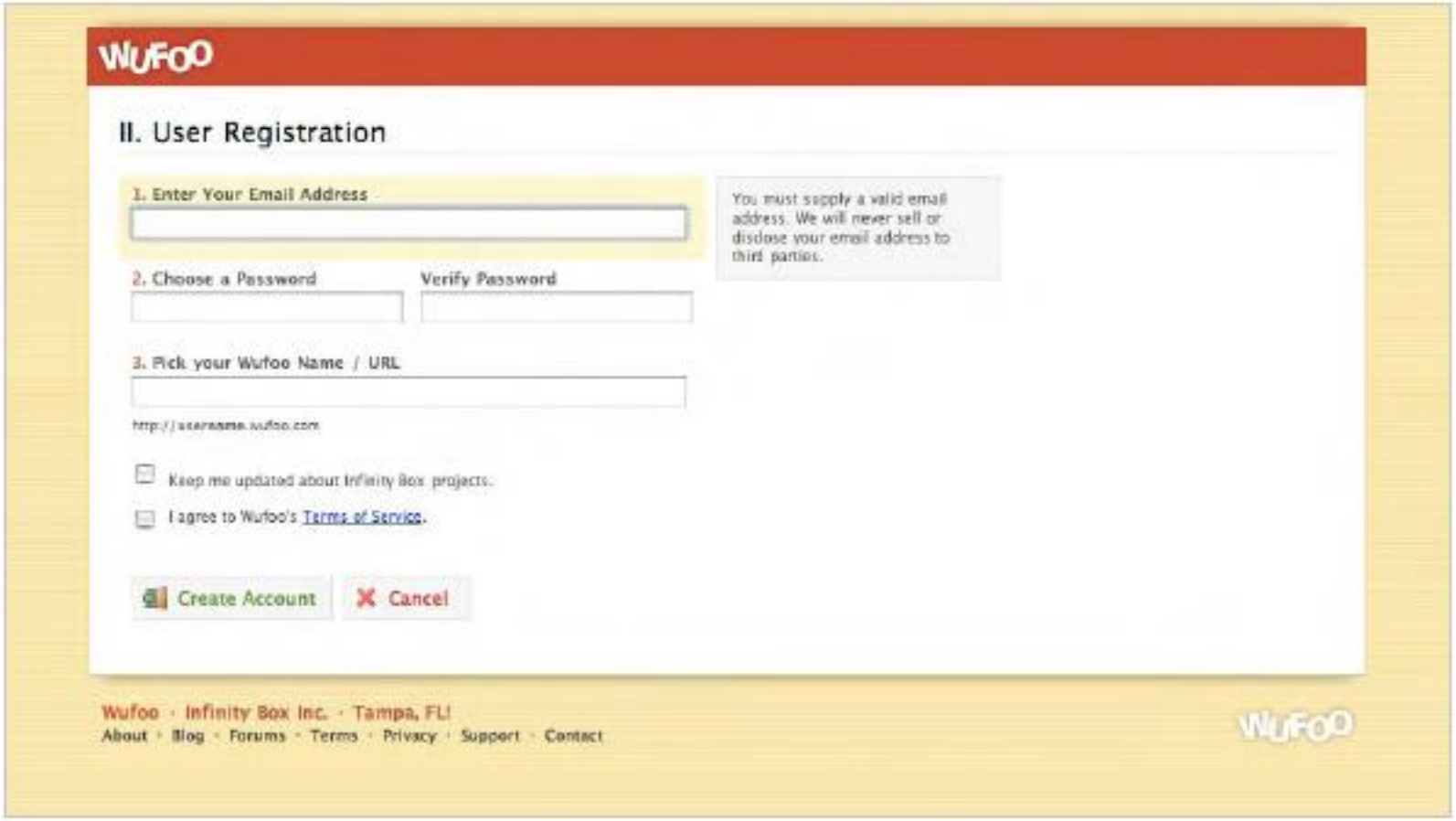
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Providing Help & Tips

- Help & Tips are useful when:
  - Asking for unfamiliar data
  - Users may question why data is being requested
  - There are recommended ways of providing data
  - Certain data requests are optional
- However, Help & Tips can quickly overwhelm a form if overused
- In these cases, you may want to consider a dynamic solution
  - Automatic inline exposure
  - User activated inline exposure
  - User activated section exposure

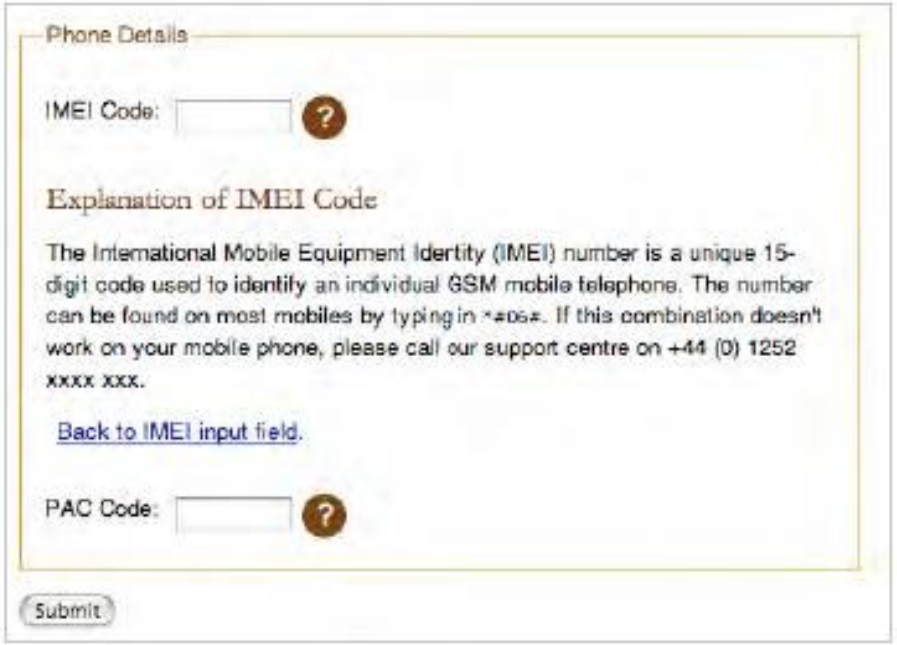
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Help – Automatic inline exposure



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Help – User activated inline exposure



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Providing Help & Tips: Best Practice

- Minimize the amount of help & tips required to fill out a form
- Help visible and adjacent to a data request is most useful
- When lots of unfamiliar data is being requested, consider using a dynamic help system

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Path to Completion

Primary goal for every form is completion

Every input requires consideration & action

- Remove all unnecessary data requests
- Enable flexible data input

Provide a clear path

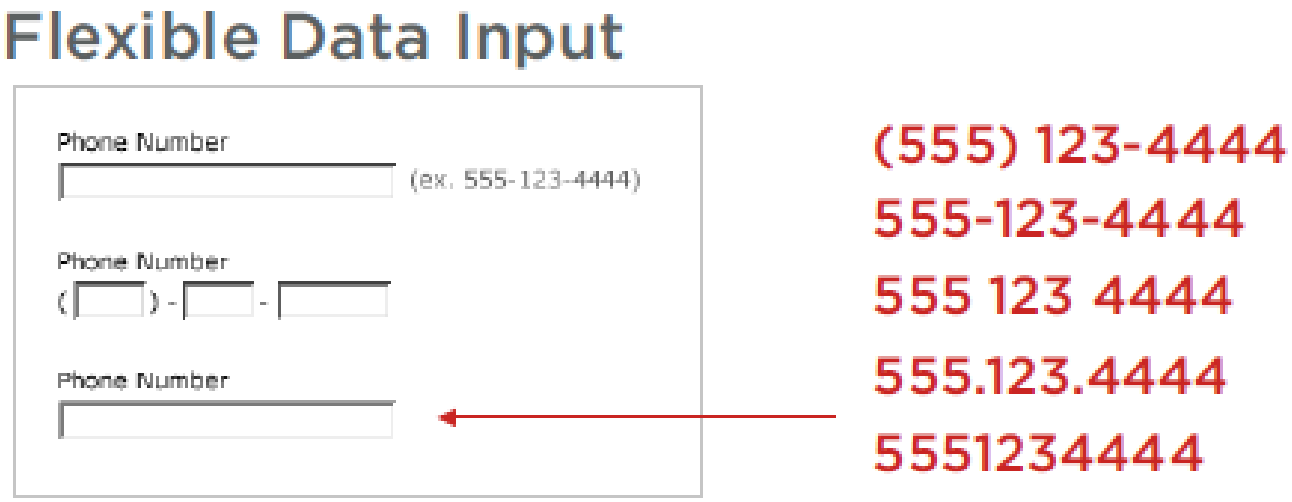
Enable smart defaults

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Clear Path to Completion

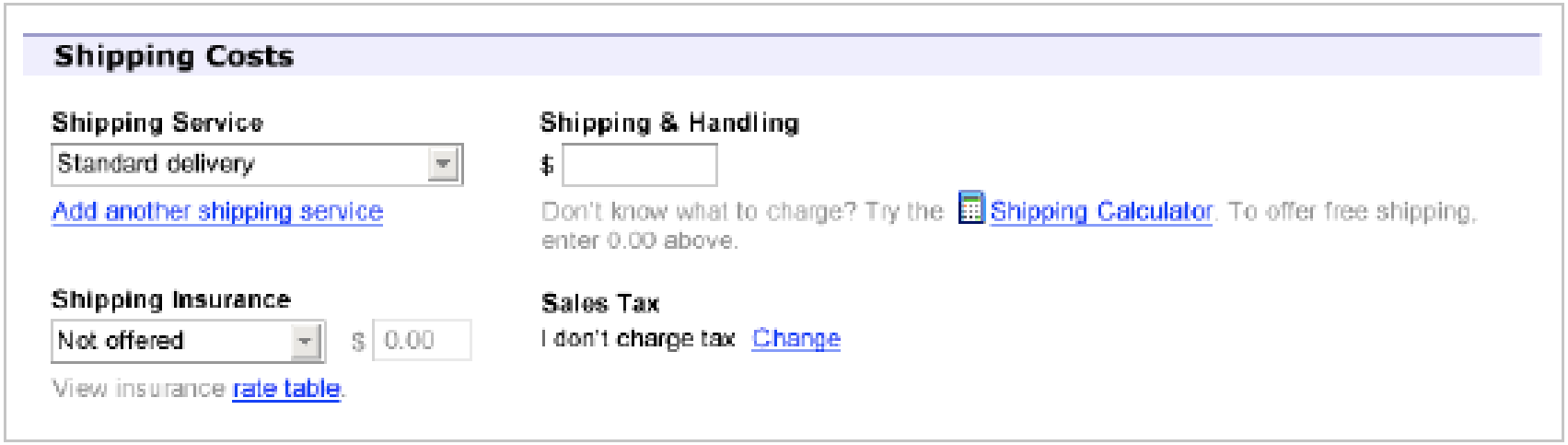
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Flexible inputs



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Smart Defaults



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Path to Completion: Best Practice

- Remove all unnecessary data requests
- Enable smart defaults
- Employ flexible data entry
- Illuminate a clear path to completion
- For long forms, show progress & save

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Tabbing: Best Practice

- Remember to account for tabbing behavior
- Use the tabindex attribute to control tabbing order
- Consider tabbing expectations when laying out forms

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Progressive disclosure: Best Practice

- Not all users require all available options all the time
- Progressive disclosure provides additional options when appropriate
  - Advanced options
  - Gradual engagement

- Most effective when user-initiated
- Maintain a consistent approach

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

FEEDBACK

- Inline validation
  - Assistance
- Errors
  - Indication & Resolution
- Progress
  - Indication
- Success
  - Verification

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Inline validation

- Provide direct feedback as data is entered
  - Validate inputs
  - Suggest valid inputs
  - Help users stay within limits

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Inline validation - Example

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Inline validation: Best practice

- Use inline validation for inputs that have potentially high error rates
- Use suggested inputs to disambiguate
- Communicate limits

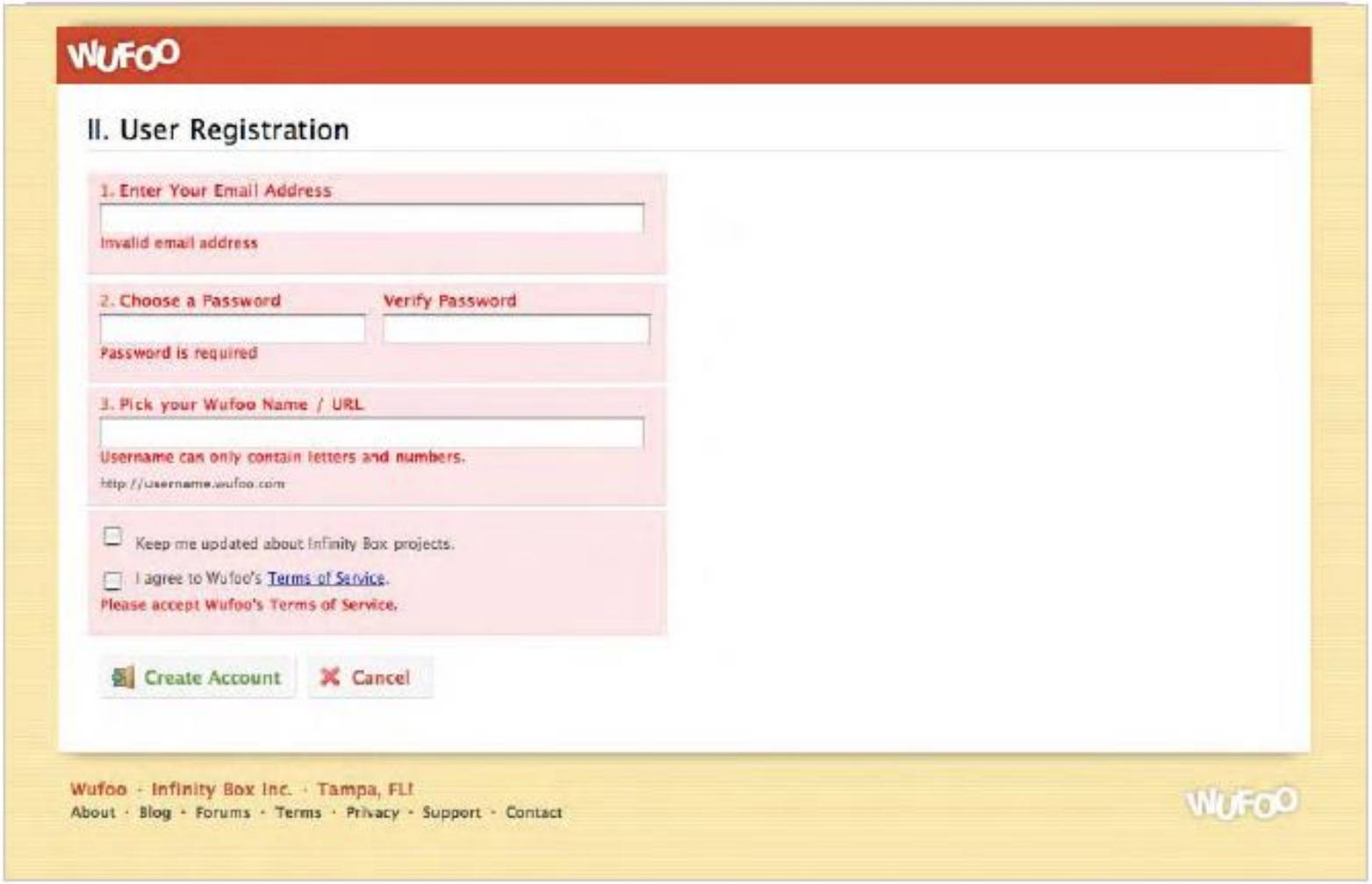
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Error handling

- Errors are used to ensure all required data is provided and valid
  - Clear labels, affordances, help/tips & validation can help reduce errors
- But some errors may still occur
- Provide clear resolution in as few steps as possible

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Error handling - Example



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Error handling: Best practice

- Clearly communicate an error has occurred: top placement, visual contrast
- Provide actionable remedies to correct errors
- Associate responsible fields with primary error message
- "Double" the visual language where errors have occurred

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Progress

- Sometimes actions require some time to process
  - Form submission
  - Data calculations
  - Uploads
- Provide feedback when an action is in progress

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Progress - Example

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Progress: Best practice

- Provide indication of tasks in progress
- Disable "submit" button after user clicks it to avoid duplicate submissions

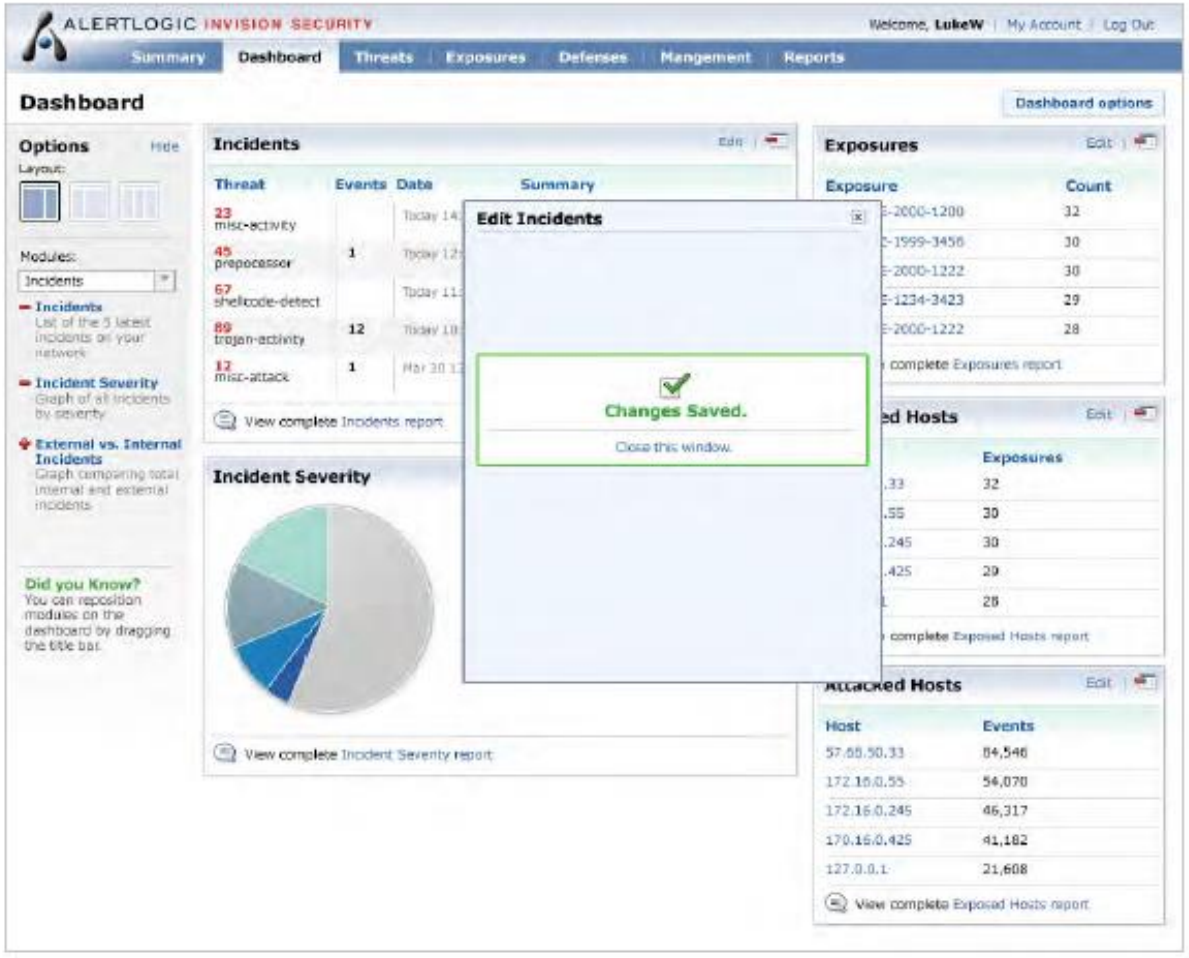
Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Successful completion

- After successful form completion confirm data input in context
  - On updated page
  - On revised form
- Provide feedback via
  - Message (removable)
  - Animated Indicator

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Successful completion - Example



Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133

Successful completion: Best Practice

- Clearly communicate a data submission has been successful
- Provide feedback in context of data submitted

Ref: http://www.slideshare.net/lukew/best-practices-for-form-design-81133