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CS 469 / CS 569: Special Topics in Computer Science: Human-Computer Interaction

Fluid Navigation

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Fluid Navigation

Topics

1. Introduction
2. Navigation by selection
3. Small displays
4. Content Organization
5. Audio menus
6. Form fill-in and dialog boxes

Introduction (1 of 2)

⌘ Navigation

- ⌘ Enables users to know where they are and to steer themselves to their intended destination
- ⌘ Is about getting work done or having fun through a series of actions, much like sailors who steer their boat to a harbor
- ⌘ Is key to:
 - ⌘ successfully operating interactive applications, such as installing a mobile app, completing an on-line survey, or purchasing a train ticket (**task navigation**)
 - ⌘ finding information on a website or browsing social media (**web navigation**)
 - ⌘ finding the action needed in a desktop application (**command menu navigation**)

Introduction (2 of 2)

⌘ Navigation

- ⌘ Note that even if a designer uses slick graphical menus, elegant form fill-in, or well known gestures **there is no guarantee** that the interface will be appealing and easy to use
- ⌘ Effective interfaces emerge only after careful consideration of and testing for numerous design issues, such as:
 - ⌘ task-related organization
 - ⌘ phrasing of items
 - ⌘ sequence of items
 - ⌘ graphic layout and design
 - ⌘ responsive design to adapt to various sizes of devices
 - ⌘ shortcuts for knowledgeable frequent users
 - ⌘ online help and error correction

Navigation By Selection (1 of 8)

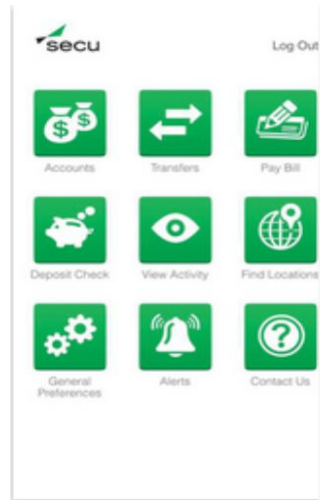
- ❧ Menu bars, pop-up menus, toolbars, palettes and ribbons
- ❧ Shortcuts and gestures for rapid interaction
- ❧ Long lists
- ❧ Linear versus simultaneous presentation

For an extra \$5
you can add a gift wrap
selected from dozens of choices

Add gift wrap

No thanks

Sample menus



Navigation By Selection (2 of 8)

☞ Radio Buttons and Checkboxes

Does anyone in your household currently smoke?

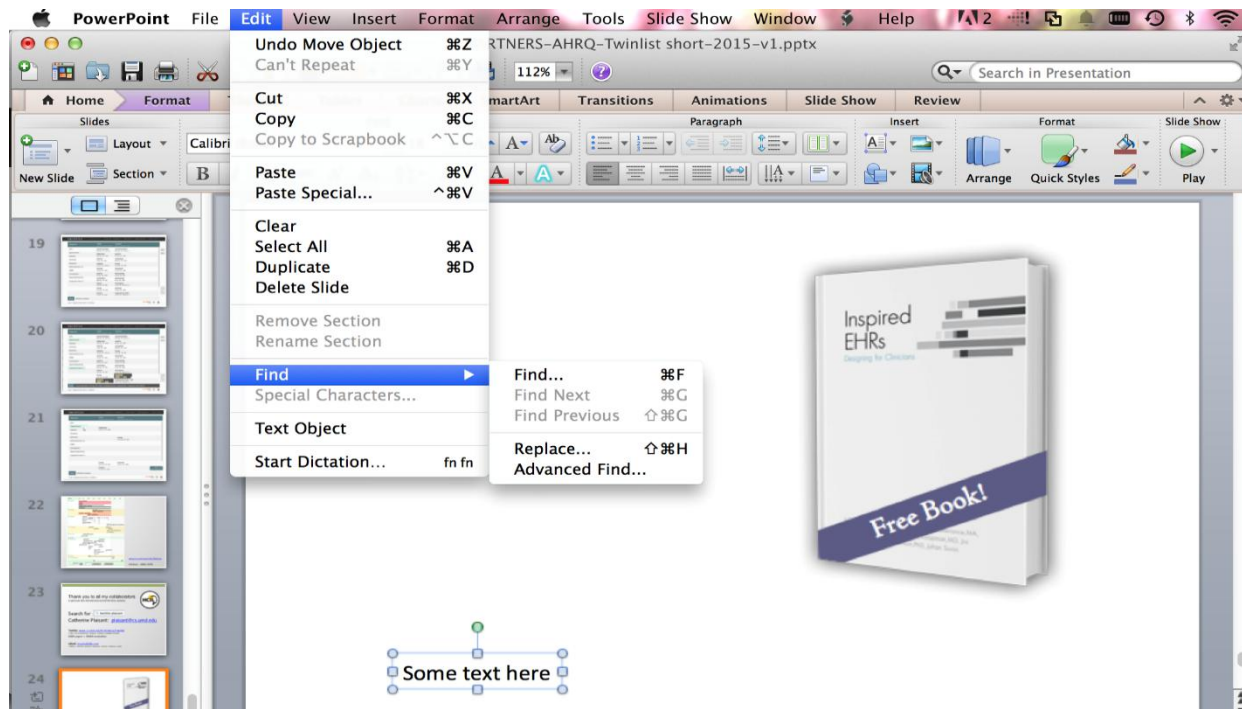
- ☐ Yes, someone does
- ☒ No, no one does
- ☐ Not sure

What treatment would you like to discuss with a nurse?

- ☐ Surgery
- ☒ Physical therapy
- ☒ Medication
- ☐ Acupuncture (not available in your area)

Navigation By Selection (3 of 8)

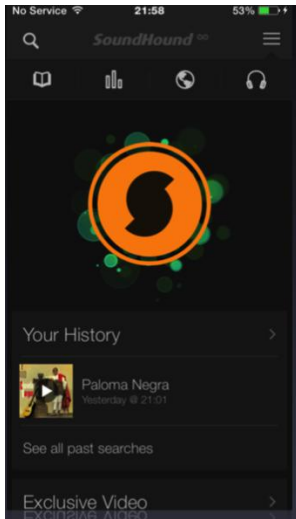
Menu bars, pop-up menus, toolbars, palettes and ribbons



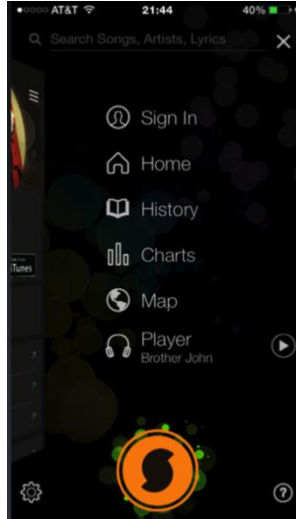
On the top menu bar of Microsoft Powerpoint the Edit cascading pull-down menu (also called pulled-right) is open, followed by the Find menu

Navigation By Selection (4 of 8)

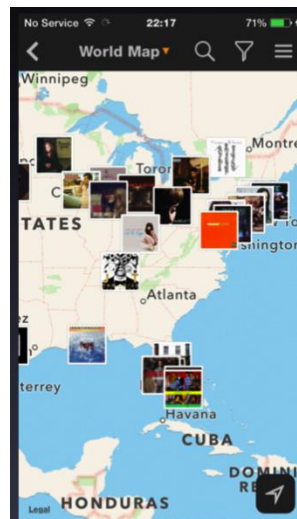
- Menu bars, pop-up menus, toolbars, palettes and ribbons



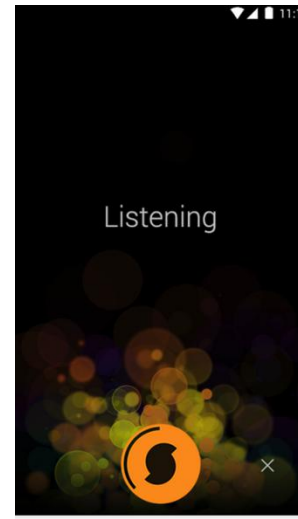
A



B



C



D

- The main menu of Soundhound has only 6 items, but it is still too much to be displayed on every page
- A main menu “hamburger” icon appears at the top right of all appropriate pages, e.g. it appears in A and C, but not in the recording screen D, where only the X close icon is visible

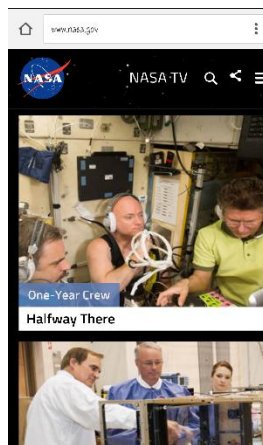
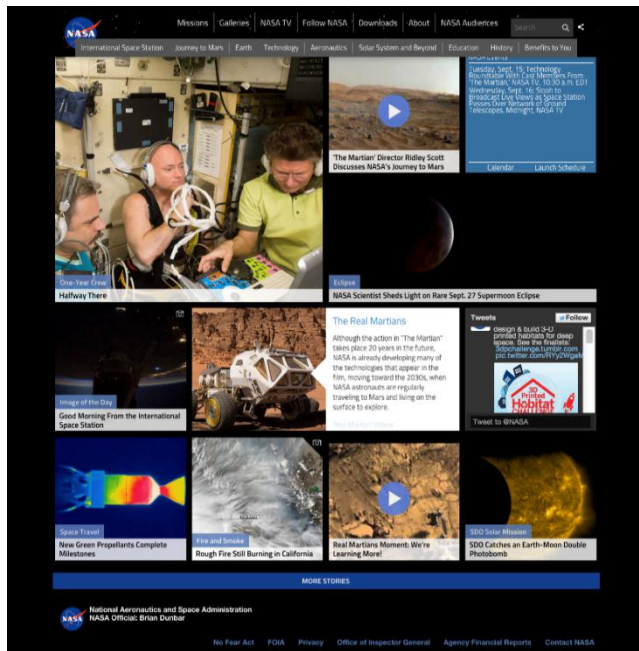
Navigation By Selection (5 of 8)

Examples of common gestures and their effect:

- ✂ Tap: select
- ✂ Long press: varied, from magnified cursor (iOS) to showing a tooltip (Windows 8)
- ✂ Double tap: varied, e.g. zoom (iOS)
- ✂ Small swipe: varied, e.g. move location or order of objects, reveal a delete button
- ✂ Large swipe: usually scroll
- ✂ Rapid swipe or fling: fast scroll with inertia
- ✂ Pinch and spread: zoom in and out
- ✂ Variation with two or more fingers: varied effects

Navigation By Selection (6 of 8)

☞ Menu bars, pop-up menus, toolbars, palettes, and ribbons



- The NASA website on the left consists of a large scrollable two-dimensional menu
 - Below the main menu each square or rectangle is a large button
 - Scrolling gives access to dozens of items easily updated and rearranged
 - This adaptive grid design scales down nicely to the small displays
- Above is the same webpage displayed on an Android phone
 - The grid now appears as a single column of items

Navigation By Selection (7 of 8)

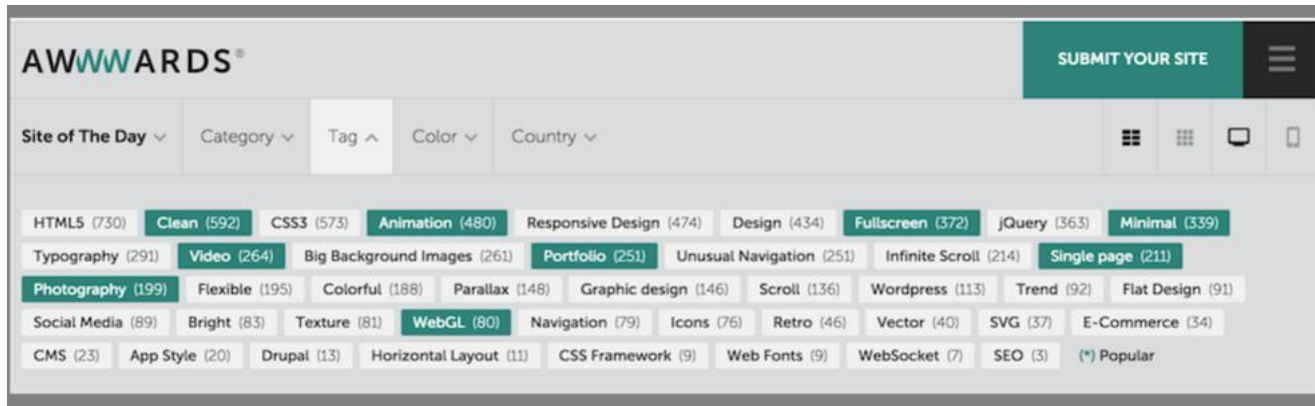
⌘ Menus for long lists

⌘ Sliders and alpha-sliders

- ⌘ When items consist of ranges or numerical values, a slider is a natural choice to allow the selection of a value
- ⌘ The alpha-slider uses multiple levels of granularity in moving the slider thumb and therefore can support tens or hundreds of thousand of items



Navigation By Selection (8 of 8)



Menu bars, pop-up menus, toolbars, palettes and ribbons

- <http://www.awwwards.com> gives awards to a large number of websites, which are tagged
- A tag index at the top of the page displays all the tags, sorted by total count
- The counts are indicated in parenthesis
- The green colored tags are the popular tags that have been selected more often (which most likely will lead to even more selection)

Small Displays (1 of 2)

- Small devices have very focused functionalities and few selectable areas.
- Discoverability is often an issue



Small Displays (2 of 2)

Design considerations for small displays:

- ⌘ Simplify: “less is more”
- ⌘ Strive to reduce or eliminate data entry
- ⌘ Learnability is key
- ⌘ Consider use frequency and importance
- ⌘ Plan for interruptions
- ⌘ Use of contextual information
- ⌘ Make clear what is selectable and what is not
- ⌘ Leave room for scroll and swipe gestures to avoid inadvertent actions
- ⌘ Consider relegating less important functions to other platforms



Content Organization (1 of 8)

✂ Organizing menus in a meaningful structure results in faster selection time and higher user satisfaction

✂ Approaches:

✂ Linear sequence (e.g. in a wizard or survey)

✂ Hierarchical structure that is natural and comprehensible (e.g. a store split into departments)

✂ Network structure when choices may be reachable by more than one path (e.g. websites)

Content Organization (2 of 8)

⌘ Content organization design:

⌘ **Tree-structure**: designers can form categories of similar items, e.g. online grocery markets divided into produce, meat, dairy, etc. further divided into vegetables, fruit, etc. for produce, and milk, cheese, etc. for dairy

⌘ **Breadth versus depth**: the depth (number of levels) of a menu tree depends in part on the breadth (number of items per level)

⌘ **Networks**: choices may be reachable by more than one path, e.g. websites for online shopping that provide access to banking information from both the personal profile and the checkout section of a link

Content Organization (3 of 8)

✂ In the REI website, the categories for “Cycle” are expanded all at once below the top menu, showing 34 items organized in a meaningful h

The screenshot shows the REI website's navigation and product layout. At the top, a horizontal menu includes links like 'Help', 'Wish List', 'Gift Registry', 'Classes & Events', 'Store Locator', and 'Checkout'. Below this is the REI logo and a search bar. A secondary navigation bar contains links for 'SHOP REI', 'SHOP REI OUTLET', 'TRAVEL WITH REI', 'LEARN', 'BLOG', 'MEMBERSHIP', and 'STEWARDSHIP'. The 'Cycle' category is selected, and its sub-categories are expanded: 'Bikes', 'Cycling Clothing', 'Bike Accessories', and 'Bike Components'. A promotional banner for 'GIVE THE GIFT OF GEAR' is also visible. Below the navigation, a grid of product cards is displayed, each featuring a product image, a star rating, the product name, price range, and a 'Compare' button. A sidebar on the left provides filters for 'Features' (e.g., Moisture wicking, Quick drying) and 'Brand' (e.g., 686).

h

▼ Help Wish List Gift Registry Classes & Events Store Locator 0 Checkout

Welcome to REI! | [Log In](#) or [Register](#)

FREE SHIPPING With \$50 minimum purchase.

REI

Find great gear and clothing

SHOP REI SHOP REI OUTLET TRAVEL WITH REI LEARN BLOG MEMBERSHIP STEWARDSHIP

Camp & Hike Climb **Cycle** Fitness Run Paddle Snow Travel Men Women Kids Footwear More **Deals**

Bikes
Mountain Bikes
Road Bikes
Hybrid Bikes
Kids' Bikes

Bike Helmets
Road Helmets
Mountain Bike Helmets
Kids Helmets

Cycling Clothing
Jerseys
Jackets
Shorts
Tights and Pants
Accessories

Cycling Shoes
Road Shoes
Mountain Bike Shoes

Bike Accessories
Computers
Lights
Locks
Pumps
Racks
Trailers
Trainers
Messengers/Backpacks
Panniers/Bike Bags

Bike Components
Brakes
Saddles/Seat Posts
Tires, Tubes and Wheels
Tools and Maintenance
Drivetrain Components
Pedals
Handlebars

GIVE THE GIFT OF GEAR
ANYTIME, ANYWHERE
REI gift & e-gift cards
[Buy now >](#)

Car Racks Novara Cycling Cycling Deals All Cycling

☐ Deals (31)

▼ **Features**

☐ Moisture wicking (27)
☐ Quick drying (26)
☐ Sun-protective fabric (22)
☐ Waterproof (15)
☐ Insulated (11)
☐ Earflaps (6)
☐ Made in USA (5)
[See 8 More](#)

▼ **Brand**

[Clear](#)
☐ 686 (6)

REI Rainwall Rain Jacket - Girls'
\$31.83 - \$64.50
[Compare](#)

REI Rainwall Rain Pants - Kids'
\$49.50
[Compare](#)

REI Sahara Convertible Pants - Girls'
\$44.50
[Compare](#)

ONLY AT REI

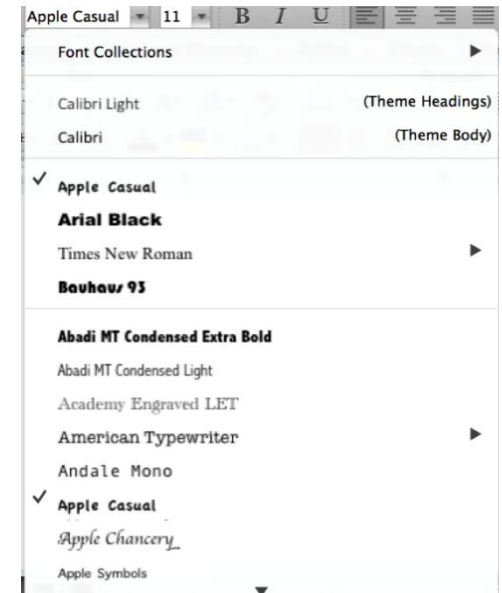
Content Organization (4 of 8)

⌘ Rules for forming menu trees:

- ⌘ Use task semantics to organize menus
- ⌘ Limit the number of levels (i.e. prefer broad - shallow to narrow - deep)
- ⌘ Create groups of logically similar items: e.g. Level 1: countries, Level 2: states, Level 3: cities
- ⌘ Form groups that cover all possibilities: e.g. Age ranges: [0 - 9] [10 - 19] [20 - 29] and [\geq 30]
- ⌘ Make sure that items are non-overlapping: e.g. use “Concerts” and “Sports.” over “Entertainment” and “Events”
- ⌘ Arrange items in each branch by natural sequence (not alphabetically) or group related items
- ⌘ Keep ordering of items fixed (or possibly duplicate frequent items in dedicated section of the menu)

Content Organization (5 of 8)

- ✧ Additional considerations for content organization design include:
 - ✧ sequence, phrasing and layout
- ✧ Typical lists are alphabetically ordered, but categorical lists may be useful
 - ✧ Principles of menu-list sequencing apply, e.g. sequencing menu items by frequency of use can be more useful than sequencing by category or alphabetical order



- Example of adaptive split menus in Microsoft Office
- A font-selection menu lists the theme fonts and then the recently used fonts near the top of the menu (as well as in the full list), making it easier to quickly select the popular fonts
- A thin line separates the sections

Content Organization (6 of 8)

✧ Phrasing:

- ✧ Use familiar and consistent terminology.
 - ✧ Carefully select terminology that is familiar to the designated user community and keep a list of these terms to facilitate consistent use
- ✧ Ensure that items are distinct from one another
 - ✧ Each item should be distinguished clearly from other items. For example, “Slow tours of the countryside,” “Journeys with visits to parks,” and “Leisurely voyages” are less distinctive than are “Bike tours,” “Train tours to national parks,” and

Content Organization (7 of 8)

- ✧ Use consistent and concise phrasing
 - ✧ Review the collection of items to ensure consistency and conciseness. Users are likely to feel more comfortable and to be more successful with “Animal,” “Vegetable,” and “Mineral” than with “Information about animals,” “Vegetable choices you can make,” and “Viewing mineral categories”
- ✧ Bring the keyword to the fore
 - ✧ Try to write menu items such that the first word aids the user in recognizing and discriminating between items -use “Size of type” instead of “Set the type size.” Then, if the first word indicates that this item is not relevant, users can begin

Content Organization (8 of 8)

⌘ Layout

- ⌘ Techniques to indicate position in the menu structure can be useful
- ⌘ The set of headers below from the Library of Congress collections webpages gives a clear indication of progress down the tree
- ⌘ When users want to do a traversal back up the tree or to an adjoining menu at the same level, they will feel confused

BROWSE BY TOPIC
Sports, Recreation & Leisure
Baseball
[Baseball Cards 1887-1914](#)

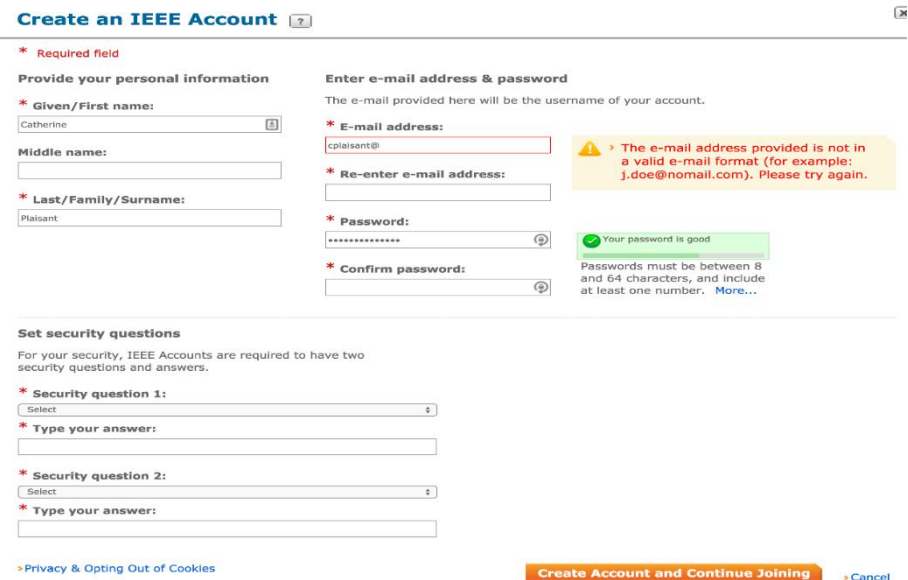
Audio Menus

- ⌘ For Interactive Voice Response (I V R) systems, instruction prompts and lists of options are spoken to users, who respond by using the keys of a keyboard, phone, or by speaking
- ⌘ Complex and deep menu structures should be avoided
 - ⌘ ‘Listen carefully, as our menu options have recently changed’
- ⌘ More in the next chapter

Form Fill-in

- This form fill-in allows users to enter information when joining the IEEE Society
- Fields are grouped meaningfully, and field-specific rules such as password requirements are provided next to the fields
- The data is validated as soon as it is being provided (opposed to being validated when the form is submitted) and error messages are provided next to the problem

✂ (<http://www.ieee.org>)



The screenshot shows the 'Create an IEEE Account' form. It is divided into several sections: 'Provide your personal information', 'Enter e-mail address & password', and 'Set security questions'. The 'Personal information' section has fields for 'Given/First name' (filled with 'Catherine'), 'Middle name', and 'Last/Family/Surname' (filled with 'Plaisant'). The 'Email and password' section has fields for 'E-mail address' (filled with 'cplaisant@'), 'Re-enter e-mail address', 'Password', and 'Confirm password'. A yellow warning box indicates the email is invalid. A green success box shows the password is good. The 'Security questions' section has two questions, each with a dropdown for the question and a text field for the answer. At the bottom, there are links for 'Privacy & Opting Out of Cookies', 'Create Account and Continue Joining', and 'Cancel'.

Create an IEEE Account

* Required field

Provide your personal information

* Given/First name: Catherine

Middle name:

* Last/Family/Surname: Plaisant

Enter e-mail address & password

The e-mail provided here will be the username of your account.

* E-mail address: cplaisant@

* Re-enter e-mail address:

* Password: *****

* Confirm password:

⚠ The e-mail address provided is not in a valid e-mail format (for example: j.doe@nomain.com). Please try again.

✔ Your password is good

Passwords must be between 8 and 64 characters, and include at least one number. [More...](#)

Set security questions

For your security, IEEE Accounts are required to have two security questions and answers.

* Security question 1: Select

* Type your answer:

* Security question 2: Select

* Type your answer:

[Privacy & Opting Out of Cookies](#) [Create Account and Continue Joining](#) [Cancel](#)

Data Entry with Form Fill-in

⌘ Form Fill-in

- ⌘ Appropriate when many fields of data must be entered:
 - ⌘ Full complement of information is visible to user
 - ⌘ Display resembles familiar paper forms
 - ⌘ Few instructions are required for many types of entries
- ⌘ Users must be familiar with:
 - ⌘ Keyboards
 - ⌘ Use of T A B key or mouse to move the cursor
 - ⌘ Error correction methods
 - ⌘ Field-label meanings
 - ⌘ Permissible field contents
 - ⌘ Use of the ENTER and/or RETURN key

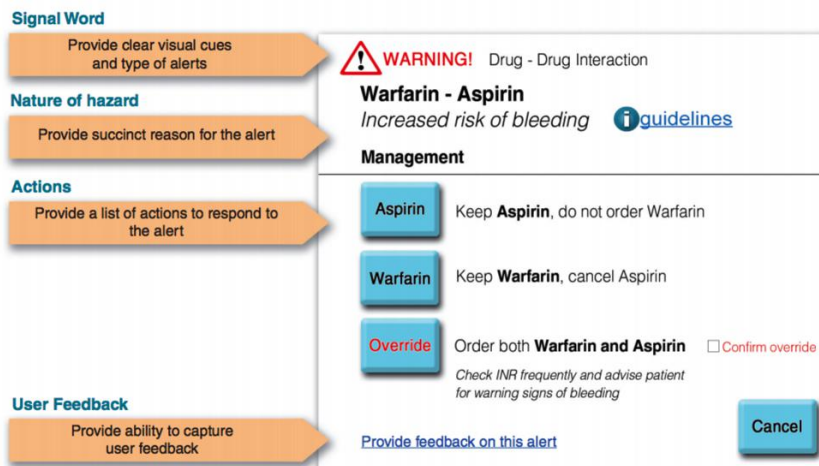
Dialog Boxes (1 of 2)

- This dialog box includes a binary menu with two choices (Yes or No)
- The blue highlighting on Yes indicates that this selection is the default and that pressing Return will select it
- Specific keyboard shortcuts can be made available
- Escape closes the dialog box
- Typing the letter 'N' will select 'No' as indicated by the



Dialog Boxes (2 of 2)

- This dialog box is used to alert clinicians who try to prescribe the drug Warfarin, because it increases the risk of bleeding of patients already on Aspirin
- Several possible actions are proposed
- Overriding the alert is possible but requires confirmation by clicking a check box
- Because of the severity of the alert, this is a modal dialog box and it requires immediate action



Data Entry with Dialog Boxes

(1 of 2)

⌘ Dialog Boxes

- ⌘ Combination of menu and form fill-in techniques
- ⌘ Internal layout guidelines:
 - ⌘ Meaningful title, consistent style
 - ⌘ Top-left to bottom-right sequencing
 - ⌘ Clustering and emphasis
 - ⌘ Consistent layouts (margins, grid, white space, lines, boxes)
 - ⌘ Consistent terminology, fonts, capitalization, justification
 - ⌘ Standard buttons (OK, Cancel)
 - ⌘ Error prevention by direct manipulation

Data Entry with Dialog Boxes

(2 of 2)

⌘ Dialog Boxes

⌘ External Relationship

- ⌘ Smooth appearance and disappearance
- ⌘ Distinguishable but small boundary
- ⌘ Size small enough to reduce overlap problems
- ⌘ Display close to appropriate items
- ⌘ No overlap of required items
- ⌘ Easy to make disappear
- ⌘ Clear how to complete/cancel