CSE 403

UI Prototyping

Refer slides 2-9, 14-23,25-27

Reading:

Paper Prototyping,
C. Snyder

Big questions

- What's the point of prototyping? Should I do it?
  - If so, when in the overall process or "lifecycle" should I?
- Should I make my prototype on paper or digitally?
- How do I know whether my UI is good or bad?
  - What are the ways in which a UI's "quality" can be quantified?
  - What are some examples of software you use that have especially good/bad UIs? What do you think makes them good/bad?

Usability and software design

- **usability**: the effectiveness with which users can achieve tasks in one software environment
  - Studying and improving usability is part of Human-Computer Interaction (HCI).
  - Usability and good UI design are closely related.
  - A bad UI can have unfortunate results...

Achieving usability

- Some methods to achieve good usability:
  - User testing / field studies
    - having users use the product and gathering data
  - Evaluations and reviews by UI experts
  - Card sorting
    - Show users various UI menus and ask them to group the ones that are similar, to see what UI tasks are seen as being related by users.
  - Prototyping
    - Paper prototyping
    - Code prototyping

- Good UI design focuses on the *user*
  - not on the developer or on the system environment

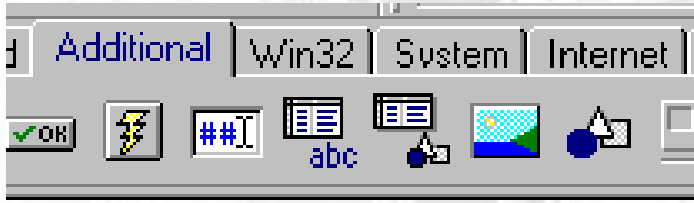
Prototyping

- **prototyping**: Creating a scaled-down or incomplete version of a system to demonstrate or test aspects of it.

- Reasons to do prototyping:
  - aids UI design
  - provides basis for testing
  - team-building
  - allows interaction with user to ensure satisfaction

Some prototyping methods

- UI builders (Visual Studio, ...)
  - draw a GUI visually by dragging/dropping UI controls on screen
- implementation by hand
  - writing a "quick" version of your code



- **paper prototyping**: a paper version of a UI

  Why not just code up a working prototype?

  - much faster to create than code
  - can change faster than code
  - more visual bandwidth (can see more at once)
  - more conducive to working in teams
  - can be done by non-technical people

Where does P.P. fit in?

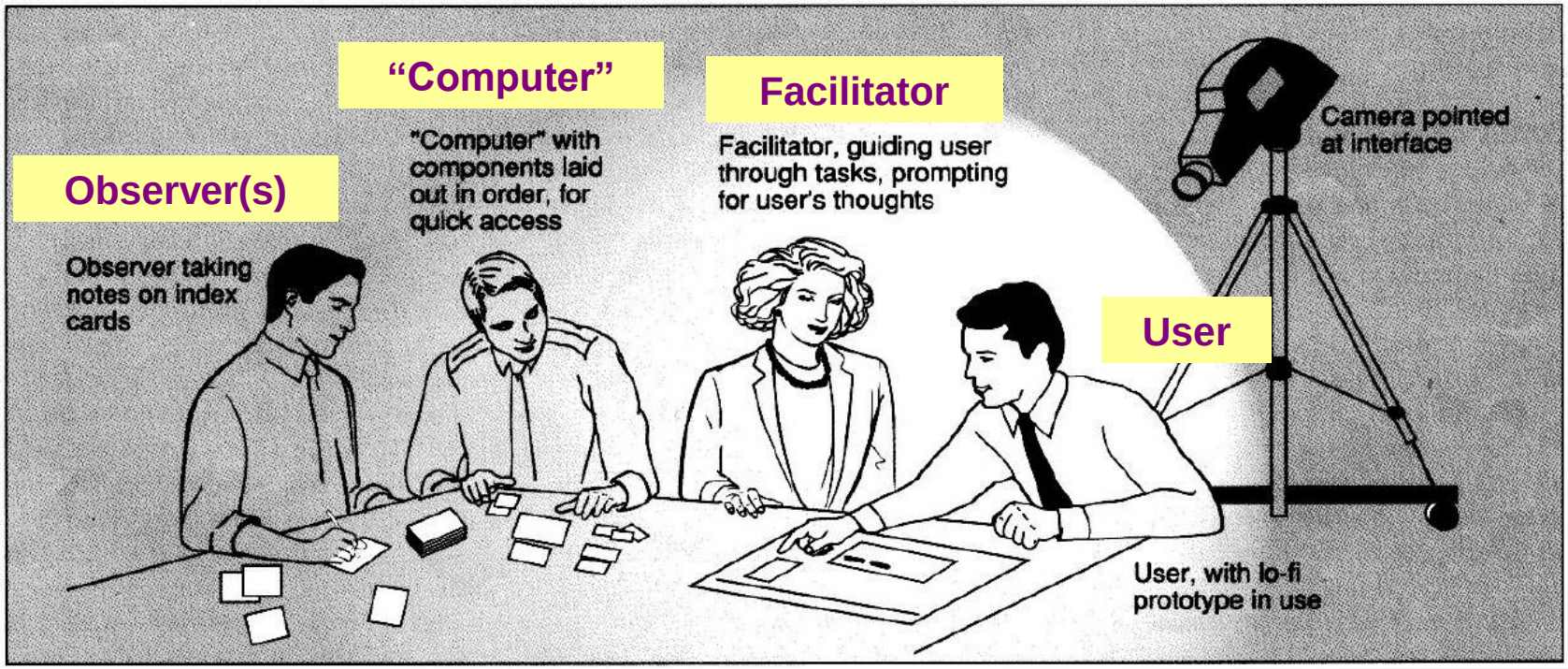
- At what point in the software lifecycle should we do (paper) prototyping? When would it be most useful to do it? Why?

- We talk about requirements being about "what" and design being about "how." Which is paper prototyping?

  - PP helps us uncover requirements and also upcoming design issues
  - do PP during or after requirements; before design
  - "what" vs. "how": PP shows us "what" is in the UI, but it also shows us details of "how" the user can achieve their goals in the UI

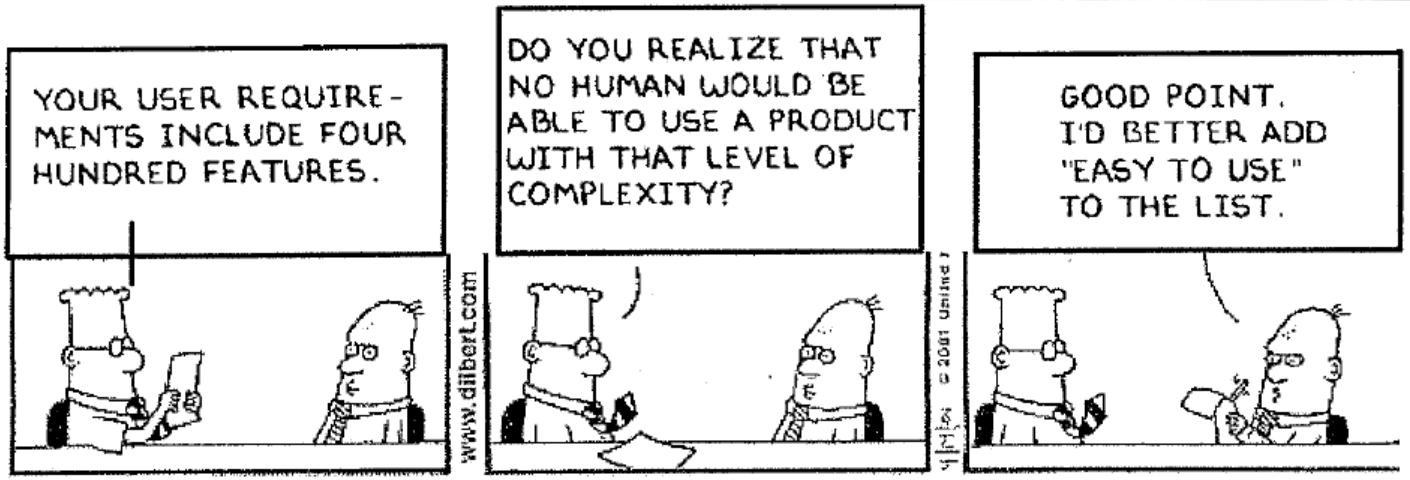
P.P. usability session

- user is given tasks to perform using paper prototype
- session can be observed by people or camera
- one developer can "play computer"



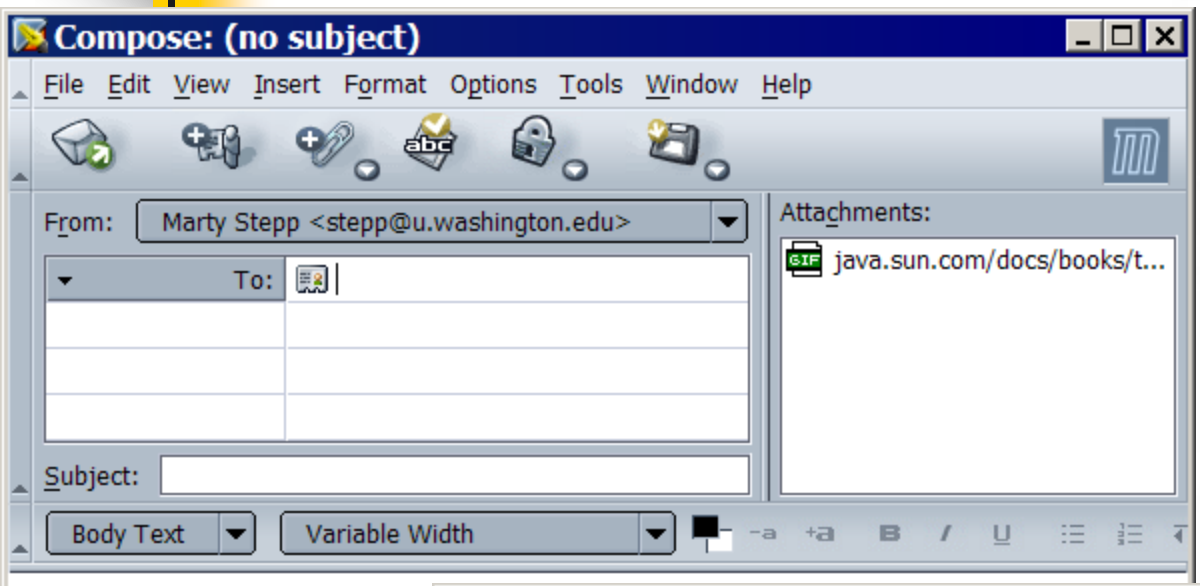
Schneiderman's 8 Golden Rules

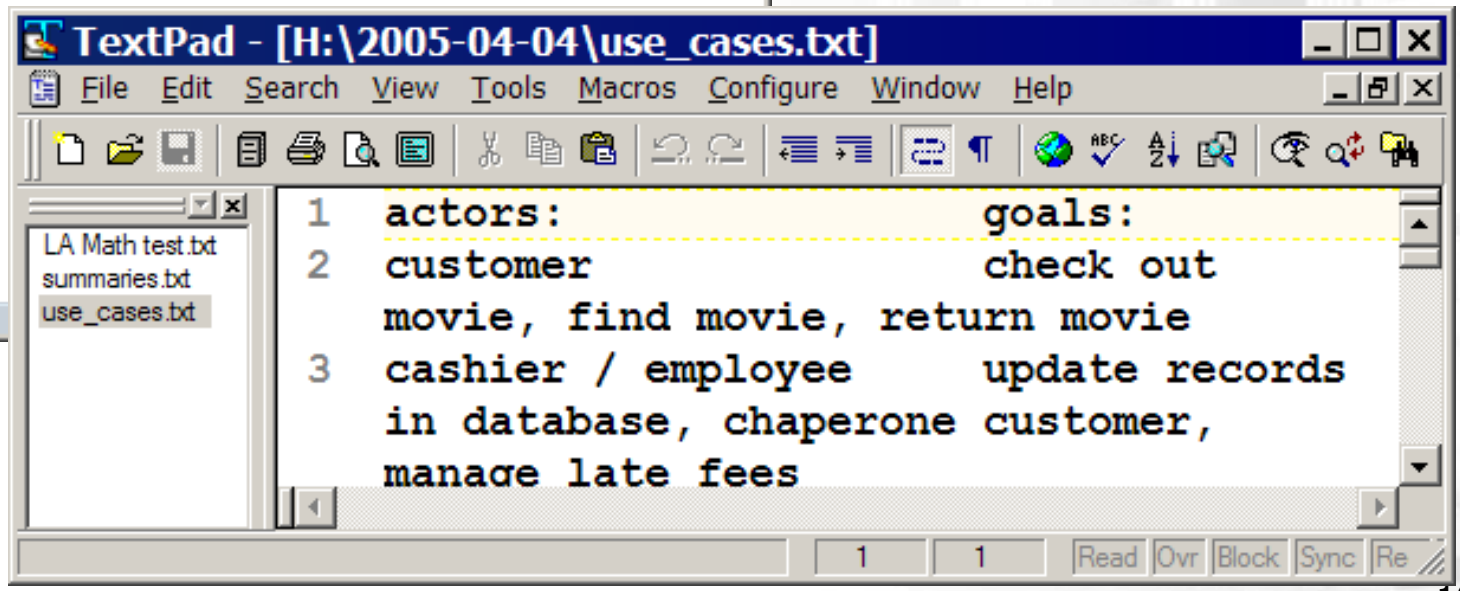
- Strive for consistency.
- Give shortcuts to the user.
- Offer informative feedback.
- Make each interaction with the user yield a result.
- Offer simple error handling.
- Permit easy undo of actions.
- Let the user be in control.
- Reduce short-term memory load on the user.



(from Designing the User Interface, by Ben Schneiderman of UMD, noted HCI and UI design expert)

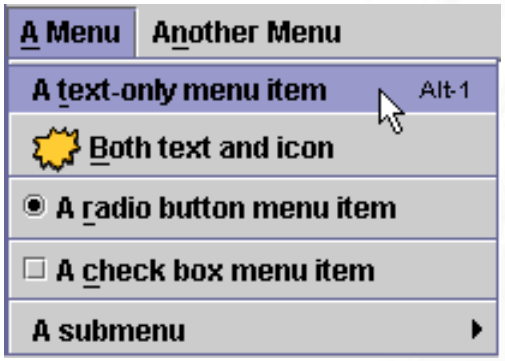
UI design examples

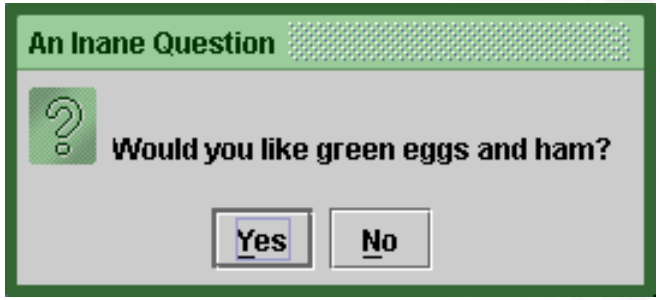


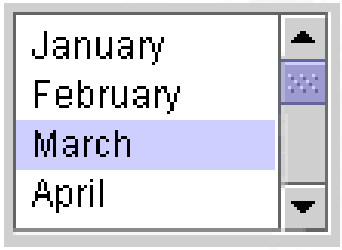


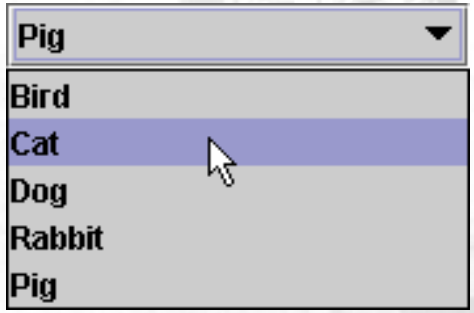
UI design, components

- When should we use:
  - A button?
  - A check box?
  - A radio button?
  - A text field?
  - A list?
  - A combo box?
  - A menu?
  - A dialog box?
  - Other..?

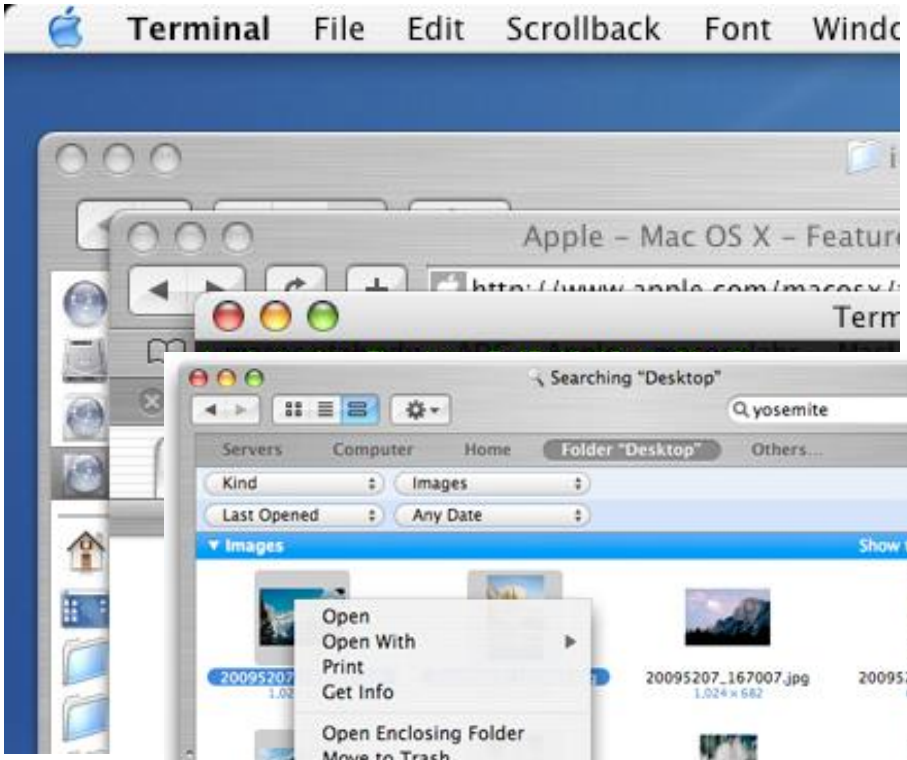


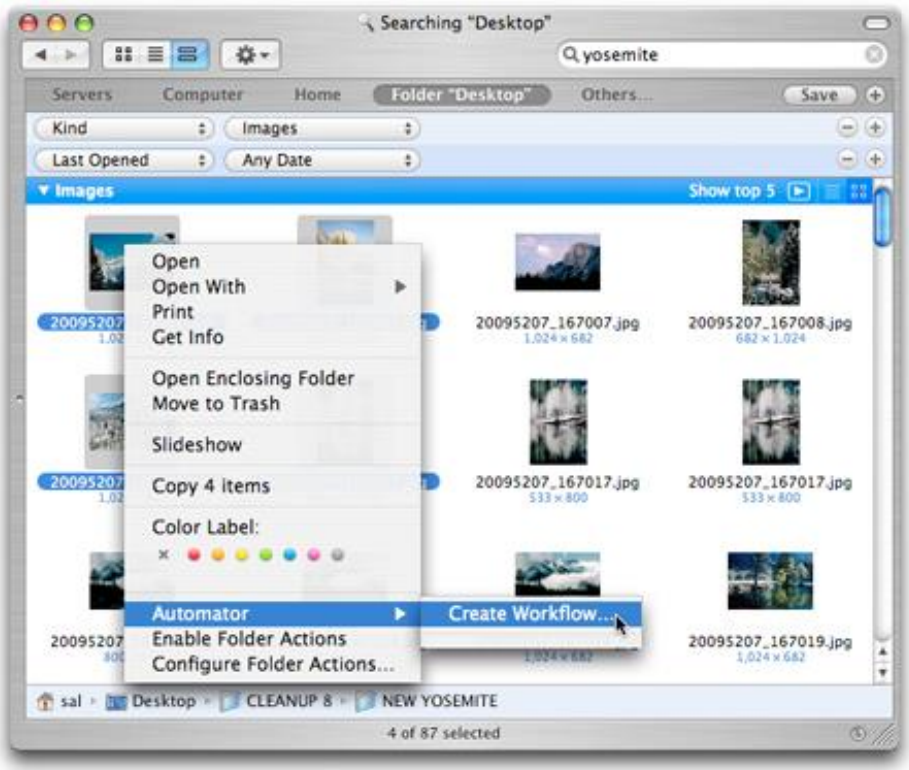






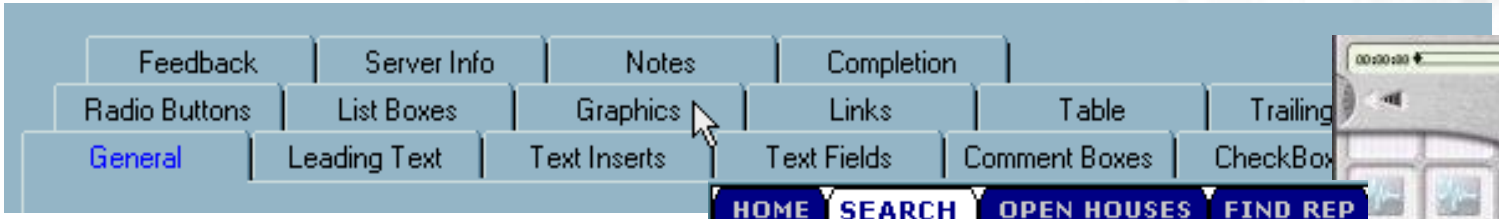
Apple Mac user interfaces

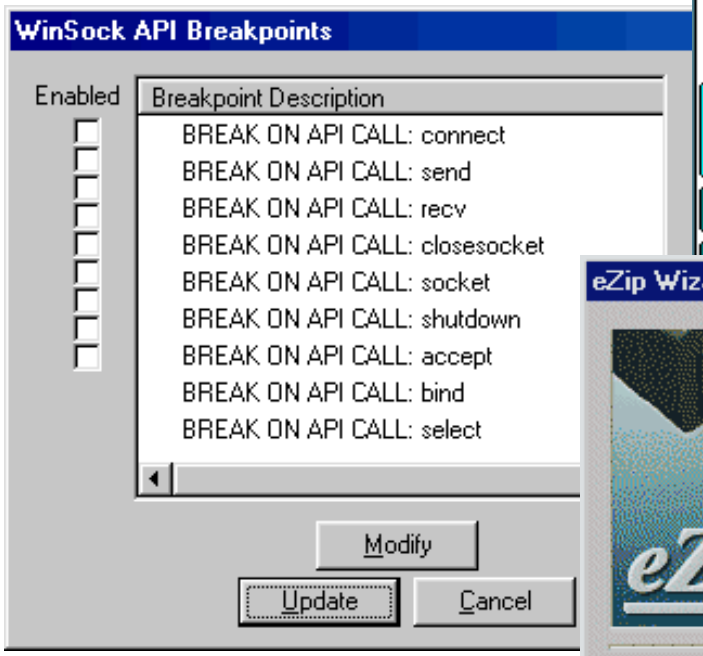


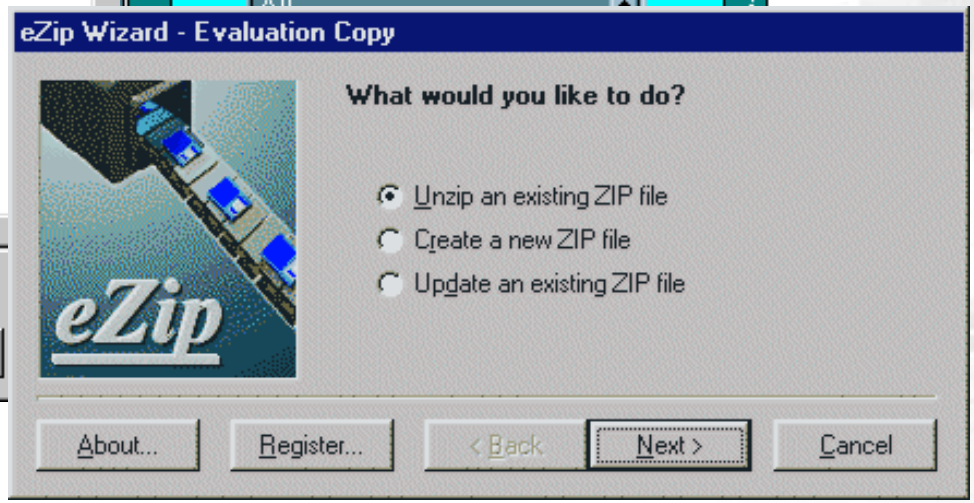


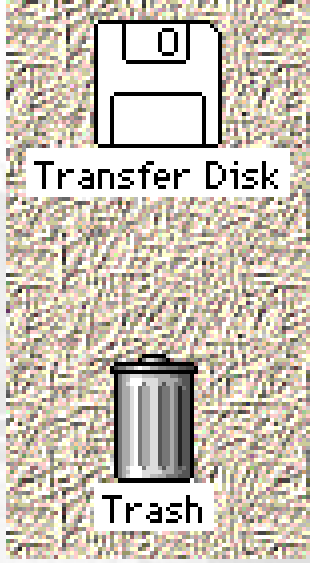
UI Hall of Shame

- http://homepage.mac.com/bradster/iarchitect/shame.htm

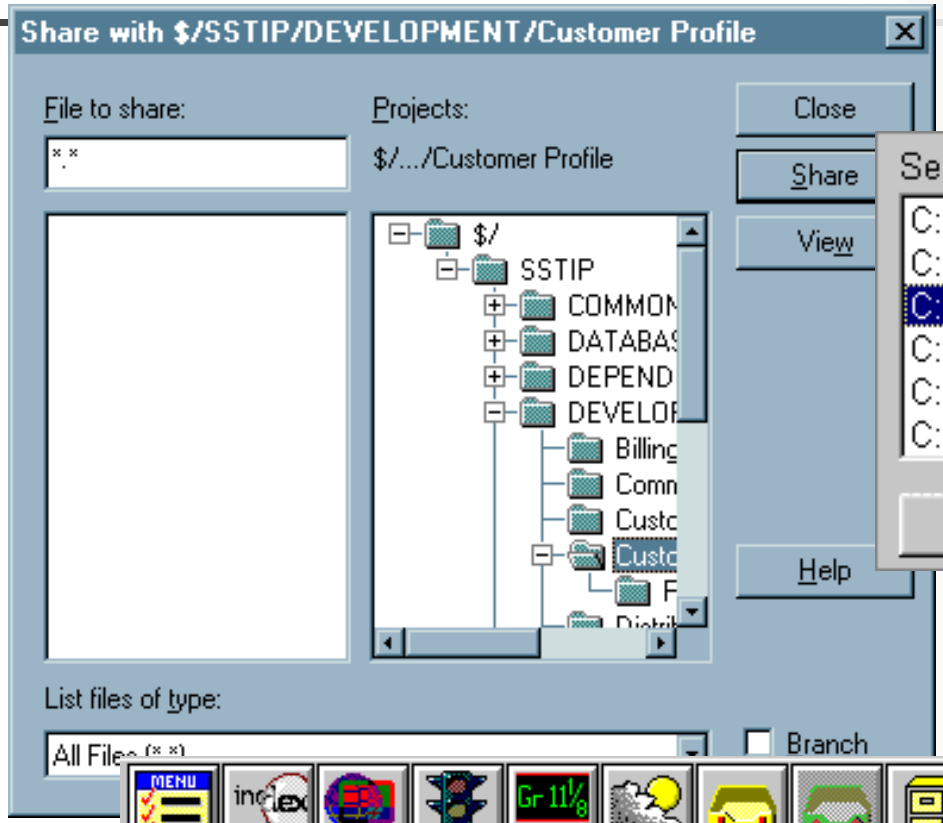


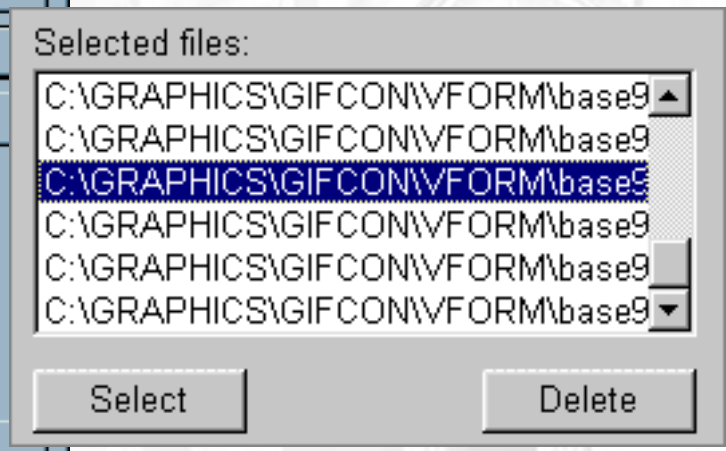


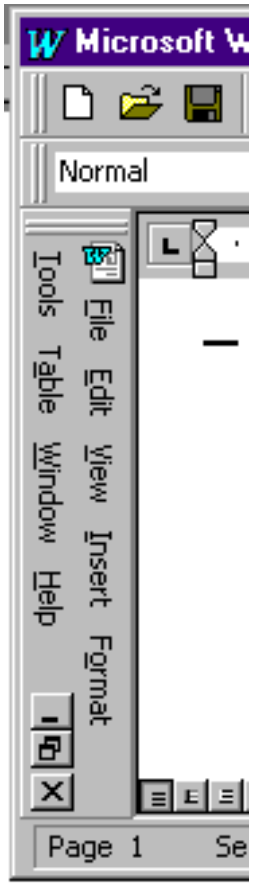




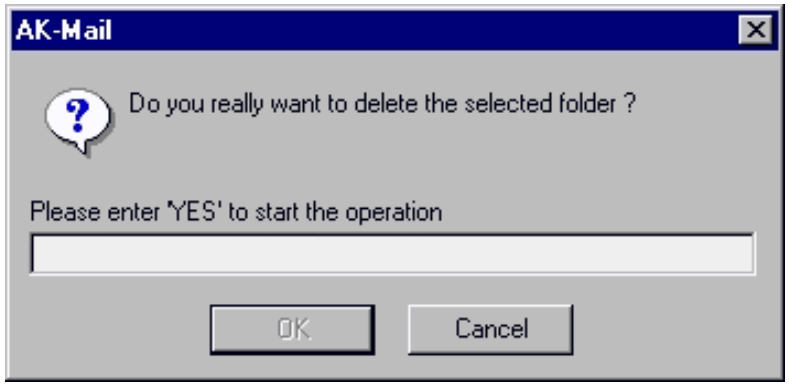
Layout and color

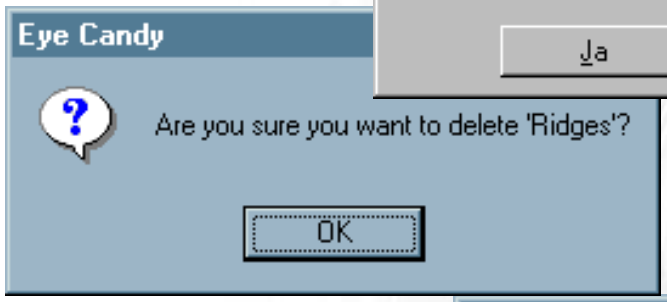


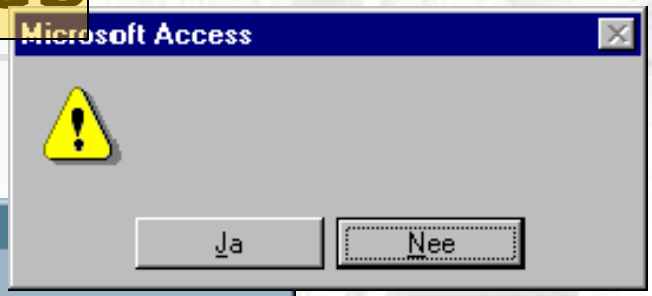


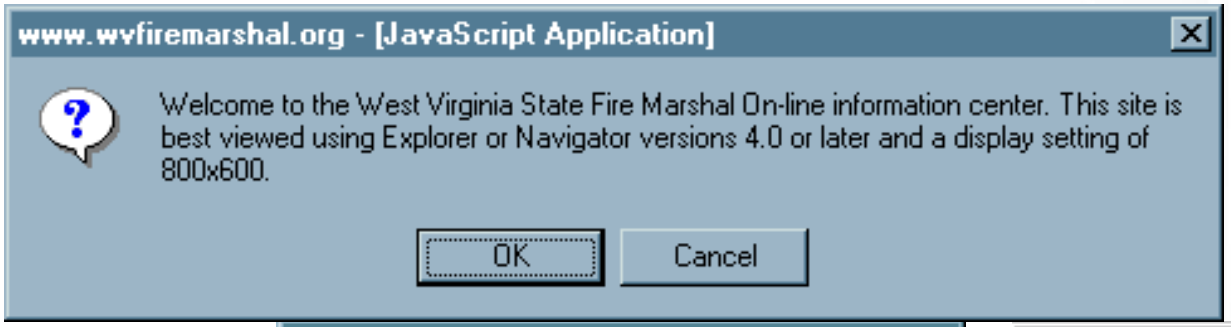


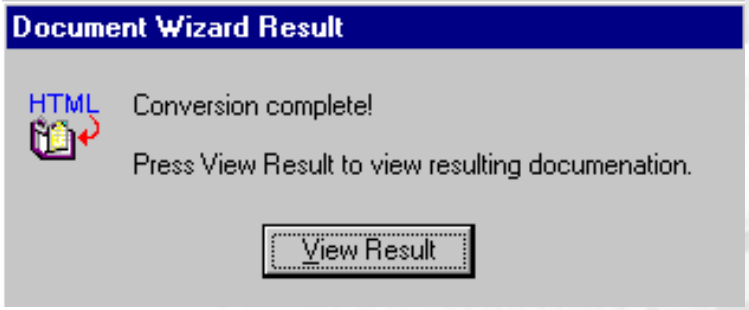
Bad error messages







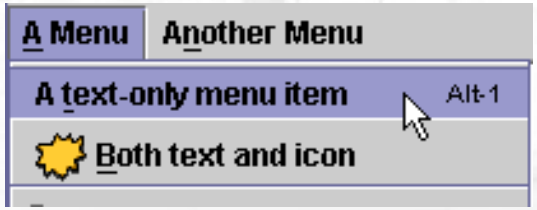




UI design - buttons, menus

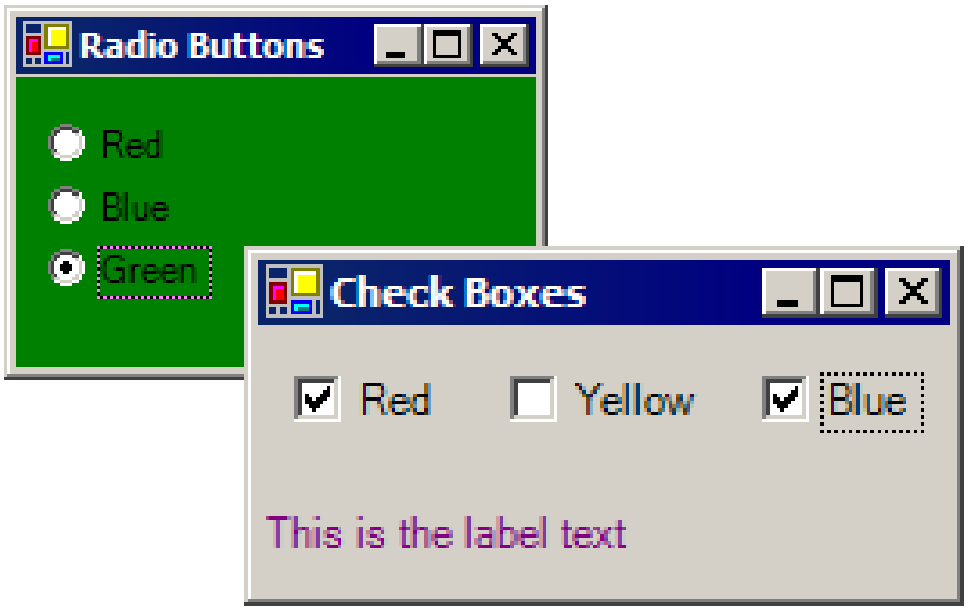
- Use **buttons** for single independent actions that are relevant to the current screen.
  - Try to use button text with verb phrases such as "Save" or "Cancel", not generic: "OK", "Yes", "No"
  - use Mnemonics or Accelerators (Ctrl-S)

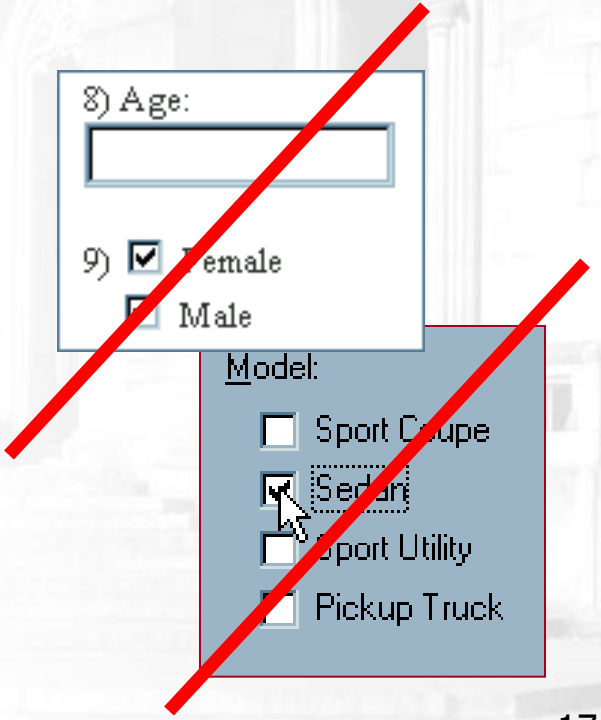
- Use **toolbars** for common actions.
- Use **menus** for infrequent actions that may be applicable to many or all screens.
  - *Users hate menus!* Try not to rely too much on menus. Provide another way to access the same functionality (toolbar, hotkey, etc)



Checkboxes, radio buttons

- Use **check boxes** for on/off switches, when any one switch can be toggled irrespective of the others (often correspond to boolean values).
- Use **radio buttons** for related choices, when only one choice can be activated at a time (often corresponds to enum / constant values).



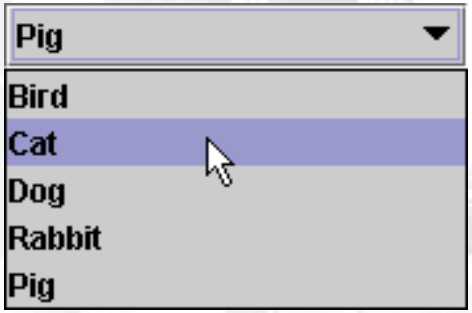


Lists, combo boxes

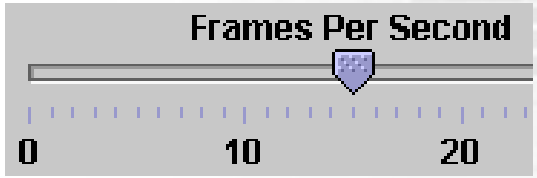
- use **text fields** (usually with a label) when the user may type in anything they want

- use **lists** when there are many fixed choices (too many for radio buttons to be practical) and you want *all* choices visible on screen at once

- use **combo boxes** when there are many fixed choices, but you don't want to take up screen real estate by showing them all at once

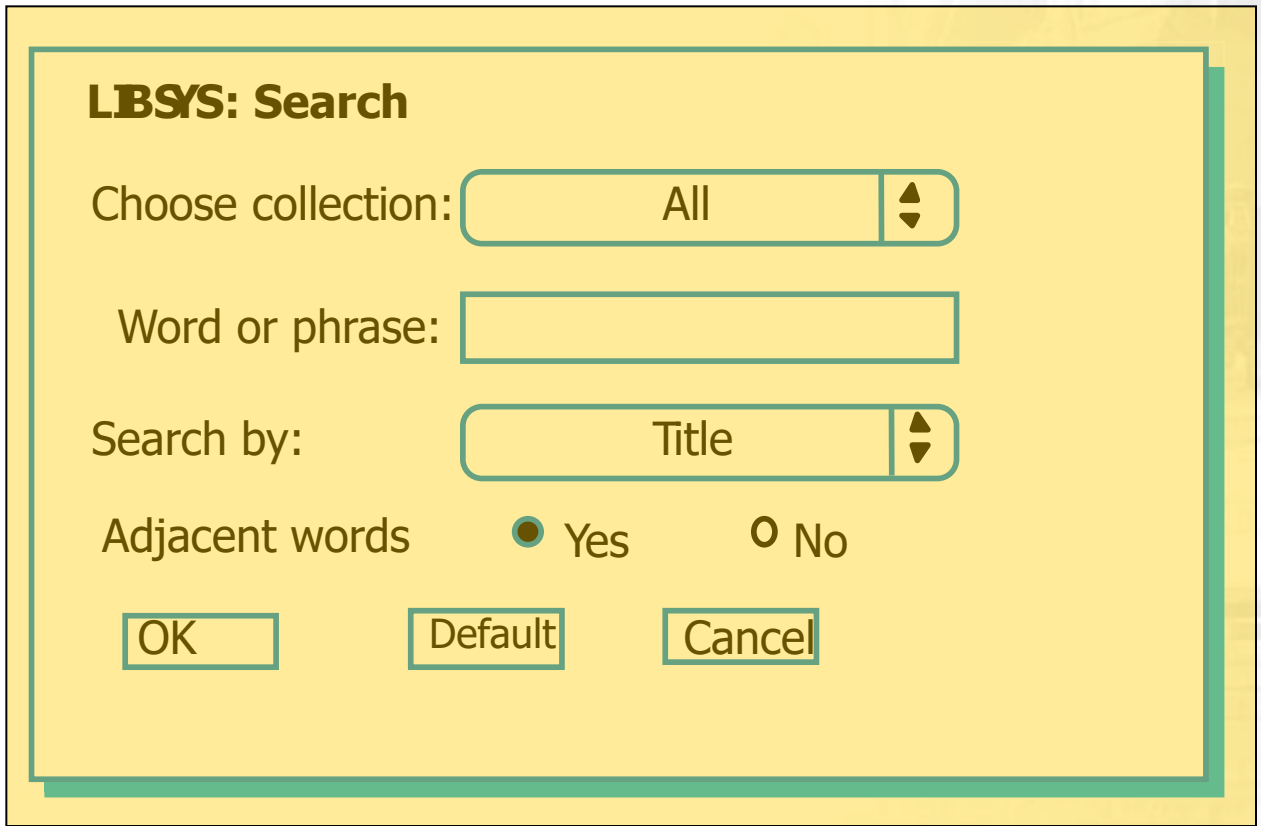


- use a **slider** or **spinner** for a numeric value



An example UI

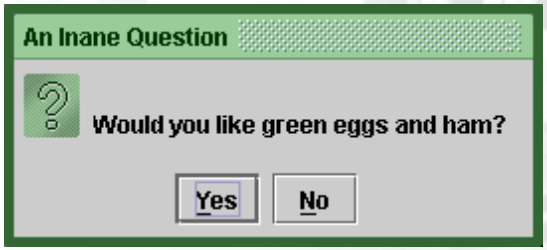
- What can we say about this UI dialog? Did the designer choose the right components?
  - Let's assume there are 20 collections and 3 ways to search (by title, author, relevancy)



UI design - multiple screens

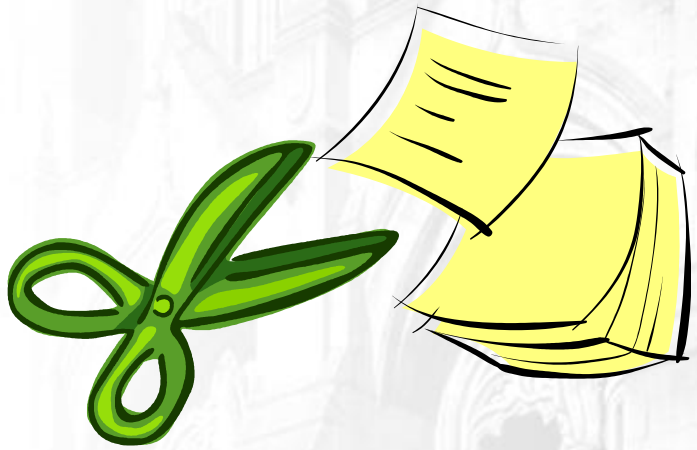
- use a **tabbed pane** when there are many screens that the user may want to switch between at any moment

- use **dialog boxes** or **option panes** to present temporary screens or options



Creating a paper prototype

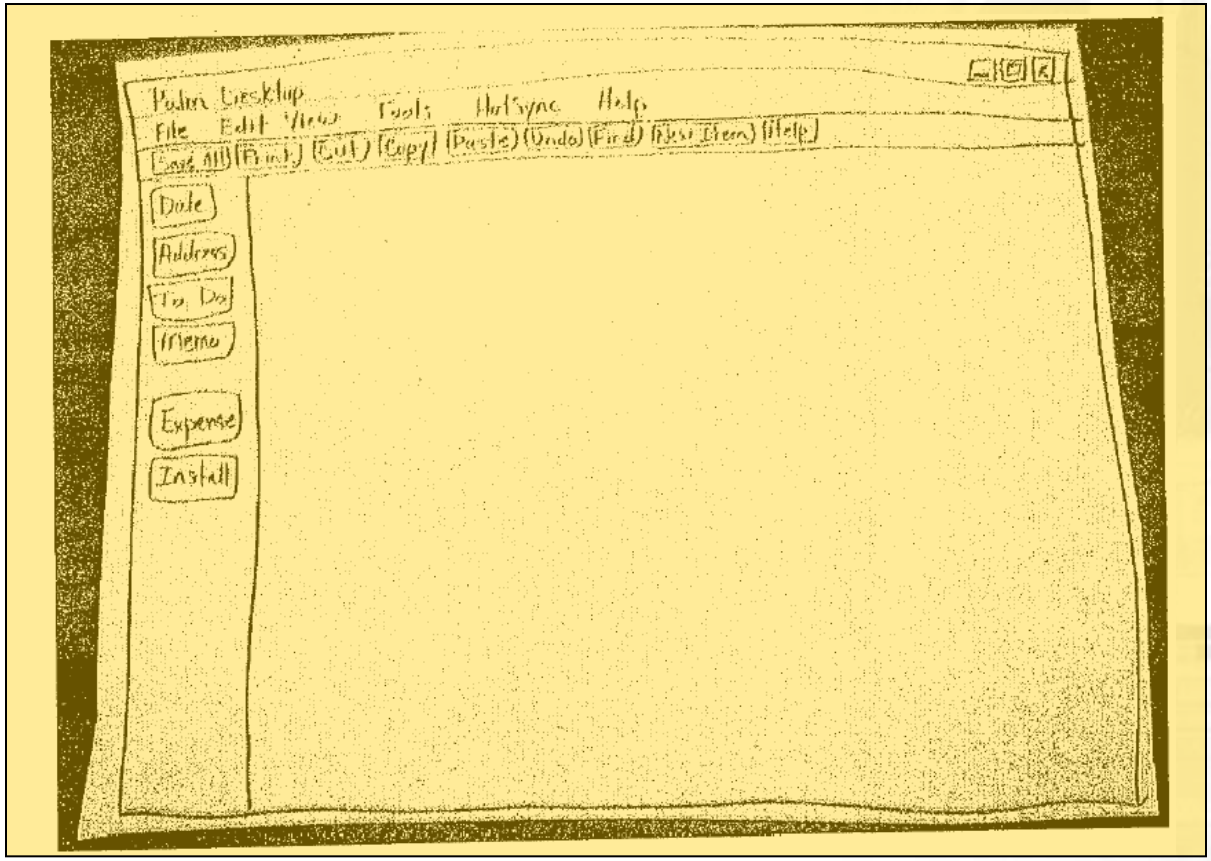
- gather materials
  - paper, pencils/pens
  - tape, scissors
  - highlighters, transparencies



- identify the screens in your UI
  - consider use cases, inputs and outputs to user
- think about how to get from one screen to next
  - this will help choose between tabs, dialogs, etc.

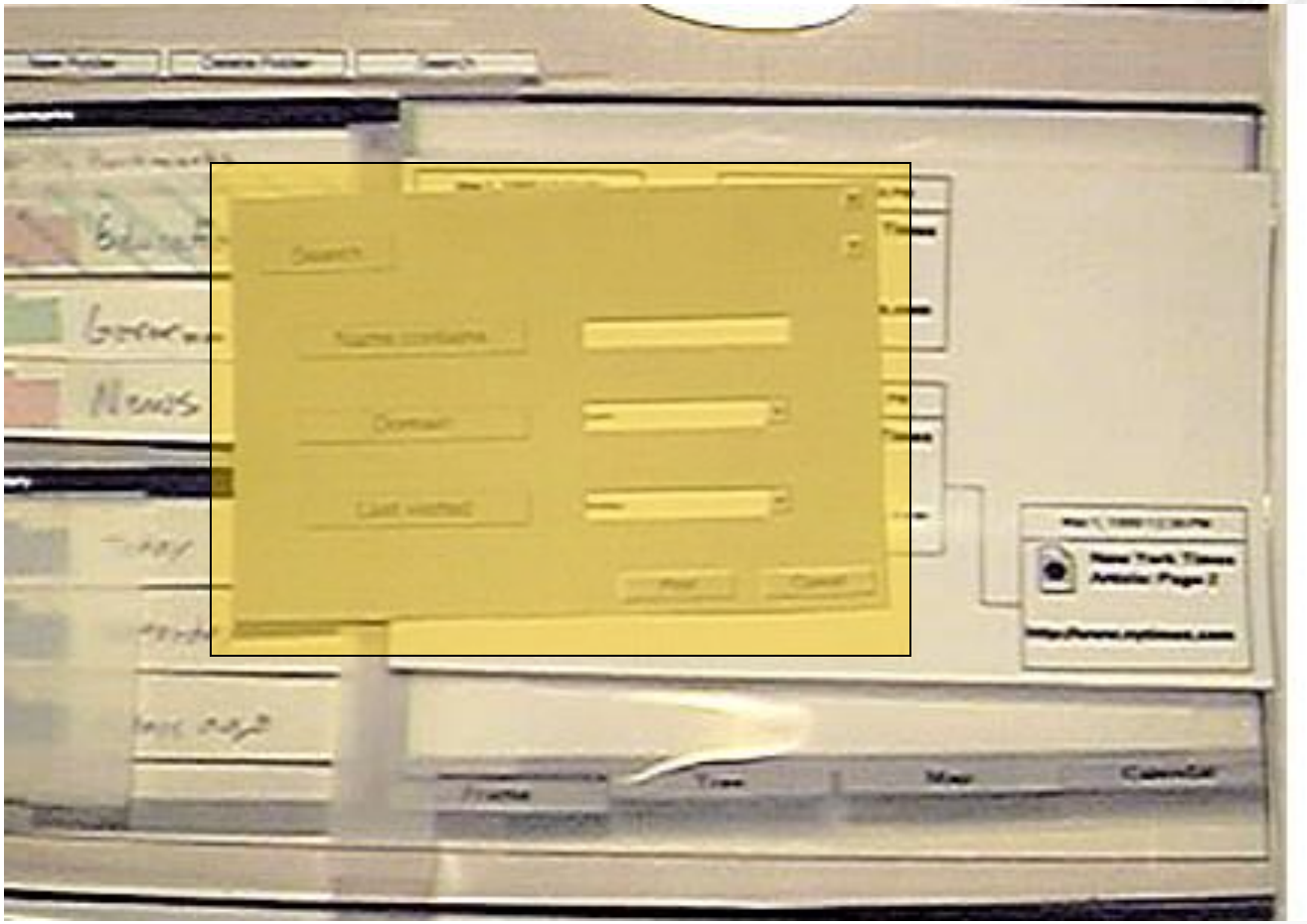
Application backgrounds

- draw the app background (the parts that matter for the prototyping) on its own, then lay the various subscreens on top of it

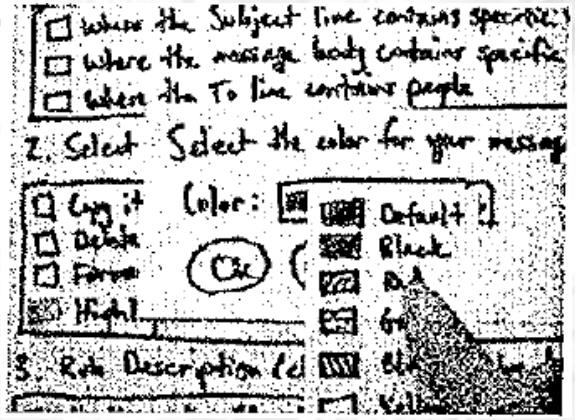


Representing a changing UI

- layers of UI can be placed on top of background as user clicks various options



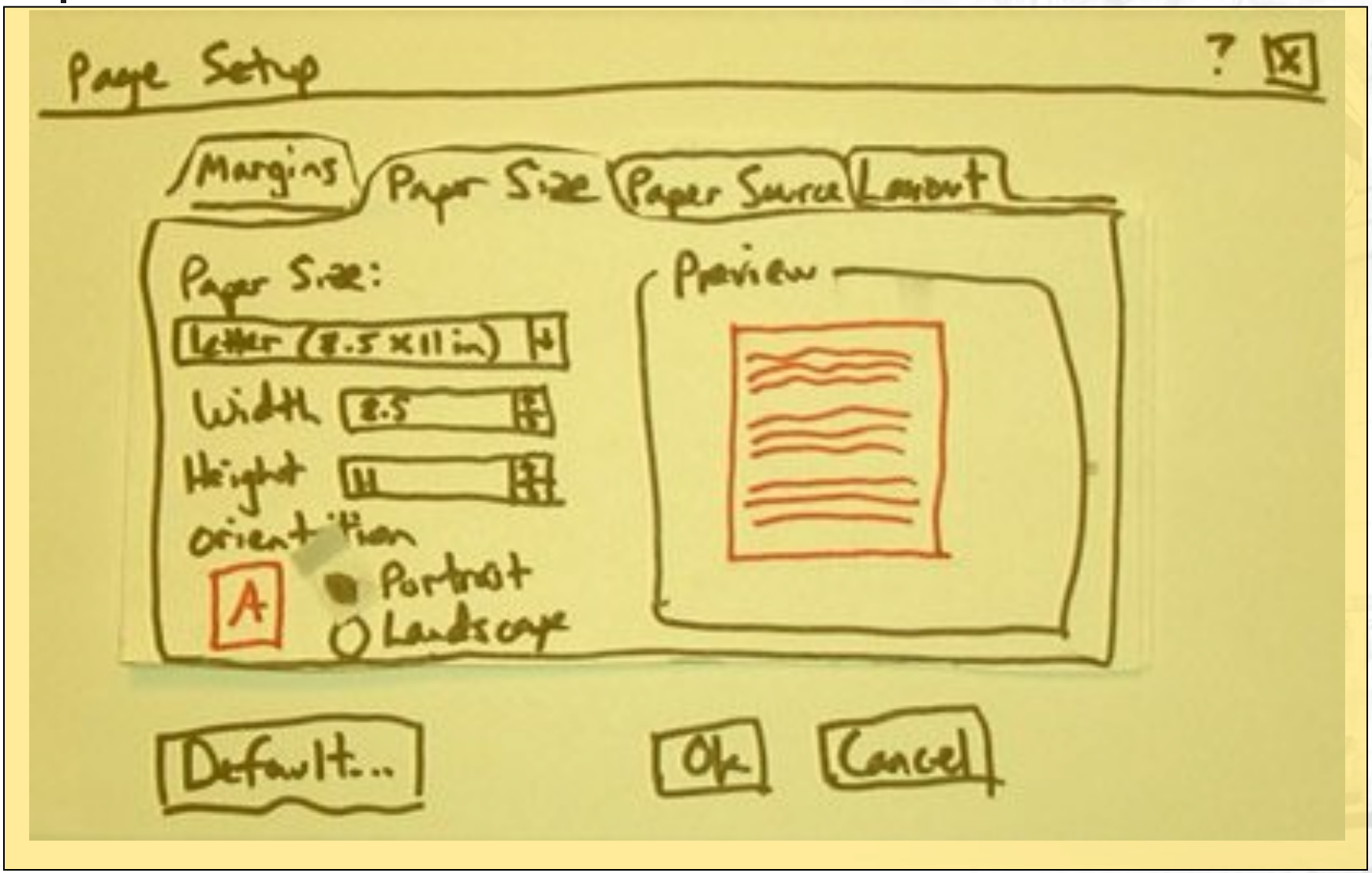
Representing interactive widgets



- buttons / check boxes: tape
- tabs, dialog boxes: index cards
- text fields: removable tape
- combo boxes: put the choices on a separate piece of paper that pops up when they click
- selections: a highlighted piece of tape or transparency
- disabled widgets: make a gray version that can sit on top of the normal enabled version

- computer beeps: say "beep" (hah!)

Example paper prot. screen



Example full paper prototype

Prototyping exercise

- In your project groups, let's draw a rough prototype for a music player (e.g. iTunes).
  - Assume that the program lets you store, organize, and play songs and music videos.
  - Draw the main player UI and whatever widgets are required to do a **search for a song or video**.
  - After the prototypes are done, we'll try walking through each UI together.

- Things to think about:
  - How many clicks are needed? What controls to use?
  - Could your parents figure it out without guidance?