UI prototyping

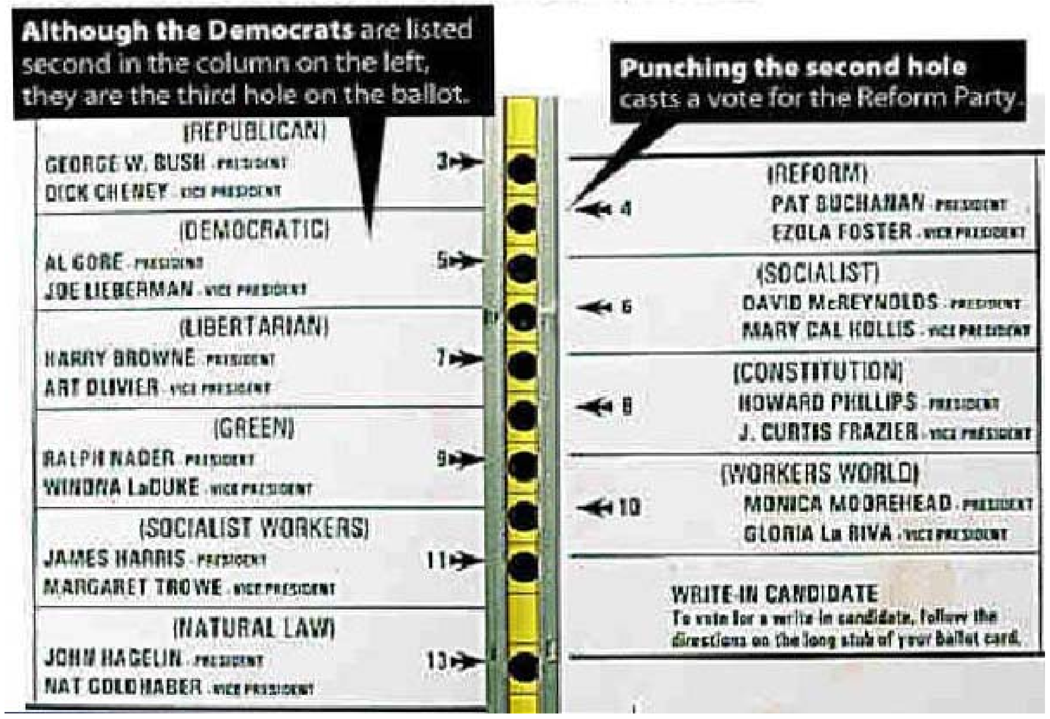
CSE 403

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...



Although the Democrats are listed second in the column on the left, they are the third hole on the ballot.

Punching the second hole casts a vote for the Reform Party.

(REPUBLICAN)
GEORGE W. BUSH - PRESIDENT
DICK CHENEY - VICE PRESIDENT
3

(DEMOCRATIC)
AL GORE - PRESIDENT
JOE LIEBERMAN - VICE PRESIDENT
5

(LIBERTARIAN)
HARRY BROWNE - PRESIDENT
ART OLIVIER - VICE PRESIDENT
7

(GREEN)
RALPH NADER - PRESIDENT
WINONA LaDUKE - VICE PRESIDENT
9

(SOCIALIST WORKERS)
JAMES HARRIS - PRESIDENT
MARGARET TROWE - VICE PRESIDENT
11

(NATURAL LAW)
JOHN HAGELIN - PRESIDENT
NAT GOLDHABER - VICE PRESIDENT
13

4
(REFORM)
PAT BUCHANAN - PRESIDENT
EZOLA FOSTER - VICE PRESIDENT

6
(SOCIALIST)
DAVID McREYNOLDS - PRESIDENT
MARY CAL HOLLIS - VICE PRESIDENT

8
(CONSTITUTION)
HOWARD PHILLIPS - PRESIDENT
J. CURTIS FRAZIER - VICE PRESIDENT

10
(WORKERS WORLD)
MONICA MOOREHEAD - PRESIDENT
GLORIA La RIVA - VICE PRESIDENT

WRITE-IN CANDIDATE
To vote for a write-in candidate, follow the directions on the long stub of your ballot card.

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

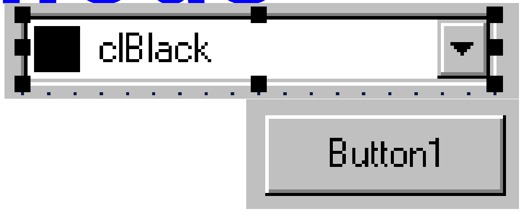
- Good UI design focuses on the *user*
  - not on the developer or on the system environment

Prototyping

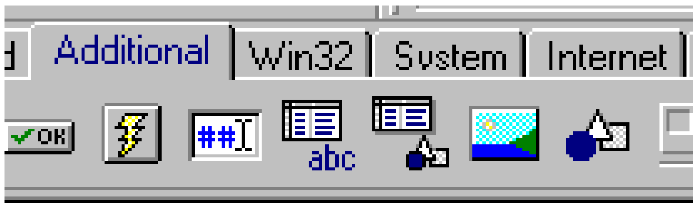
- **prototyping**: Creating a scaled-down or incomplete version of a system to demonstrate or test aspects of it.

- 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
  - feels less permanent or final

Where does paper prototyping fit?

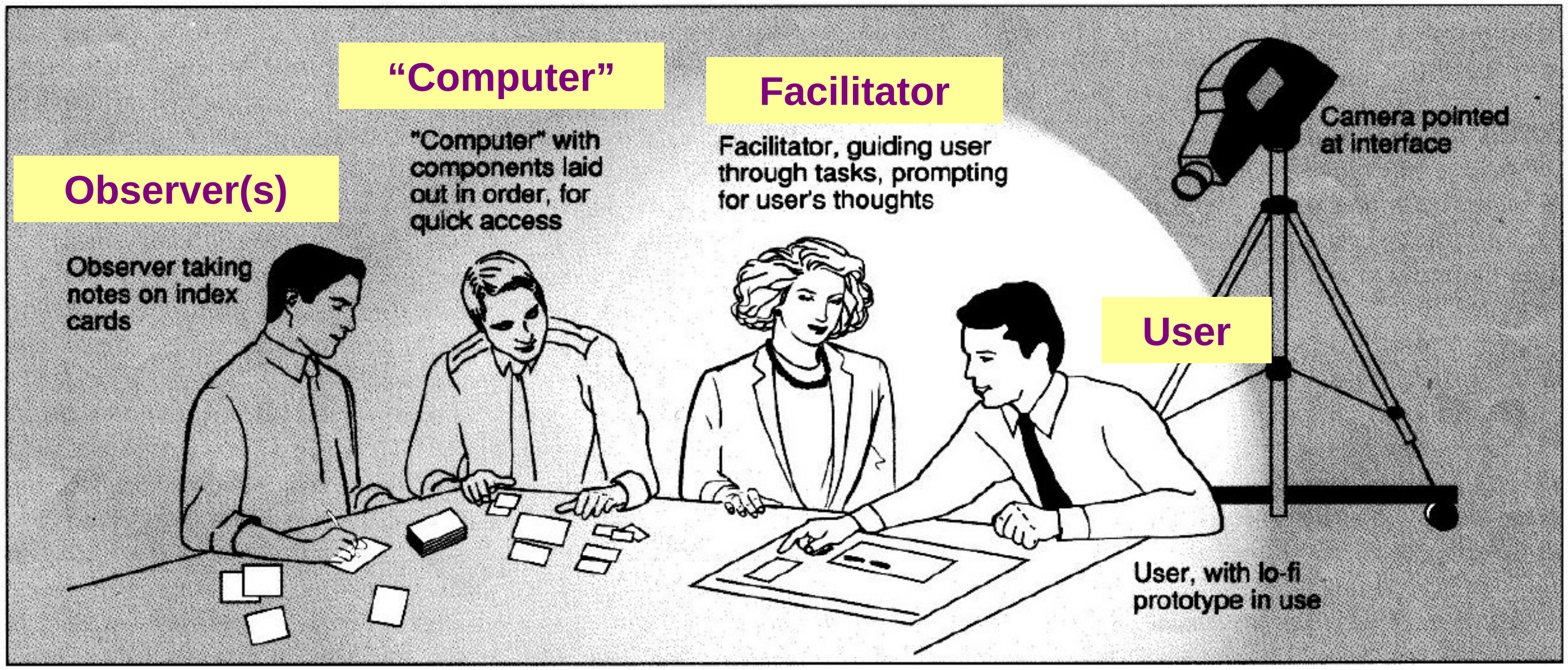
- At what point in the software lifecycle should we do (paper) prototyping? When would it be most useful to do it? Why?

- 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

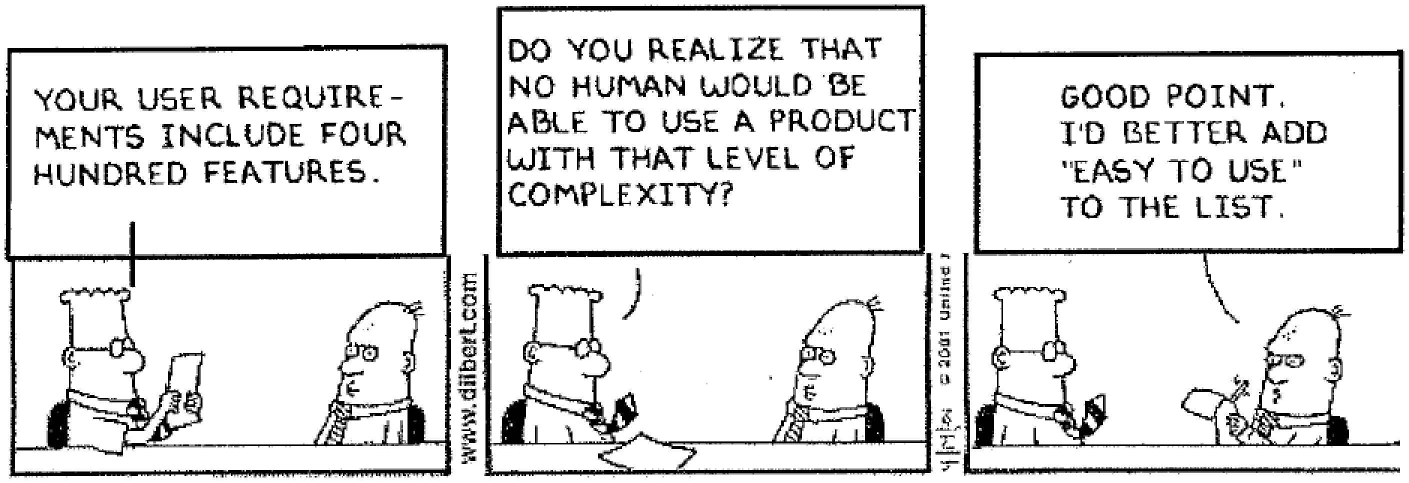
Paper prototyping usability session

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


"Computer"
Facilitator
Observer(s)
User
"Computer" with components laid out in order, for quick access
Facilitator, guiding user through tasks, prompting for user's thoughts
Camera pointed at interface
Observer taking notes on index cards
User, with lo-fi prototype in use

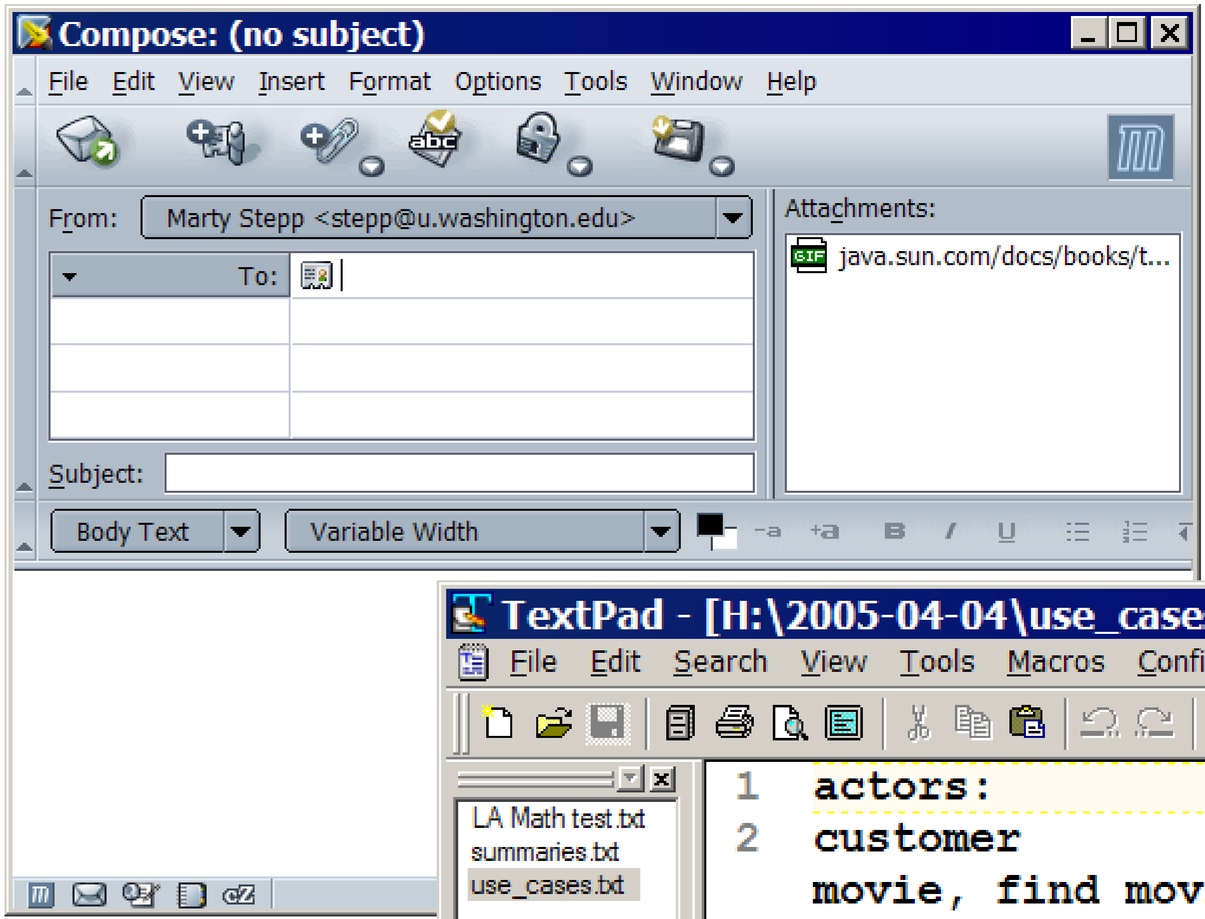
Schneiderman's 8 Golden Rules

- 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.


YOUR USER REQUIRE-MENTS INCLUDE FOUR HUNDRED FEATURES.
DO YOU REALIZE THAT NO HUMAN WOULD BE ABLE TO USE A PRODUCT WITH THAT LEVEL OF COMPLEXITY?
GOOD POINT. I'D BETTER ADD "EASY TO USE" TO THE LIST.
www.dilbert.com

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

UI design examples



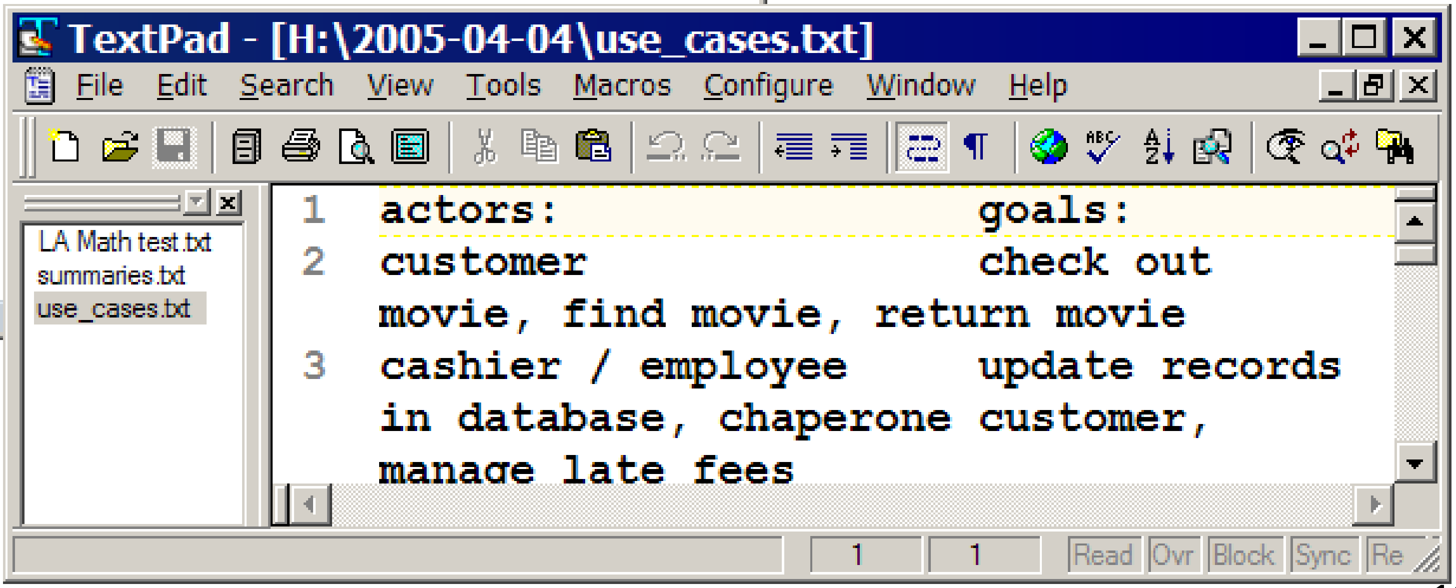
From: Marty Stepp <stepp@u.washington.edu>

To:

Subject:

Attachments:

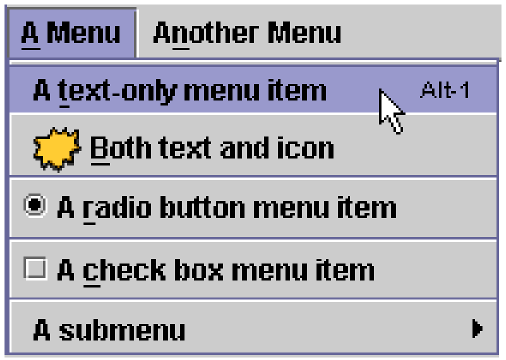
java.sun.com/docs/books/t...

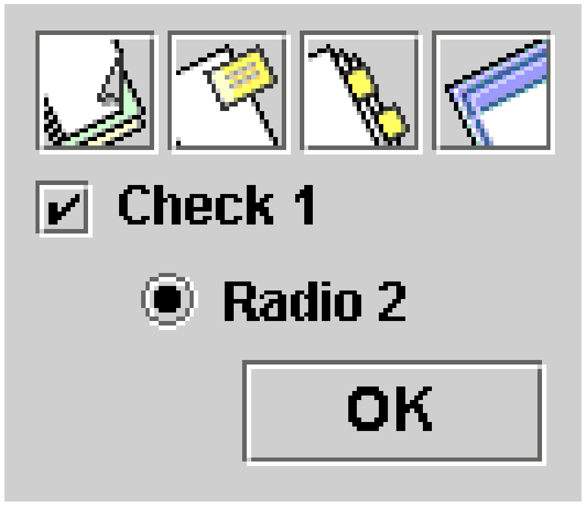

TextPad - [H:\2005-04-04\use_cases.txt]
File Edit Search View Tools Macros Configure Window Help
LA Math test.txt
summaries.txt
use_cases.txt
1
1
Read Ovr Block Sync Re

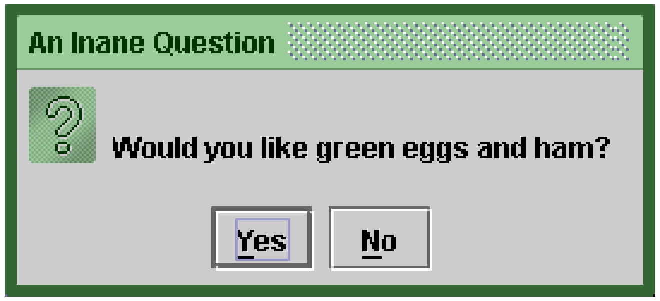
```
actors:                 goals:
customer                check out
movie, find movie, return movie
cashier / employee      update records
in database, chaperone customer,
manage late fees
```

UI design, components

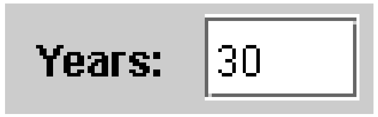
- When should we use:
  - A button?
  - A check box?
  - A radio button?
  - A text field?
  - A list?
  - A combo box?
  - A menu?
  - A dialog box?
  - Other..?

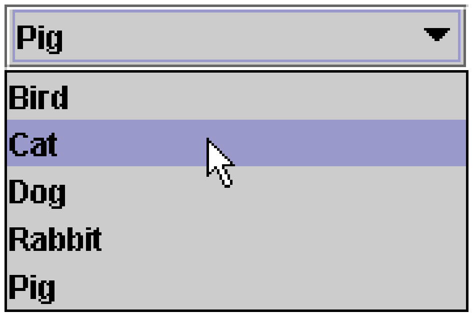


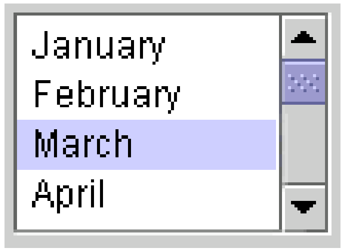


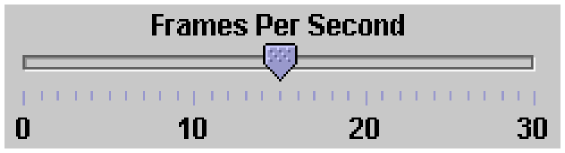


Would you like green eggs and ham?

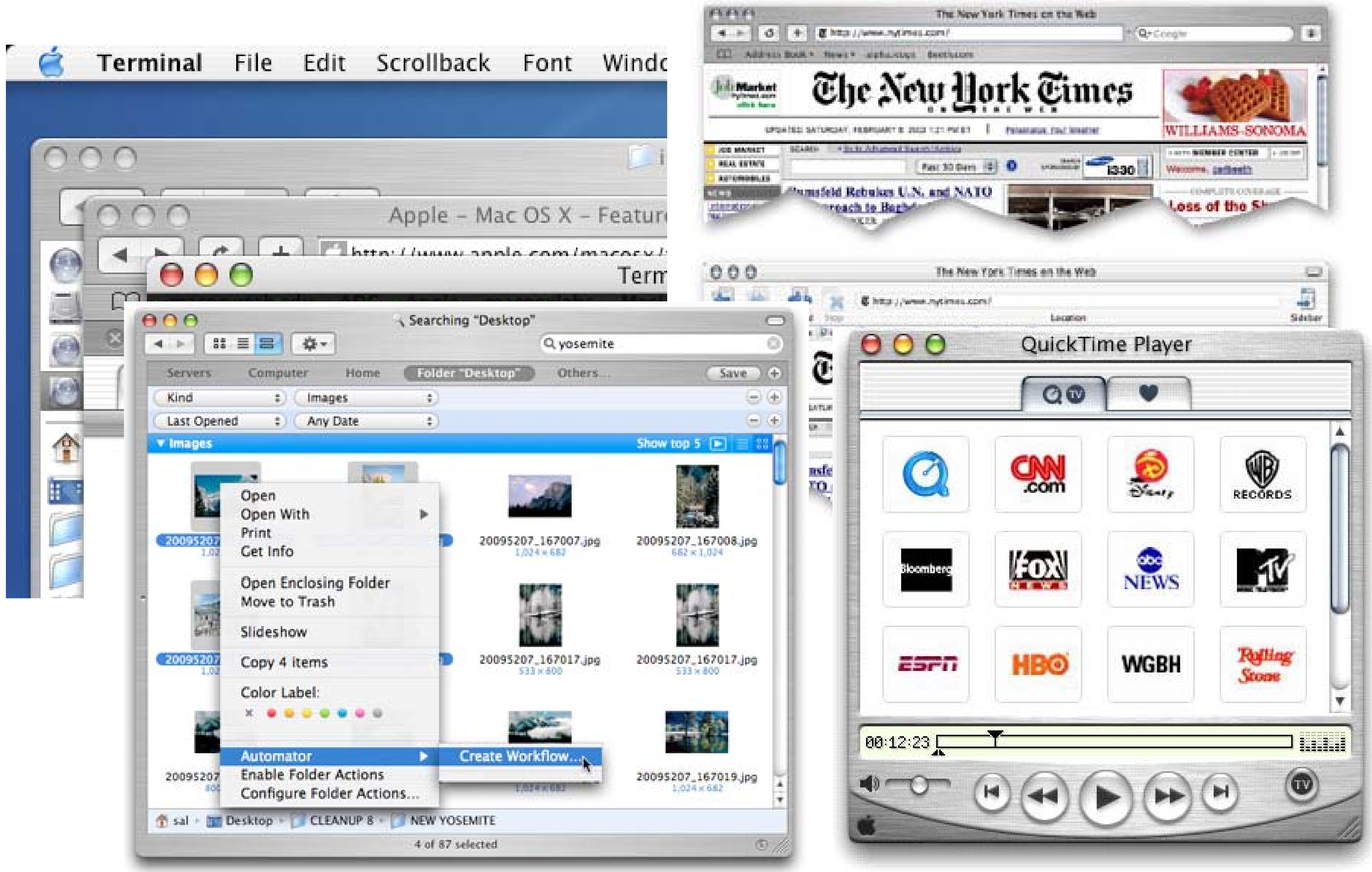




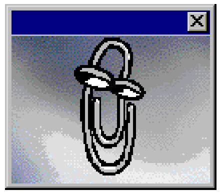




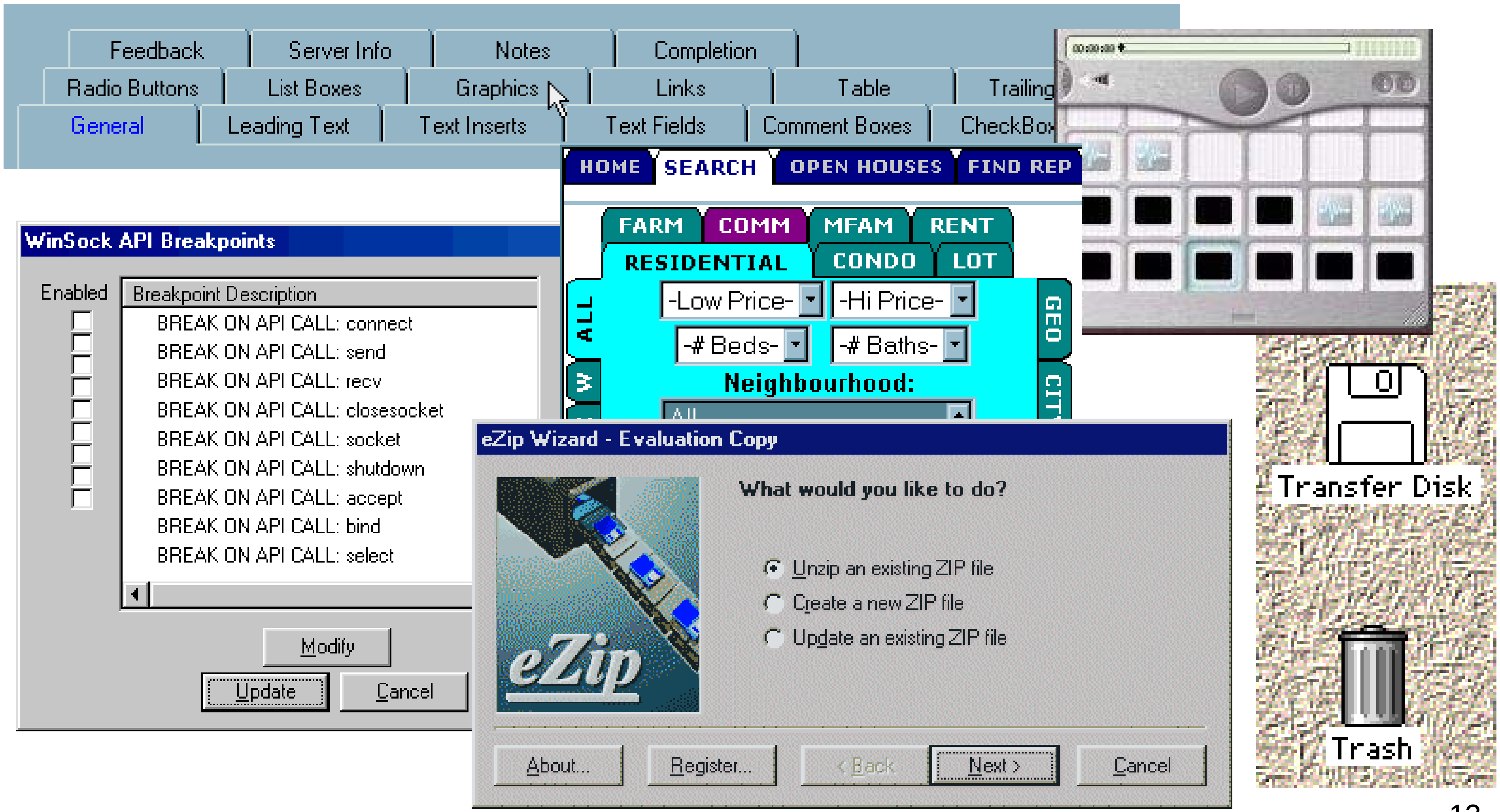
Apple Mac user interfaces



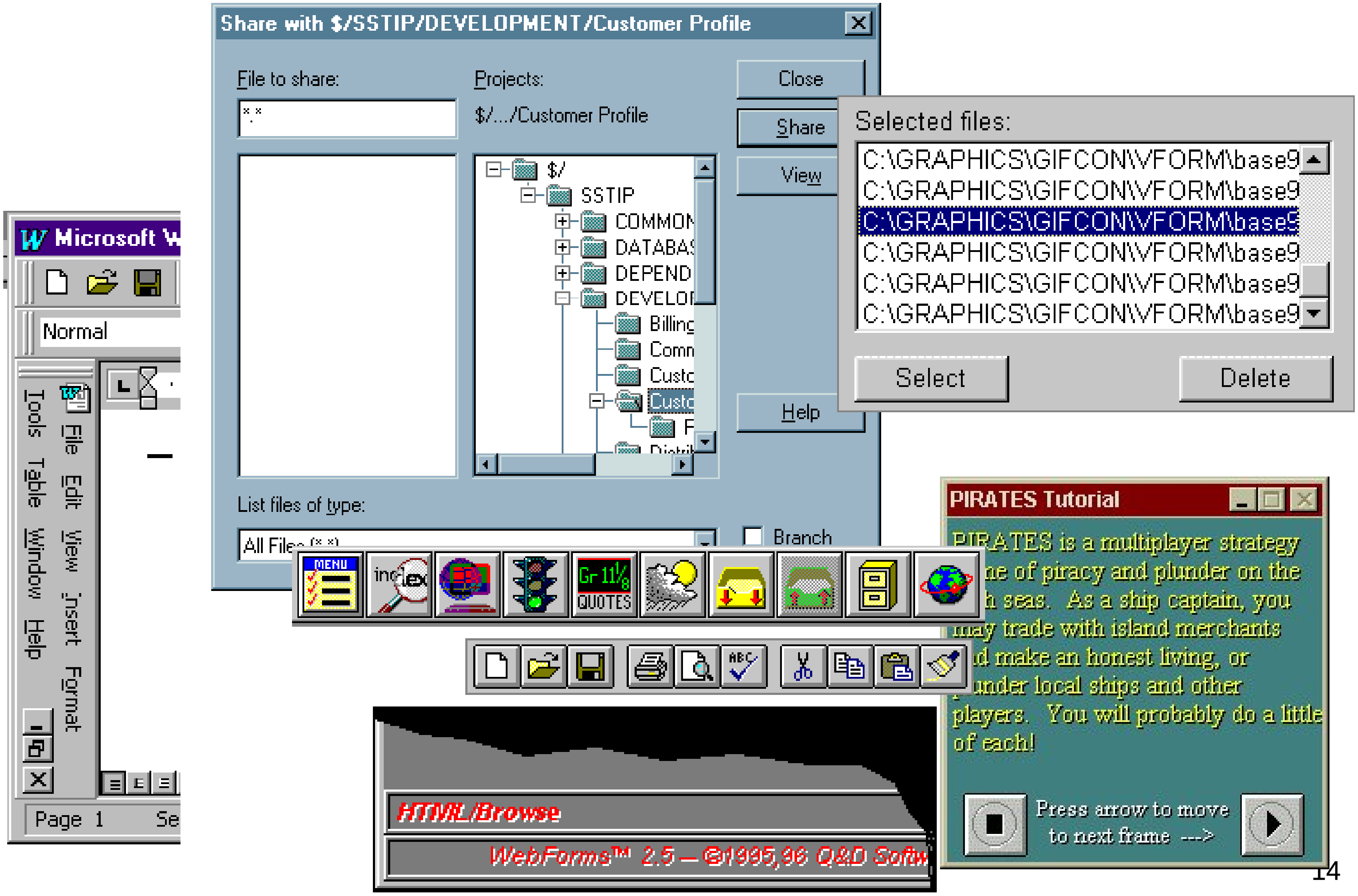
UI Hall of Shame



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

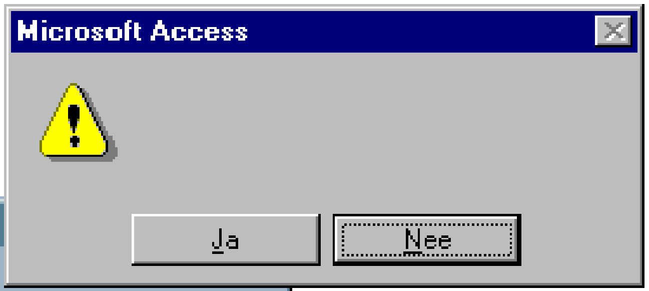


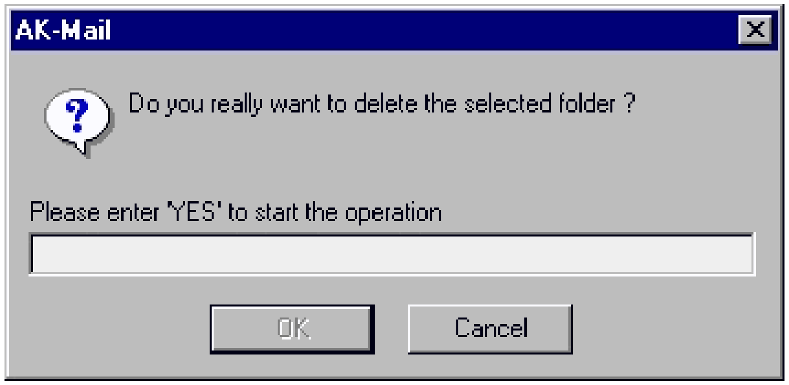
Layout and color



PIRATES is a multiplayer strategy ...ne of piracy and plunder on the ...h seas. As a ship captain, you may trade with island merchants ...d make an honest living, or ...under local ships and other players. You will probably do a little of each!

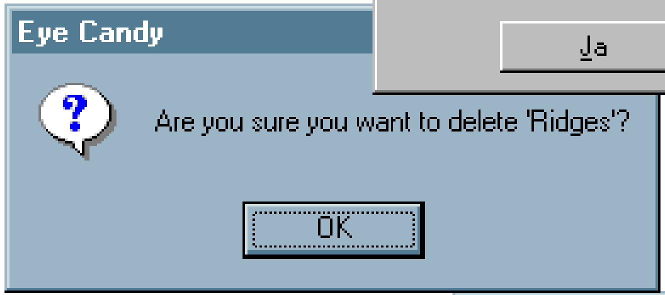
Bad error messages


Microsoft Access

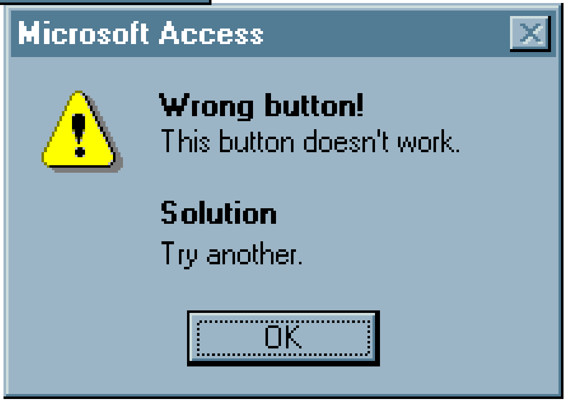

AK-Mail

Do you really want to delete the selected folder ?

Please enter 'YES' to start the operation

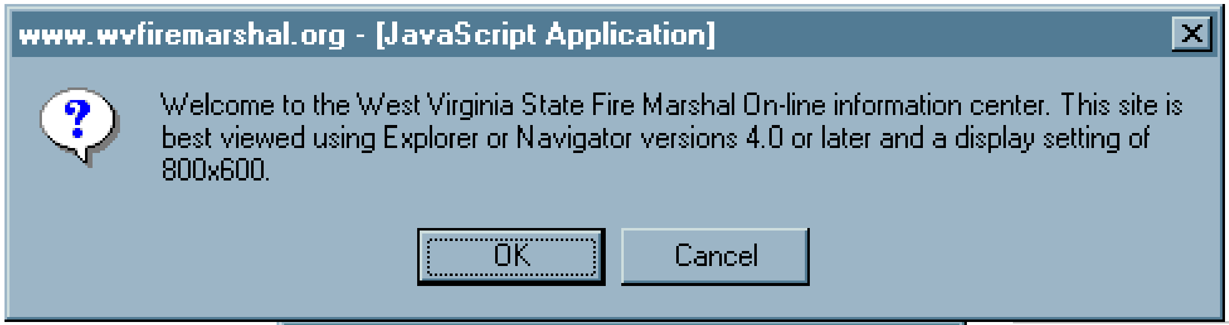

Eye Candy

Are you sure you want to delete 'Ridges'?

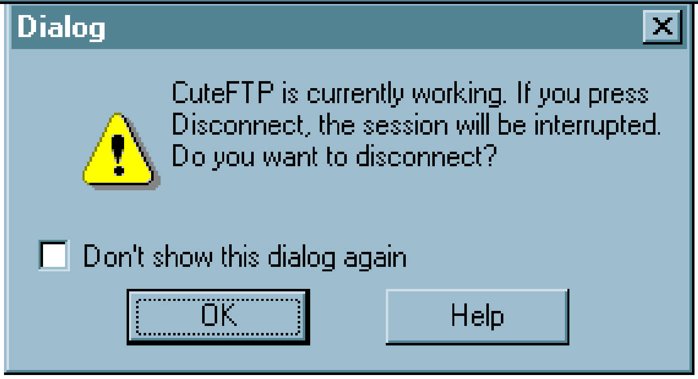

Microsoft Access

Wrong button!
This button doesn't work.

Solution
Try another.

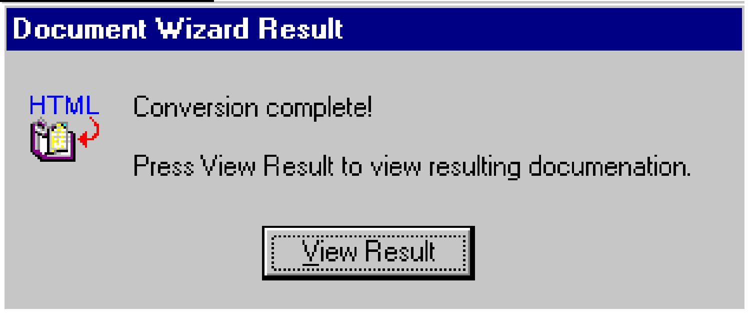

www.wvfiremarshal.org - [JavaScript Application]

Welcome to the West Virginia State Fire Marshal On-line information center. This site is best viewed using Explorer or Navigator versions 4.0 or later and a display setting of 800x600.


Dialog

CuteFTP is currently working. If you press Disconnect, the session will be interrupted. Do you want to disconnect?

Don't show this dialog again

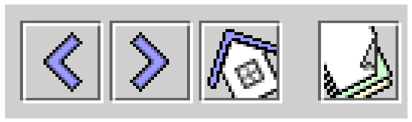

Document Wizard Result

Conversion complete!

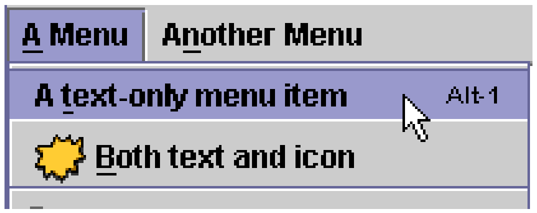
Press View Result to view resulting documenation.

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 <u>M</u>nemonics or Accelerators (Ctrl-S)

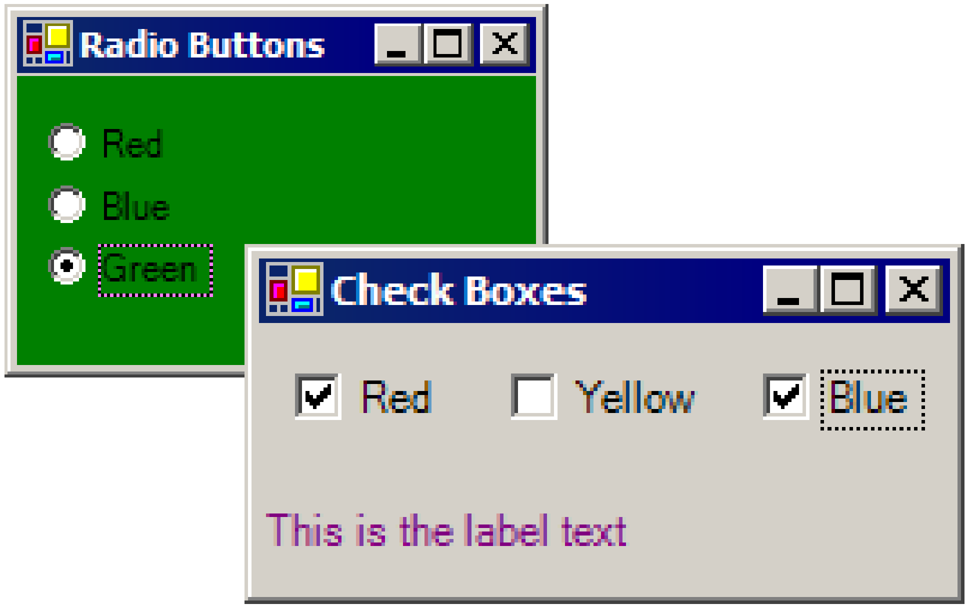


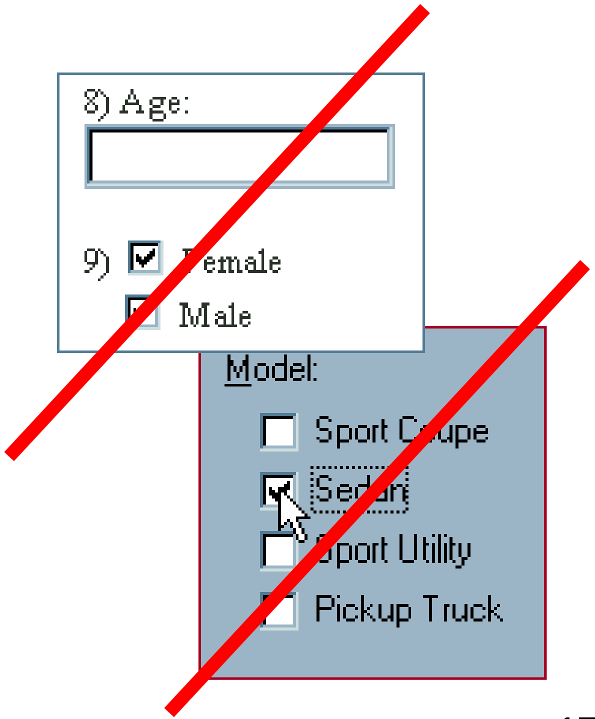
- Use **toolbars** for common actions.
- Use **menus** for infrequent actions that may be applicable to many or all screens.
  - *Users hate menus!* Try not to rely too much on menus. Provide another way to access the same functionality (toolbar, hotkey, etc)



Checkboxes, radio buttons

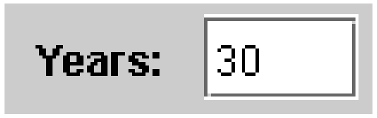
- Use **check boxes** for on/off switches, when any one switch can be toggled irrespective of the others (often correspond to boolean values).
- Use **radio buttons** for related choices, when only one choice can be activated at a time (often corresponds to enum / constant values).



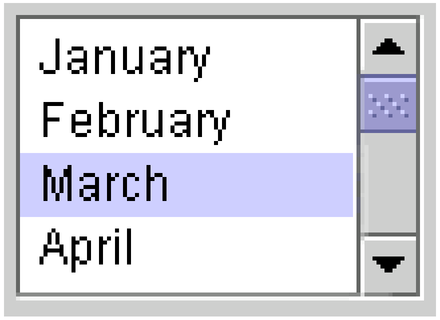


Lists, combo boxes

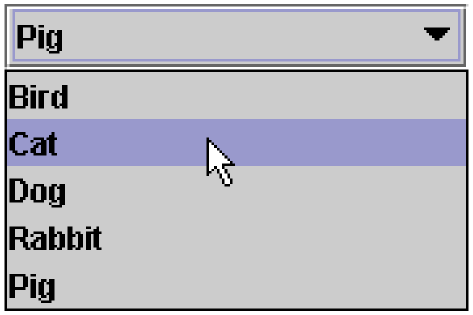
- use **text fields** (usually with a label) when the user may type in anything they want



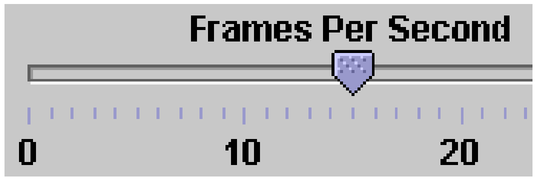
- use **lists** when there are many fixed choices (too many for radio buttons to be practical) and you want *all* choices visible on screen at once

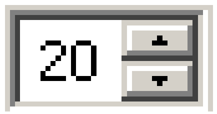


- use **combo boxes** when there are many fixed choices, but you don't want to take up screen real estate by showing them all at once



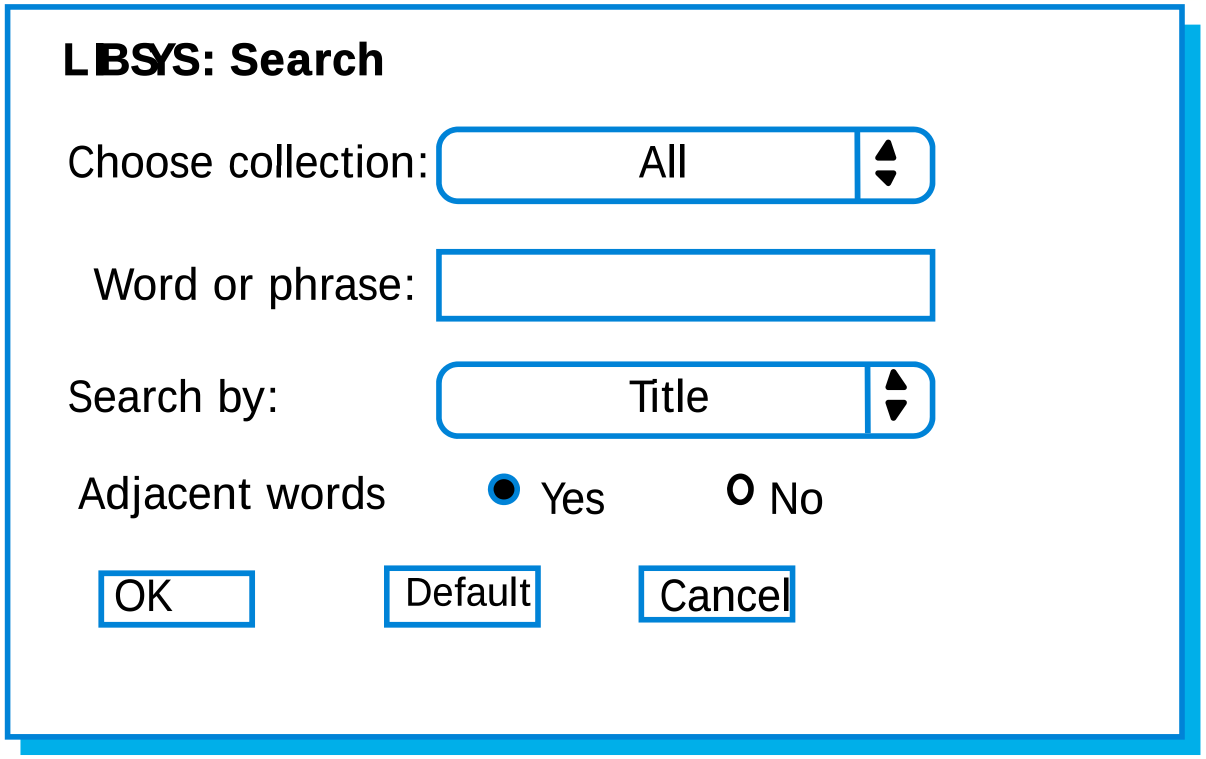
- use a **slider** or **spinner** for a numeric value





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)



LIBSYS: Search

Choose collection: All

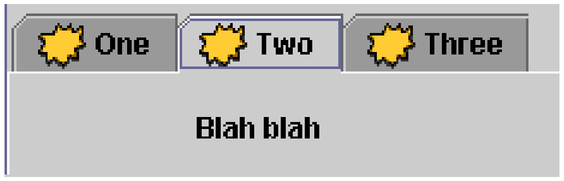
Word or phrase:

Search by: Title

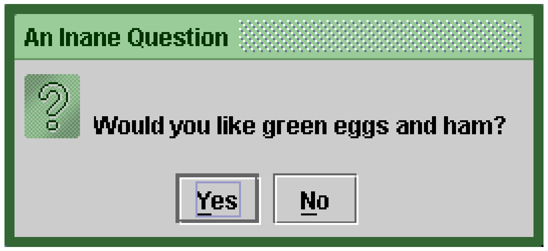
Adjacent words [✓ Yes] No

UI design - multiple screens

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



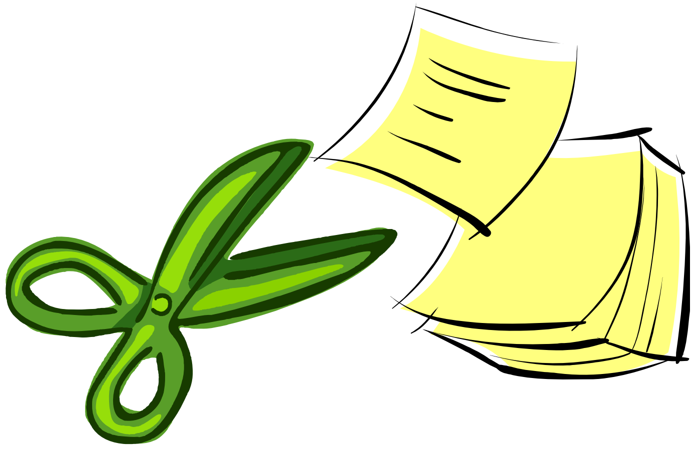
- use **dialog boxes** or **option panes** to present temporary screens or options


An Inane Question

Would you like green eggs and ham?

Creating a paper prototype

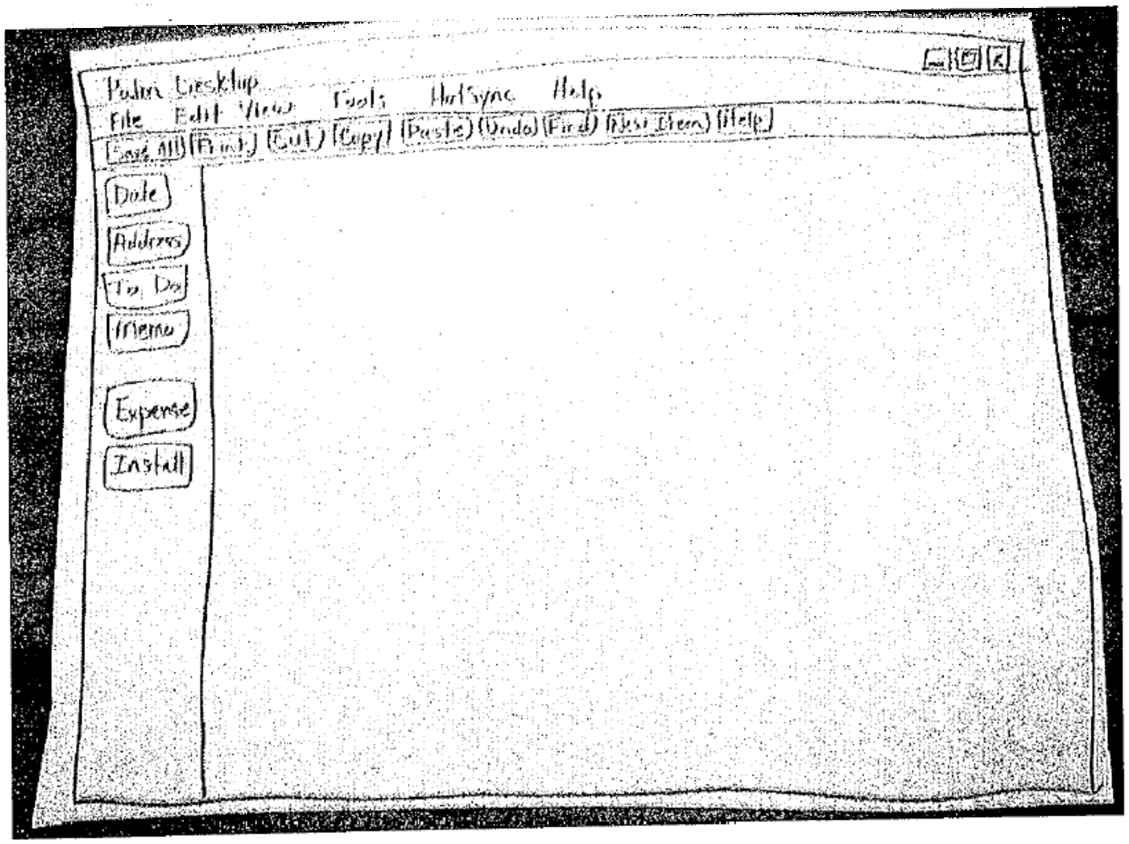
- gather materials
  - paper, pencils/pens
  - tape, scissors
  - highlighters, transparencies



- 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.

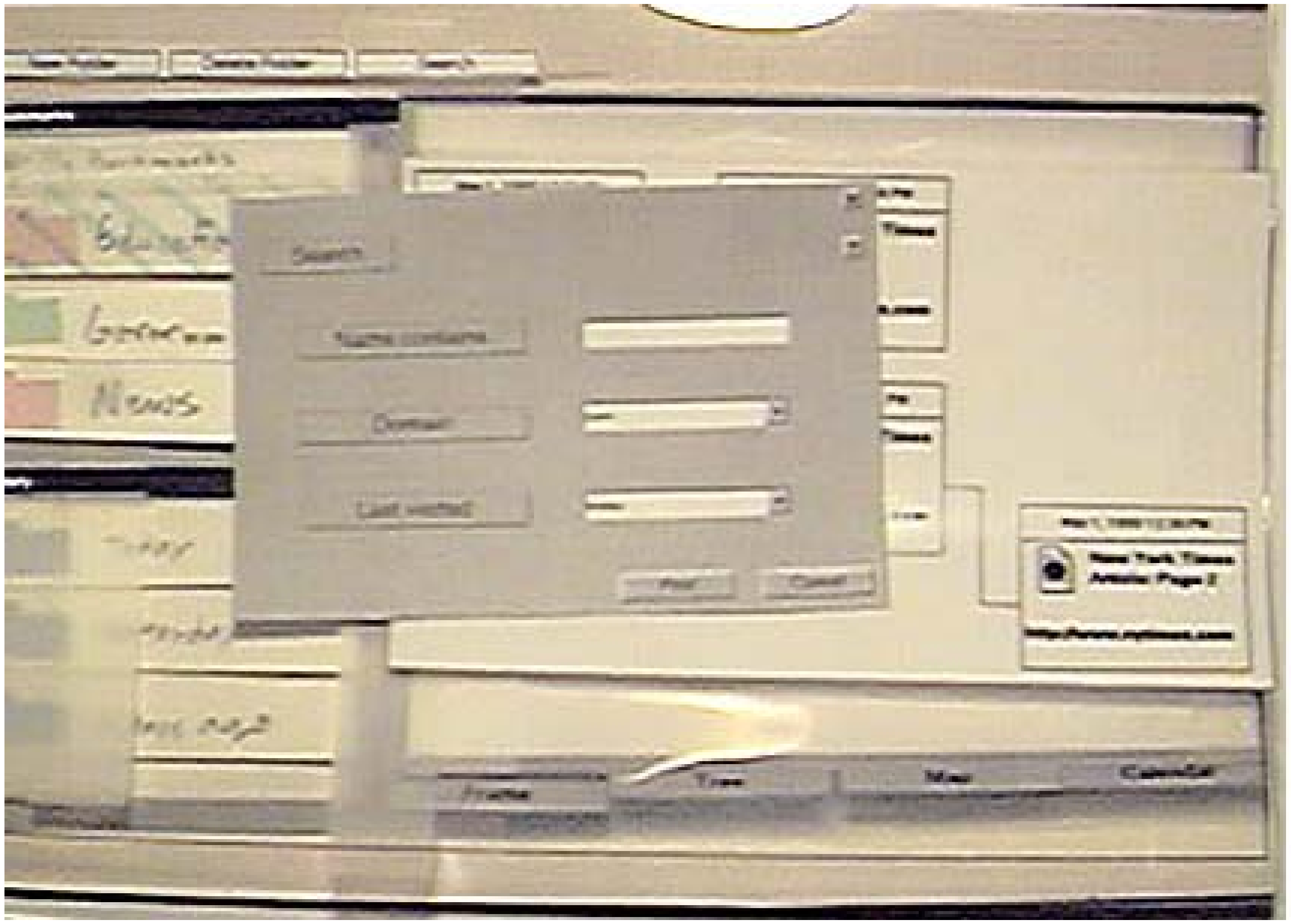
Application backgrounds

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

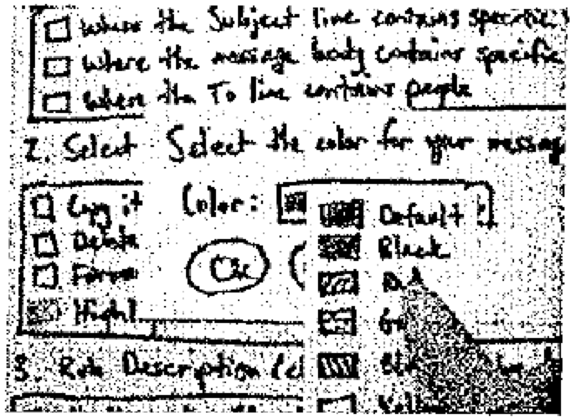


Representing a changing UI

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



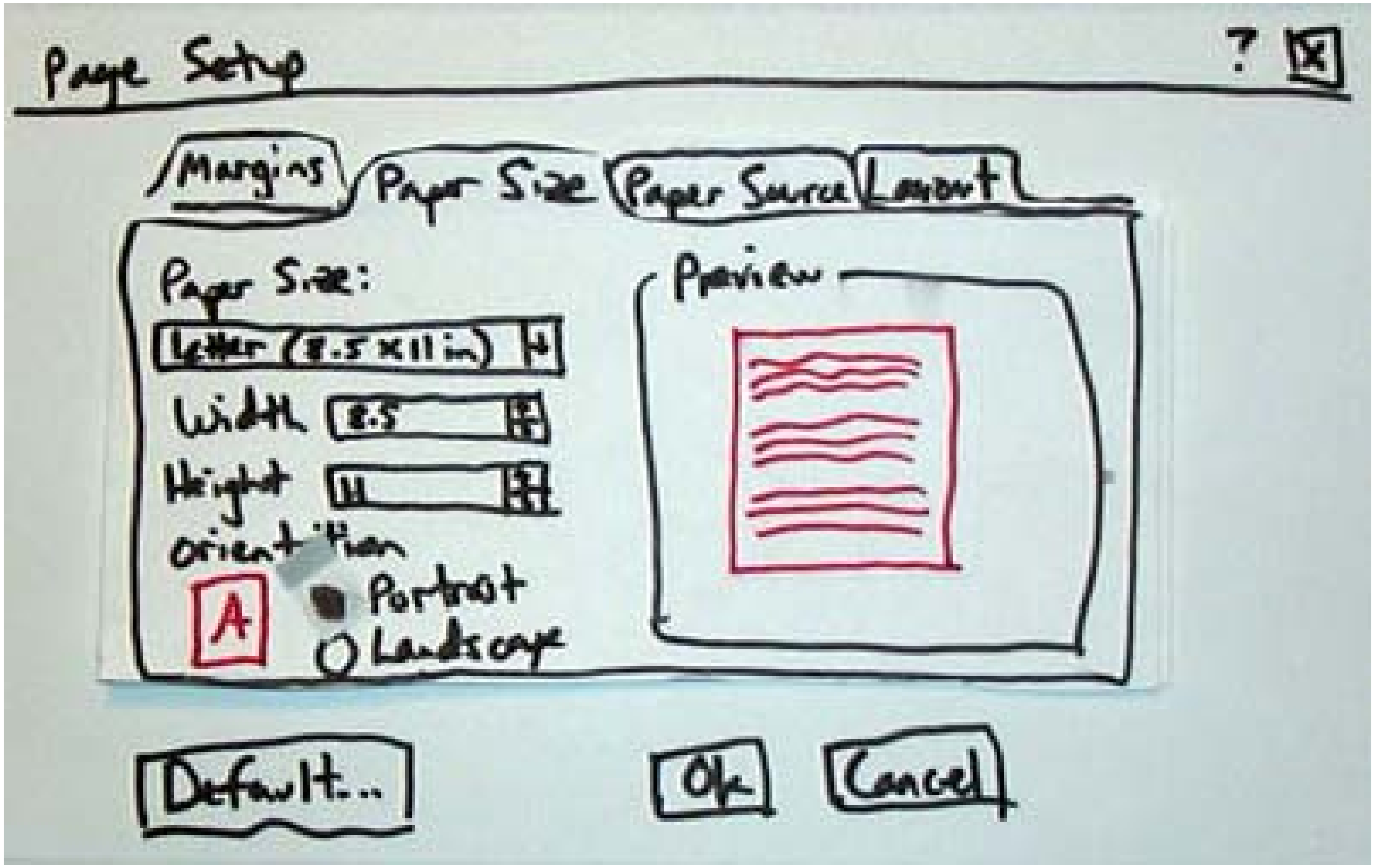
Representing interactive widgets


where the Subject line contains specific
where the message body contains specific
when the To line contains people
2. Select
Select the color for your message
Copy it
Delete
Forward
Highl
Color:
Default
Black
Ok
3. Rule Description

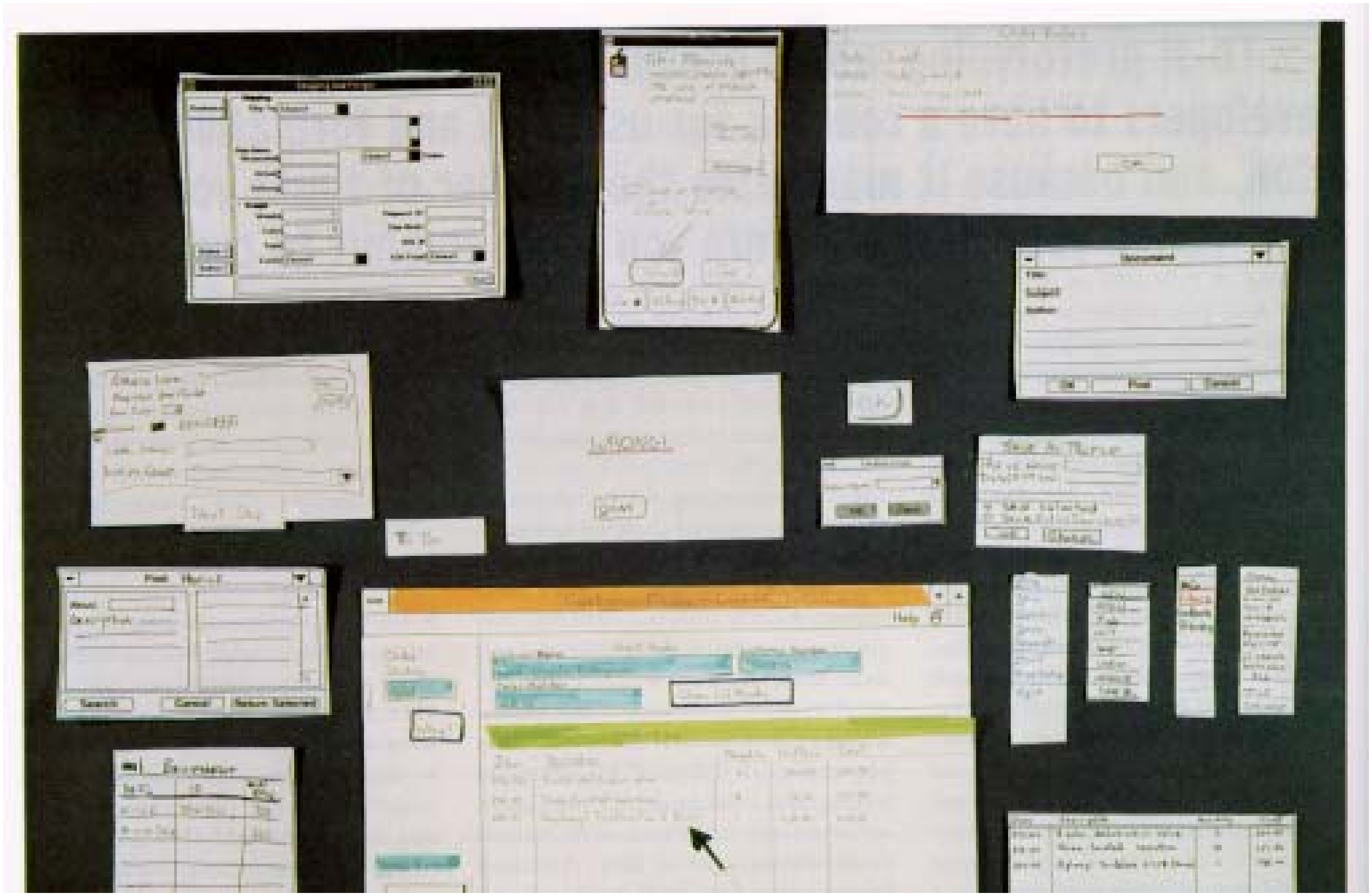
- buttons / check boxes: tape
- tabs, dialog boxes: index cards
- text fields: removable tape
- combo boxes: put the choices on a separate piece of paper that pops up when they click
- selections: a highlighted piece of tape or transparency
- disabled widgets: make a gray version that can sit on top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