Coming up

- Everyone signed up for Nov 9 project meetings

November 9 project meetings

10:00	10:15	10:30	10:45	11:00
What	EleNa_Group	Cow People	EleNa #1	Heisenbug_Reloaded
	EleNa Roosevelt	CMD_Final	RandomMax	
	EleNa #2	Neon	~~Neon~~	

Missing in action:
Yankee Steak

https://doodle.com/poll/u2awntgygdcu6q9c

Coming up

- Everyone signed up for Nov 9 project meetings
- Homework 2 posted:
  https://people.cs.umass.edu/~rjust/courses/2017Fall/CS520/hw2.pdf
- This Thursday (11/2) in-class assignment

Thursday 11/2 In-Class Assignment

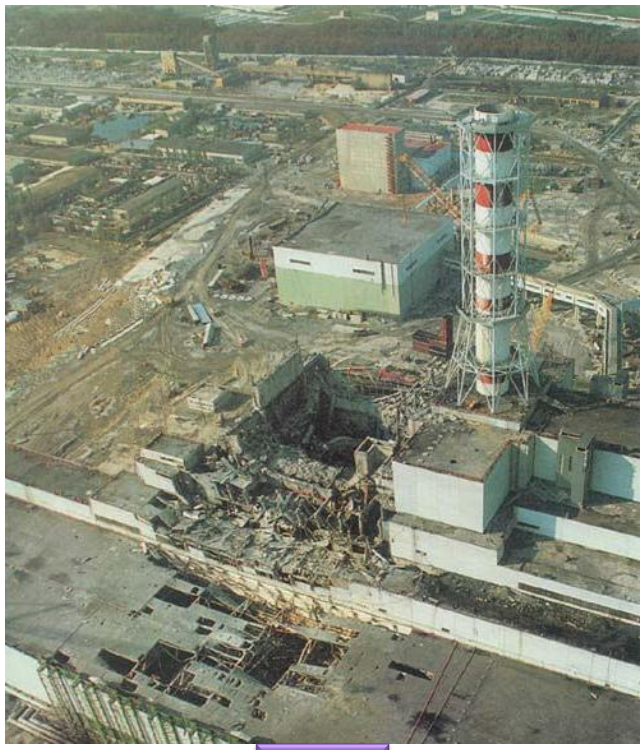
- Bring a computer!
- Assignment performed in teams of 2-4
- Pre-select your team on moodle:
  - https://moodle.umass.edu/mod/groupselect/view.php?id=1411792
    (In-class exercise 3: group selection)
- Before class, install
  - Java 8 JDK: http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html
  - Apache Ant: http://ant.apache.org/
  - Git
- …or download a VM and install VirtualBox
  http://people.cs.umass.edu/~brun/omg/v/CS520-InClass3.ova

last time

- Requirements
- Use cases
  - natural language
  - structured language
  - formal

User Interface

Three Mile Island



Chernobyl

How do we avoid bad UI?

- Learn from past mistakes
- Build prototypes

Big questions

- What's the point of prototyping? Should I do it?
  - If so, when 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 quality can be quantified?
  - What are some examples of software you use that have an especially good/bad UI?
    What do you think makes them good/bad?

Usability and software design

- **usability**: the effectiveness of users achieving tasks
  - Human-Computer Interaction (HCI).
  - Usability and good UI design are closely related.
  - A bad UI can have serious results…

Achieving usability

- User testing and field studies
  - having users use the product and gathering data
- Evaluations and reviews by UI experts
- Prototyping
  - Paper prototyping
  - Code prototyping
- Good UI design focuses on the *user*
  not on the developer, not on the system environment

Prototyping

- **prototyping**: Creating a scaled-down or incomplete version of a system to demonstrate or test its aspects.
- Reasons to do prototyping:
  - aids UI design
  - provides basis for testing
  - team-building
  - allows interaction with user to ensure satisfaction

Some prototyping methods

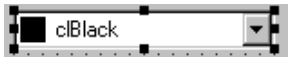
1. UI builders (Visual Studio, ...)

   draw a GUI visually by dragging/dropping UI controls on screen

2. implementation by hand

   writing a quick version of your code

3. **paper prototyping**: a paper version of a UI



Why do paper prototypes?

- 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?

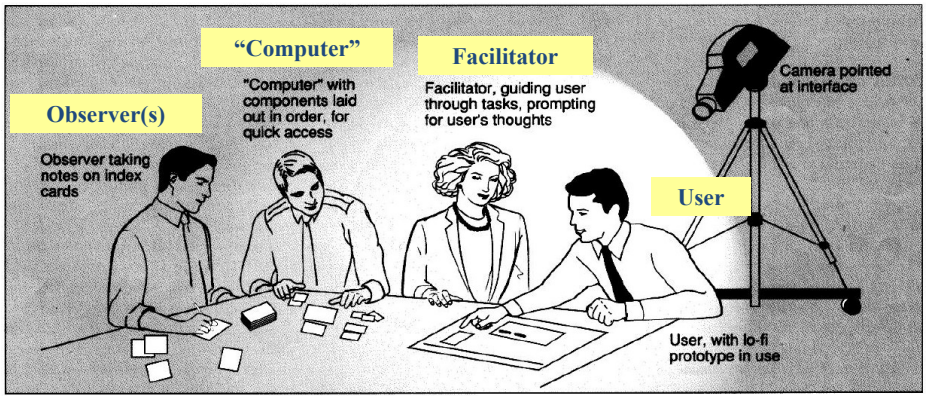
When in the software lifecycle is it most useful to do (paper) prototyping?

- Requirements are the what and design is the how. Which is paper prototyping?

- Prototyping
  - helps uncover requirements and upcoming design issues
  - during or after requirements but before design
  - shows us what is in the UI, but also shows us details of how the user can achieve goals in the UI

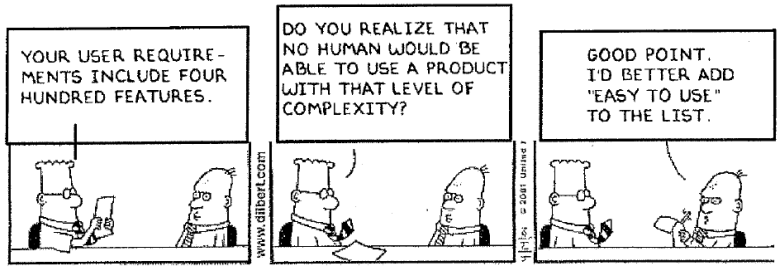
Paper prototyping usability session

- user gets tasks to perform on a paper prototype
- observed by people and/or recorded
- a developer can "play computer"



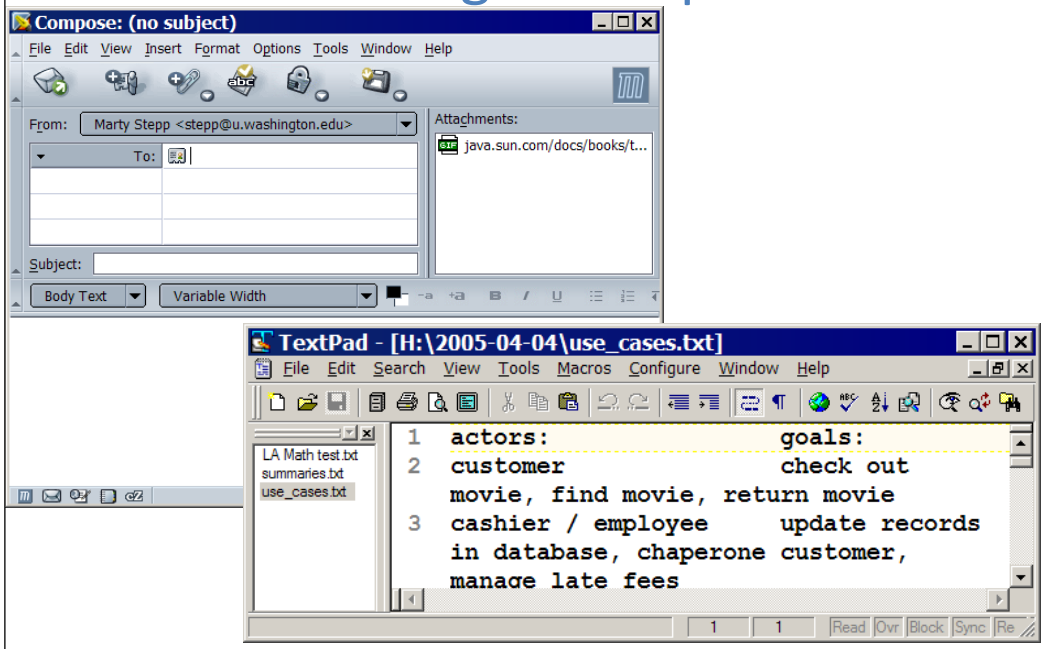
Schneiderman's 8 Golden Rules

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



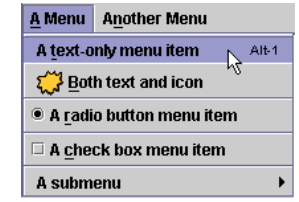
(from Designing the User Interface, by Ben Schneiderman of UMD, noted HCI and UI design expert)

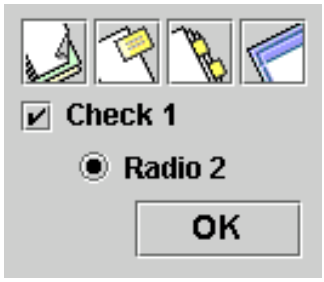
UI design examples

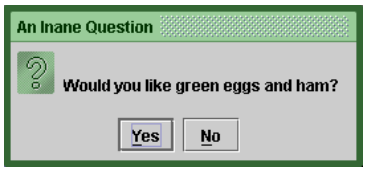


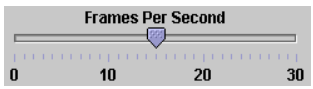
UI design, components

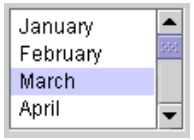
- When should we use:
  - A button?
  - A check box?
  - A radio button?
  - A text field?
  - A list?
  - A combo box?
  - A menu?
  - A dialog box?
  - Other..?

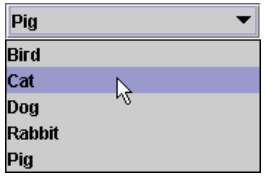






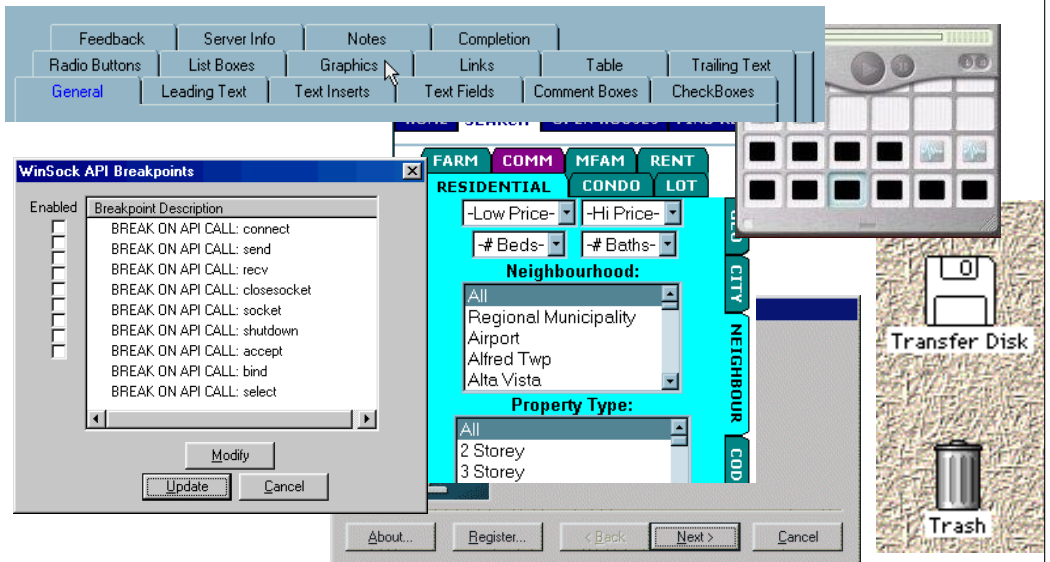




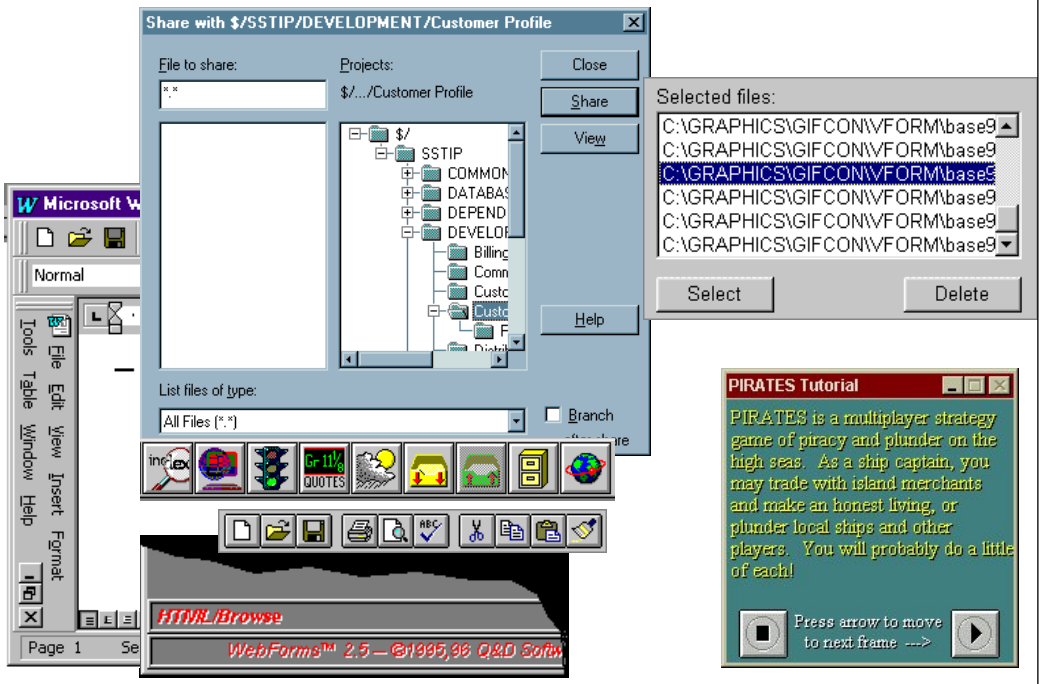


UI Hall of Shame

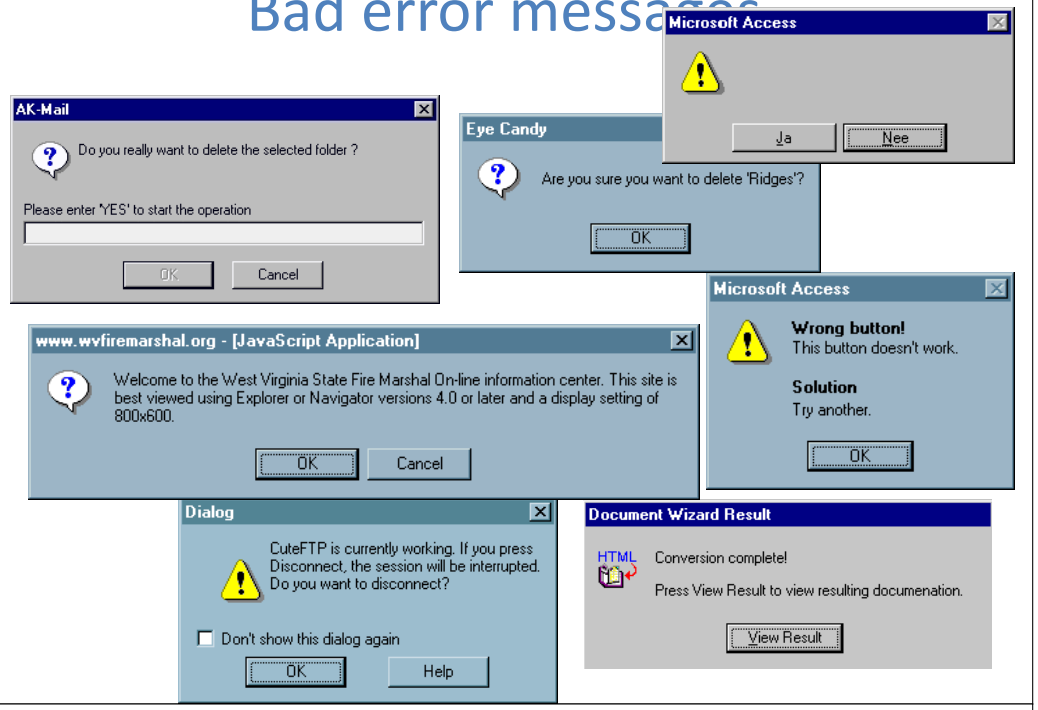
http://interfacehallofshame.eu (sadly now defunct)



Layout and color



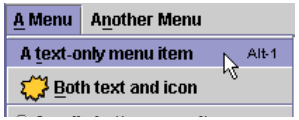
Bad error messages



UI design – buttons, menus

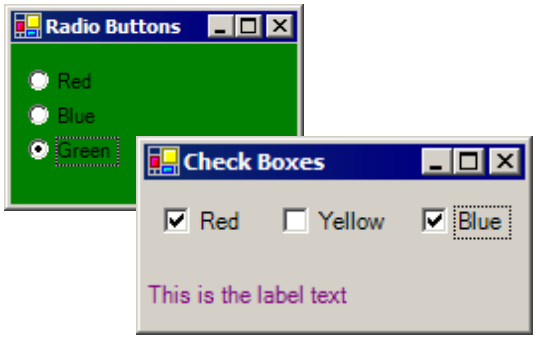
- Use **buttons** for single independent actions that are relevant to the current screen.
  - Try to use button text with verb phrases such as "Save" or "Cancel", not generic: "OK", "Yes", "No"
  - use Mnemonics or Accelerators (Ctrl-S)

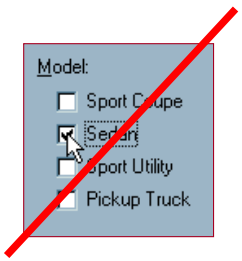
- Use **toolbars** for common actions.
- Use **menus** for infrequent actions that may be applicable to many or all screens.
  - *Users hate menus!* Try not to rely too much on menus. Provide another way to access the same functionality (toolbar, hotkey, etc.)



UI design – checkboxes, radio buttons

- Use **check boxes** for independent on/off switches
- Use **radio buttons** for related choices, when only one choice can be activated at a time

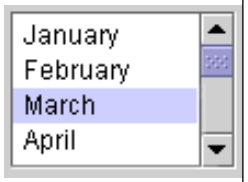




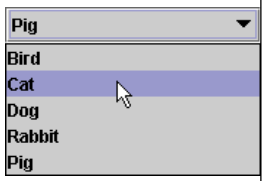
UI design – lists, combo boxes

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

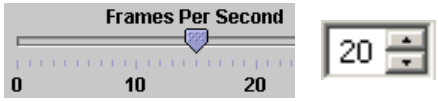
- use **lists** when there are many fixed choices (too many for radio buttons); *all* choices visible on screen at once



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

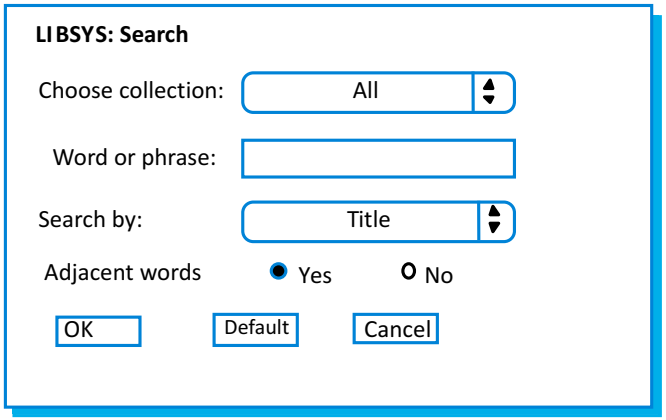


- use a **slider** or **spinner** for a numeric value



An example UI

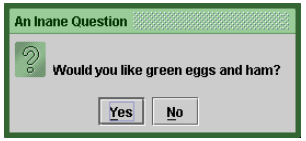
- Good UI dialog?
  Did the designer choose the right components?
  assume there are 20 collections and 3 ways to search



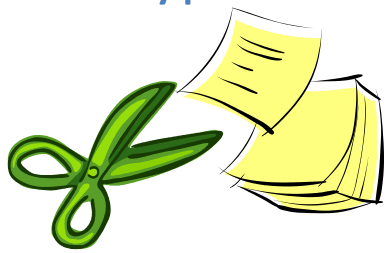
UI design – multiple screens

- 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



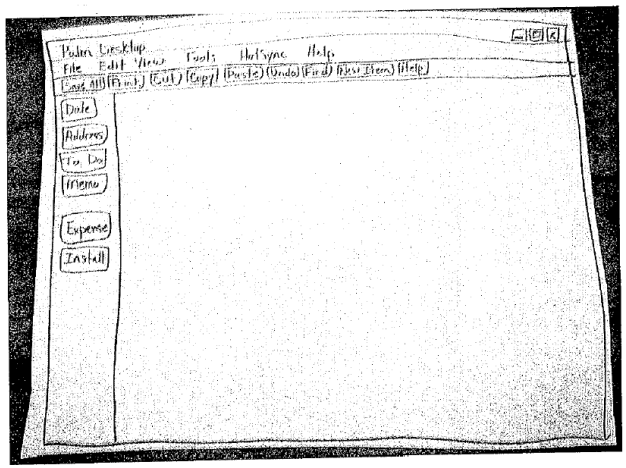
Creating a paper prototype



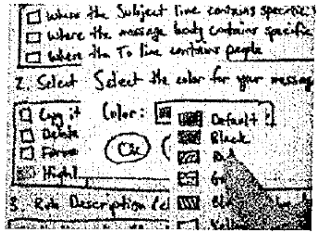
- gather materials
  - paper, pencils/pens
  - tape, scissors
  - highlighters, transparencies
- identify the screens in your UI
  - consider use cases, inputs and outputs to user
- think about how to get from one screen to next
  - this will help choose between tabs, dialogs, etc.

Application backgrounds

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



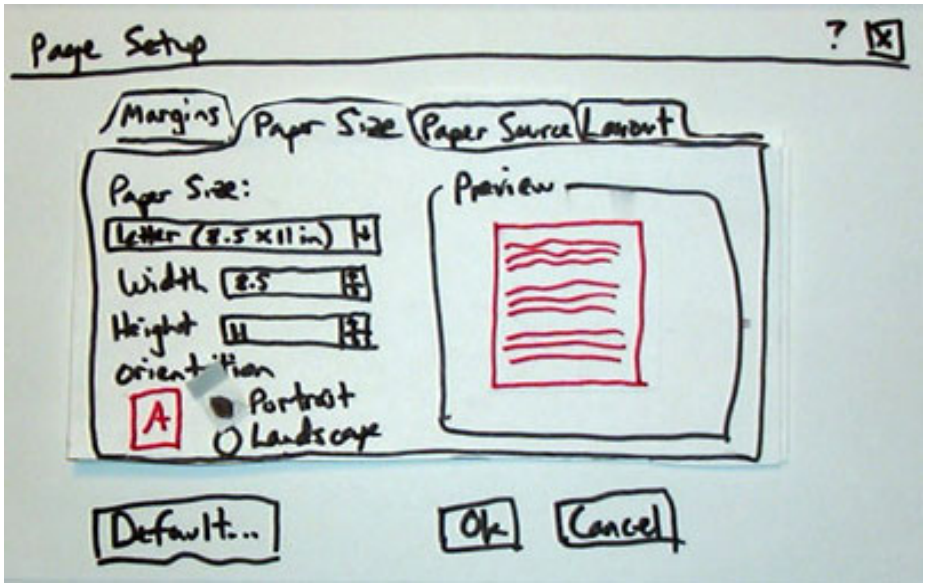
Representing interactive widgets



- 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"

Example paper prototype screen



Prototyping exercise

- In your project groups, draw a rough prototype for a music player (e.g., WinAmp or 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?