coming up

- Today
  - quiz review
  - Lecture on User Interfaces (not on this quiz)
- give anonymous class feedback https://forms.gle/A5TSF3wHu3pos5dm7

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Quiz Review

This is how it's going to work:

- Topics
- Then I'll open the floor to questions
- Once we are out of questions, we'll move on to the day's lecture

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Quiz 1 Topics

- Software development lifecycle
- Teamwork
- Requirements
- Architecture
- UML
- Software fairness
- Software Productivity and Wellbeing (guest lecture / video)

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Some specifics

- UI won't be on this quiz
- Study the lecture slides
- Know how to read a class diagram
- Know your object association types
  - dependency
  - aggregation
  - composition

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Question types

- True / False
- Multiple choice
- Short answer
- One reasoning question

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Let's talk about presentations

- Practice, practice, practice

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How to give a good presentation

- Practice with your team
- Practice with people outside your team
  - Your audience won't be our teammates who've been working on the project nonstop
- Aim your presentation at the right audience
- If you had never heard about the product, what kinds of things do you need to hear?

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Audience

- Who is your audience?

Your customer is your audience.

- Before you begin:
  - List the things you want to convey to your customer
  - Figure out the most effective way to convey them
  - Structure the presentation around that

PRACTICE!

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User Interface

Three Mile Island

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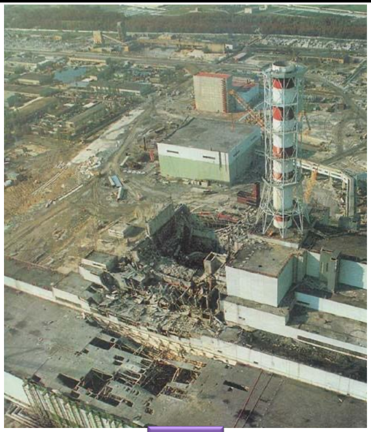
Chernobyl

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How do we avoid bad UI?

- Learn from past mistakes
- Build prototypes

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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?

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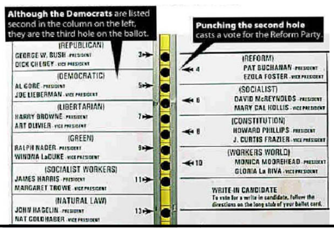
Usability and software design

- **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...



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.

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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

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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

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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

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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

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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

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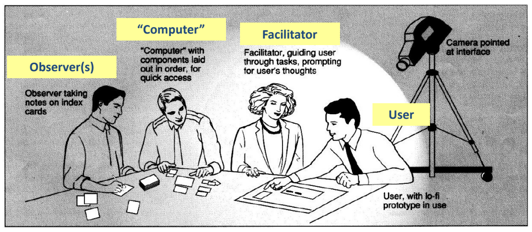
Paper prototyping usability session

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


"Computer"
Facilitator
Observer(s)
"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
User, with lo-fi prototype in use

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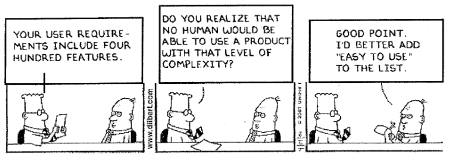
Schneiderman's 8 Golden Rules

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.


YOUR USER REQUIREMENTS 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)

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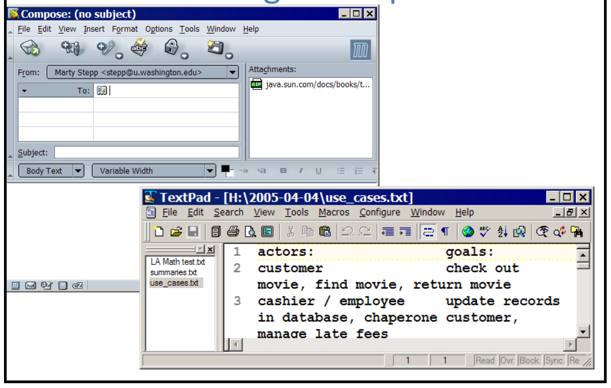
UI design examples


Compose: (no subject)
File Edit View Insert Format Options Tools Window Help
From: Marty Stepp <stepp@u.washington.edu>
To:
Attachments:
java.sun.com/docs/books/t...
Subject:
Body Text
Variable Width
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
Read Ovr Block Sync Re

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

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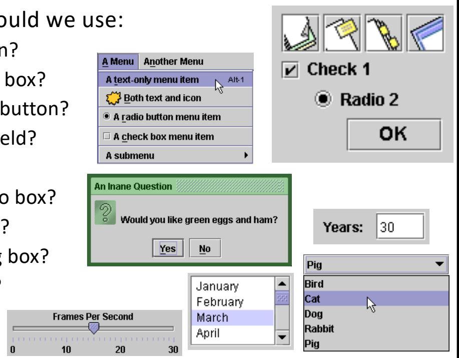
UI design, components

- 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..?



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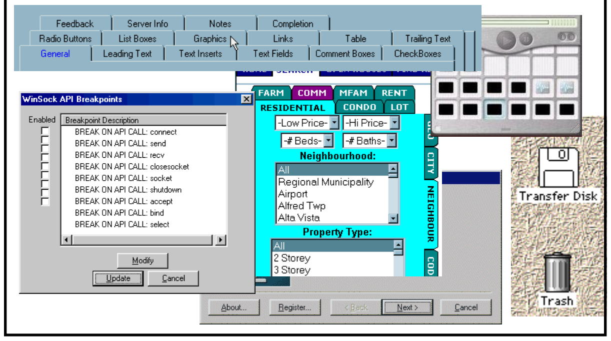
UI Hall of Shame

http://interfacehallofshame.eu



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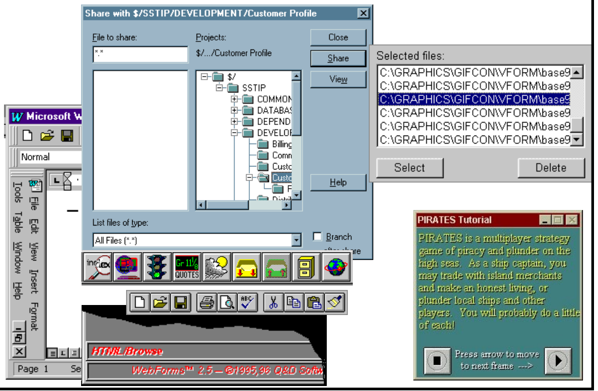
Layout and color


Share with $/SSTIP/DEVELOPMENT/Customer Profile
File to share:
.
Projects:
$/.../Customer Profile
Close
Share
View
Help
$/
SSTIP
COMMON
DATABAS
DEPEND
DEVELOP
Billing
Comm
Custo
Custo
List files of type:
All Files (*.*)
Branch
Selected files:
C:\GRAPHICS\GIFCON\VFORM\base9
C:\GRAPHICS\GIFCON\VFORM\base9
C:\GRAPHICS\GIFCON\VFORM\base9
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C:\GRAPHICS\GIFCON\VFORM\base9
Select
Delete
Microsoft W
Normal
File Edit View Insert Format Tools Table Window Help
Page 1
HTML/Browse
WebForms™ 2.5 — ©1995,96 Q&D Softw
PIRATES Tutorial
Press arrow to move to next frame -->

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

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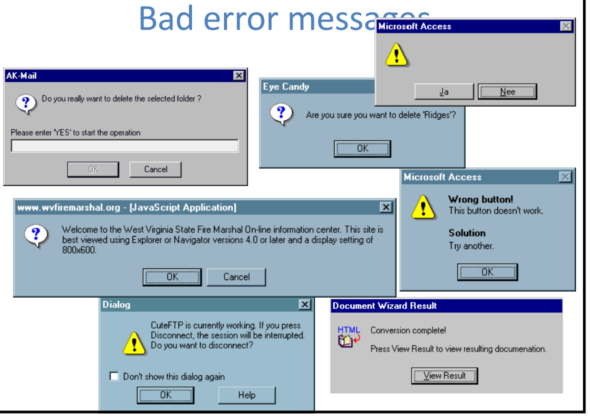
Bad error messages


AK-Mail
Do you really want to delete the selected folder ?
Please enter 'YES' to start the operation
OK Cancel

Eye Candy
Are you sure you want to delete 'Ridges'?
OK

Microsoft Access
Ja Nee

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.
OK Cancel

Microsoft Access
Wrong button!
This button doesn't work.
Solution
Try another.
OK

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
OK Help

Document Wizard Result
Conversion complete!
Press View Result to view resulting documenation.
View Result

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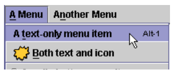
UI design – buttons, menus

- 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.)



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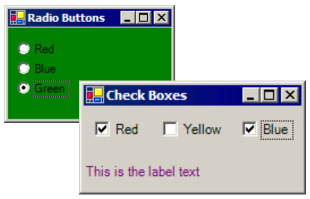
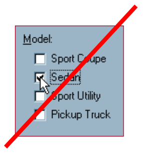
UI design – checkboxes, radio buttons

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





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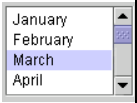
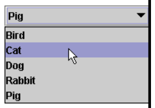
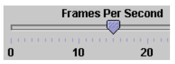
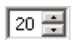
UI design – lists, combo boxes

- 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









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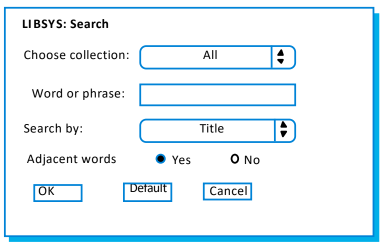
An example UI

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


LIBSYS: Search

Choose collection:	All
Word or phrase:	
Search by:	Title
Adjacent words	[✓ Yes] No

OK Default Cancel

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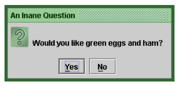
UI design – multiple screens

- 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?
Yes No

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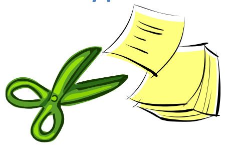
Creating a paper prototype



- 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.

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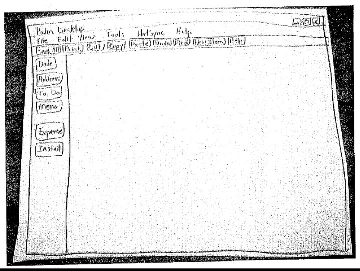
Application backgrounds

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



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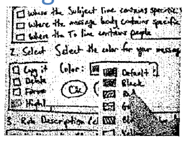
Representing interactive widgets



- 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"

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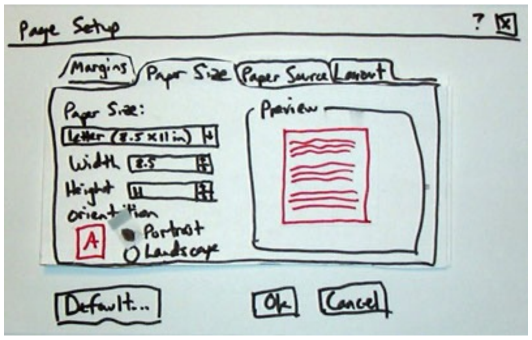
Example paper prototype screen



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Prototyping exercise

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

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