i213 User Interface Design and Development

Professor Tapan Parikh
School of Information, UC Berkeley

October 10

Formative Evaluation

<u>Formative evaluation</u> - Discover usability problems as part of an iterative design process. Goal is to uncover as many problems as possible.

<u>Summative evaluation</u> - Assess the usability of a prototype, or compare alternatives. Goal is a reliable, statistically valid comparison

THINKING ALOUD

"Having a test subject use the system while continuously thinking aloud"

Useful for formative evaluation

Understand how users view the system by externalizing their thought process

Generates a lot of qualitative data from relatively small number of users

Focus on what the user is concretely doing and saying

metanexus.net

Thinking aloud can be unnatural and awkward

Requires prompting by the experimenter to ensure that the user continues to externalize their thought process

May slow them down and affect performance

EXAMPLE PROMPTS

"Please keep talking."

"Tell me what you are thinking."

"Tell me what you are trying to do."

"Are you looking for something? What?"

"What did you expect to happen just now?"

"What do you mean by that?

Planning next
semester's classes

POINTS TO REMEMBER

Do not make value judgments

User: "This is really confusing here."
Tester: "Yeah, you're right. It is." (BAD)
Tester: "Okay, I'll make a note of that." (GOOD)

Video or audio record (with user's permission), and/or take good notes

Screen captures / Eye tracking

When the user is thinking hard, don't disturb them with a prompt - wait!

THINK ALOUD VARIANTS

<u>Co-Discovery</u>: Two users work together
- Can spur more conversation
- Needs 2x more users

<u>Retrospective</u>: Think aloud after the fact, reviewing a video recording
- Doesn't disturb the user during the task
- User may forget some thoughts, reactions

<u>Coaching</u>: Expert coach guides user, answering questions
- Identify training, help and documentation needs

HEURISTIC EVALUATION

A cheap and effective way to find usability problems

A small set of expert evaluators "examine the interface and judge its compliance with recognized usability principles"

"Discount" usability testing - find problems earlier and relatively cheaply, without involving real users

Recommended books provide a number of high-level and low-level design guidelines:

Jakob Nielsen, Usability Engineering
Donald Norman, Design of Everyday Things
Jeff Johnson, GUI Bloopers

Other heuristics can be provided by your own intuition, common sense, user research

We will use Nielsen's list from Usability Engineering

Simple and Natural Dialog
Speak the User's Language
Minimize User Memory Load
Consistency
Feedback
Clearly Marked Exits
Shortcuts
Good Error Messages
Prevent Errors
Help and Documentation
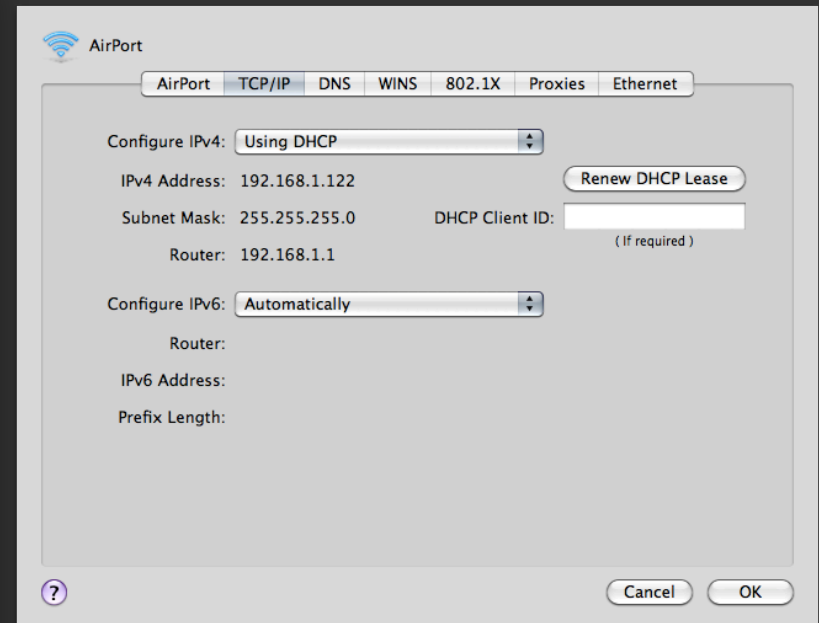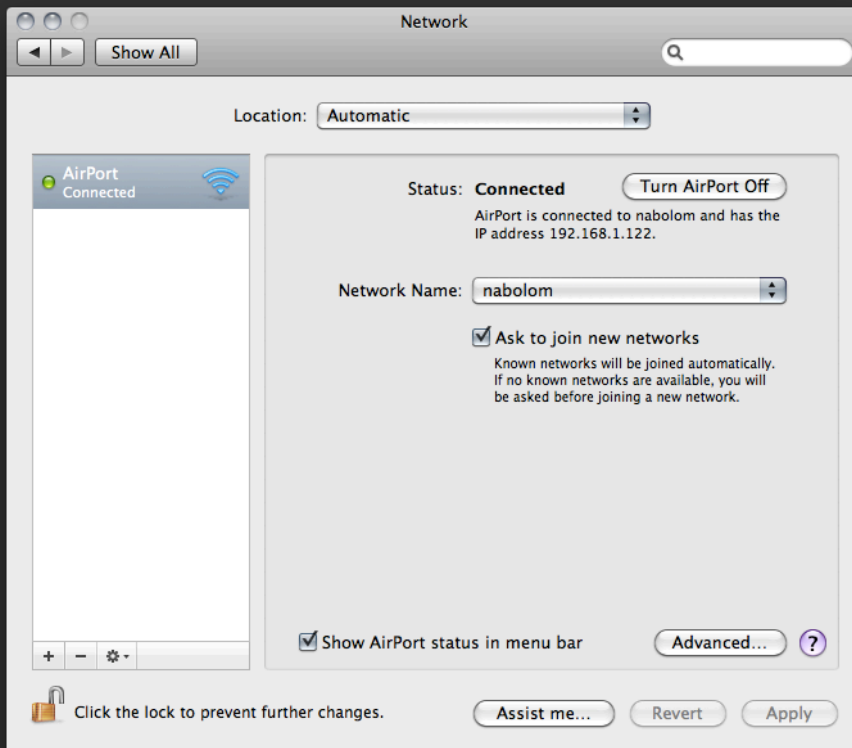
SIMPLE AND NATURAL DIALOG
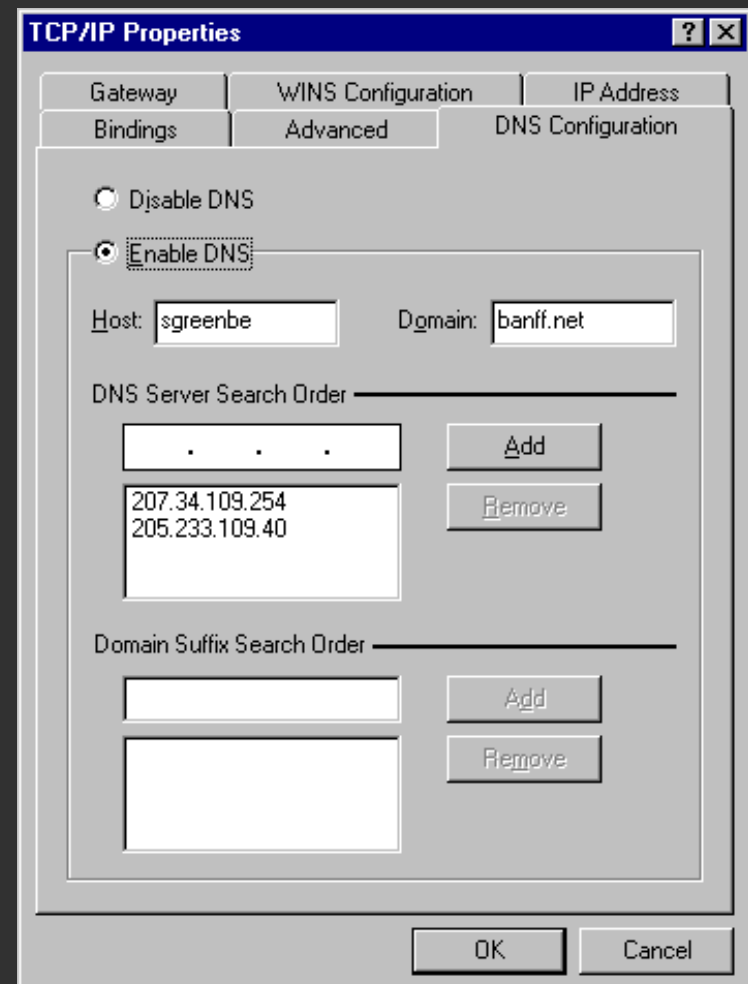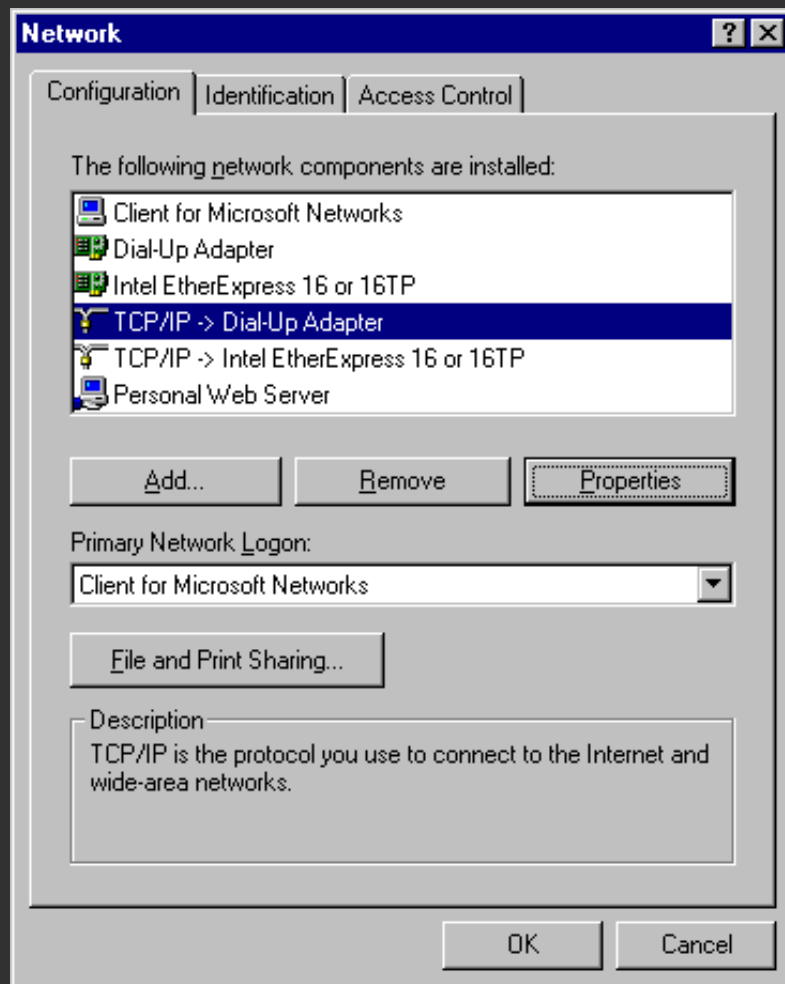
Match the user's task

Minimize navigation

Present exactly the information the user needs, when she needs it

Use good graphic design

Less is more

Network

◀ ▶ | Show All | [search]

Location: Automatic ⇕

AirPort
Connected

Status: **Connected**   [Turn AirPort Off]

AirPort is connected to nabolom and has the IP address 192.168.1.122.

Network Name: nabolom ⇕

☑ Ask to join new networks

Known networks will be joined automatically. If no known networks are available, you will be asked before joining a new network.

☑ Show AirPort status in menu bar   [Advanced...] (?)

+ − ⚙▾

🔒 Click the lock to prevent further changes.   [Assist me...] [Revert] [Apply]

AirPort

AirPort | **TCP/IP** | DNS | WINS | 802.1X | Proxies | Ethernet

Configure IPv4: Using DHCP ⇕

IPv4 Address: 192.168.1.122   [Renew DHCP Lease]

Subnet Mask: 255.255.255.0   DHCP Client ID: [   ]
                                              (If required)
Router: 192.168.1.1

Configure IPv6: Automatically ⇕

Router:

IPv6 Address:

Prefix Length:

(?)   [Cancel] [OK]

Network

Configuration | Identification | Access Control

The following network components are installed:

- Client for Microsoft Networks
- Dial-Up Adapter
- Intel EtherExpress 16 or 16TP
- **TCP/IP -> Dial-Up Adapter**
- TCP/IP -> Intel EtherExpress 16 or 16TP
- Personal Web Server

[Add...] [Remove] [Properties]

Primary Network Logon:

Client for Microsoft Networks

[File and Print Sharing...]

Description
TCP/IP is the protocol you use to connect to the Internet and wide-area networks.

[OK] [Cancel]

TCP/IP Properties

Gateway | WINS Configuration | IP Address
Bindings | Advanced | DNS Configuration

○ Disable DNS

● Enable DNS

Host: sgreenbe   Domain: banff.net

DNS Server Search Order

[. . .]   [Add]

207.34.109.254
205.233.109.40   [Remove]

Domain Suffix Search Order

[   ]   [Add]

[   ]   [Remove]

[OK] [Cancel]

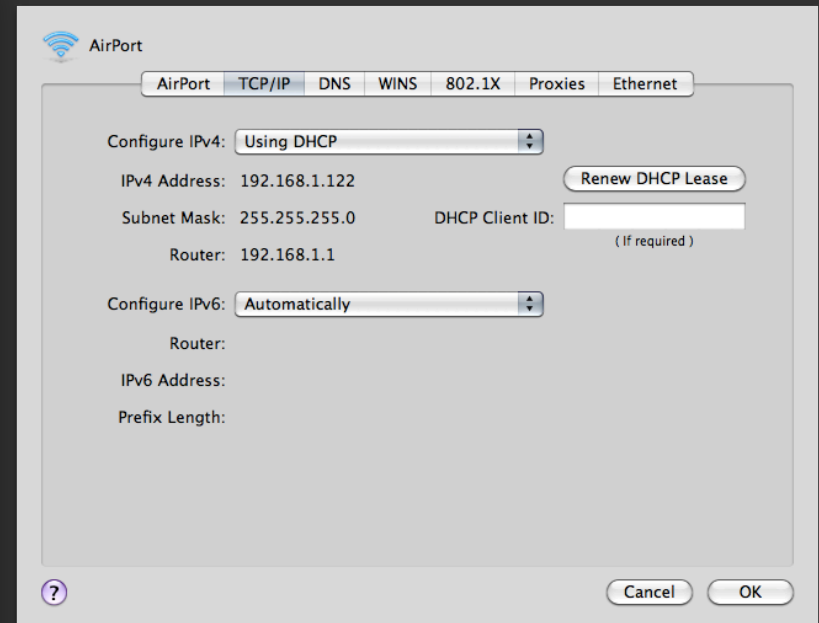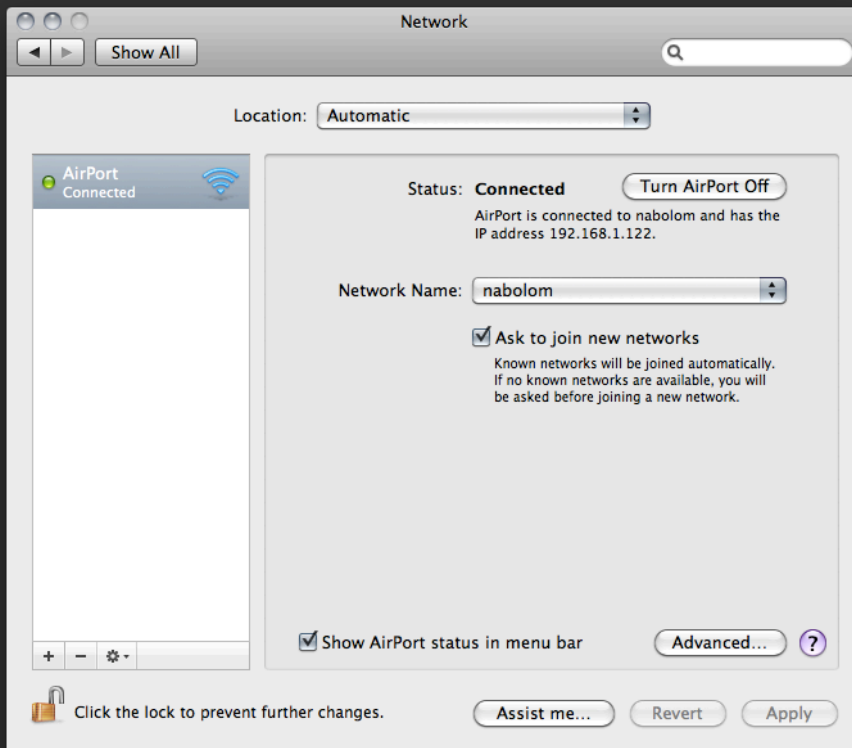# SPEAK THE USER'S LANGUAGE
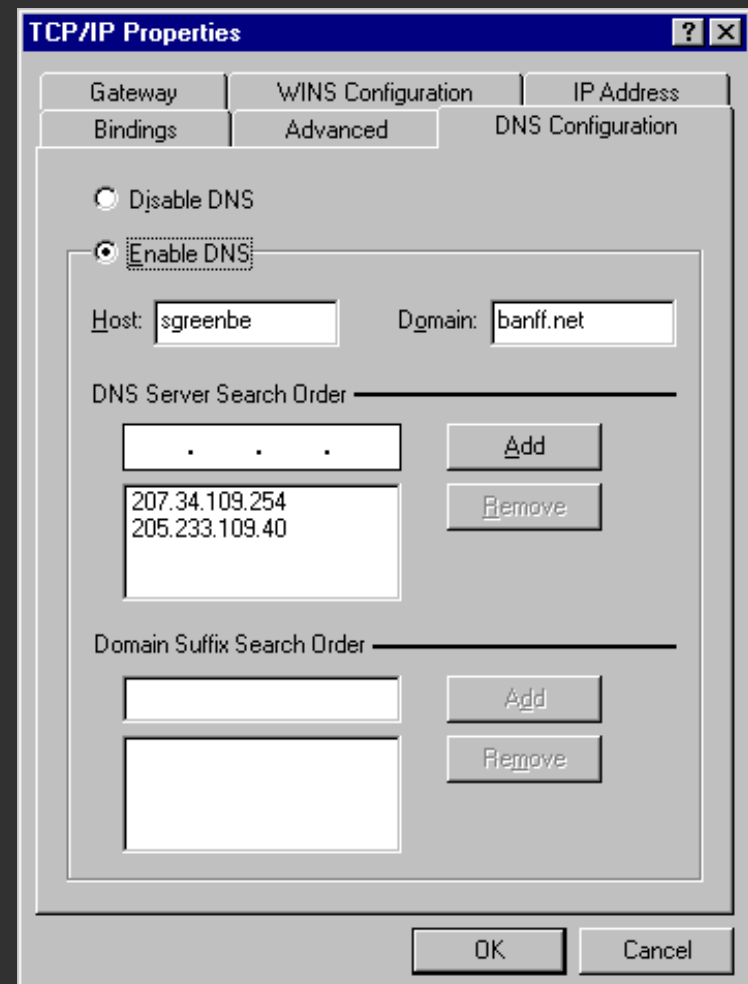
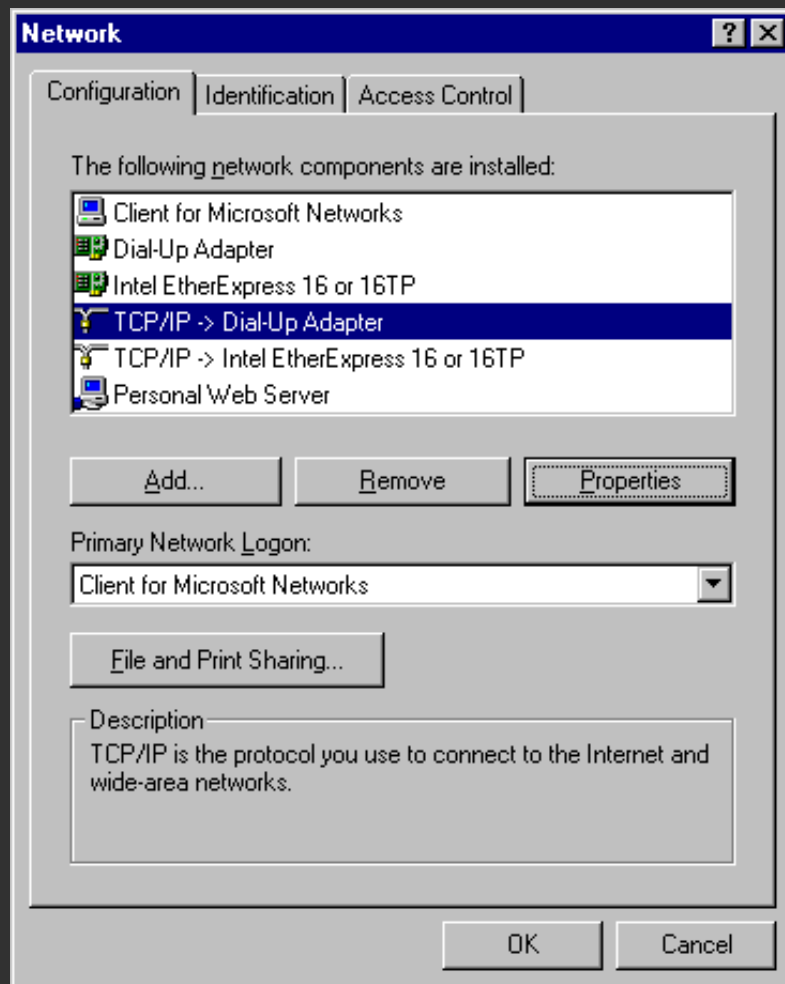Use the same terms the user would

Avoid unusual word meanings

Support synonyms and aliases

Don't impose naming conventions

Understand users and how they view their domain

Network

Show All

Location: Automatic

AirPort
Connected

Status: **Connected**   Turn AirPort Off

AirPort is connected to nabolom and has the
IP address 192.168.1.122.

Network Name: nabolom

☑ Ask to join new networks

Known networks will be joined automatically.
If no known networks are available, you will
be asked before joining a new network.

☑ Show AirPort status in menu bar   Advanced...   ?

🔒 Click the lock to prevent further changes.   Assist me...   Revert   Apply

---

AirPort

AirPort | TCP/IP | DNS | WINS | 802.1X | Proxies | Ethernet

Configure IPv4: Using DHCP

IPv4 Address: 192.168.1.122   Renew DHCP Lease

Subnet Mask: 255.255.255.0   DHCP Client ID:

Router: 192.168.1.1   (If required)

Configure IPv6: Automatically

Router:

IPv6 Address:

Prefix Length:

?   Cancel   OK

Network

Configuration | Identification | Access Control

The following network components are installed:

- Client for Microsoft Networks
- Dial-Up Adapter
- Intel EtherExpress 16 or 16TP
- **TCP/IP -> Dial-Up Adapter**
- TCP/IP -> Intel EtherExpress 16 or 16TP
- Personal Web Server

[Add...] [Remove] [Properties]

Primary Network Logon:

[Client for Microsoft Networks ▼]

[File and Print Sharing...]

Description
TCP/IP is the protocol you use to connect to the Internet and wide-area networks.

[OK] [Cancel]

TCP/IP Properties

Gateway | WINS Configuration | IP Address
Bindings | Advanced | DNS Configuration

○ Disable DNS

● Enable DNS

Host: [sgreenbe]   Domain: [banff.net]

DNS Server Search Order

[. . .]   [Add]

[207.34.109.254
205.233.109.40]   [Remove]

Domain Suffix Search Order

[ ]   [Add]

[ ]   [Remove]

[OK] [Cancel]

Recognize rather then Recall

Edit rather then Enter

Choose rather then Input

Provide a small number of basic commands

Form1

Date: [   ]

[   ] [   ] [   ]
Month   Day   Year

| May | 22 | 1997 |
Month   Day   Year

[May ▼] [22 ▼] [1997 ▼]

Appointment

General | Attendees | Notes | Planner

When

Start: [8 :30AM ▲▼] [Wed 5 /14 /97 ▼]   ☐ All day

End: [4 :30PM ▲▼] [Wed 5 /14 /97 ▼]

Description:

Smart Technology Se

◄	May 1997	►
S	M	T	W	T	F	S
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

🏠 Where: [   ]

```
% ls
#cpfa.sas#                  iron1.lst                 splot-46-betlab.txt~
#guatamalan.lst#            planetdist.sas            splot-46-pointbypoint
#splot-pointbypoint.txt#    planetdist.sas~           splot-46-pointbypoint
cholest.lst                 planetsumstat.sas         splot-pointbypoint.txt
cholest.sas7bdat            planetsumstat.sas~        splot-pointbypoint.txt
cholest2.lst                pollen.sas                splotpp.sas
cpfa.sas                    pollen.sas~               splotpp2
cpfa.sas~                   pollen1.lst               splotpp2.sas
guatamalan.lst              pollen2.lst               splotpp2.sas~
guatemalan.sas              pollen3.lst               splotpp3
guatemalan.sas~             pollen4.lst               splotpp3.sas
intrins.lst                 pollen5.lst               splotpp4.sas
intrins.sas                 pollen6.lst               veggies.sas
intrins.sas~                solar.lst                 veggies.sas~
iron.sas                    solarnlog.lst
iron.sas~                   splot-46-betlab.txt
%
```

Ensure that the same action always has the same effect (avoid modes)

Present the same information in the same location

Follow established standards and conventions
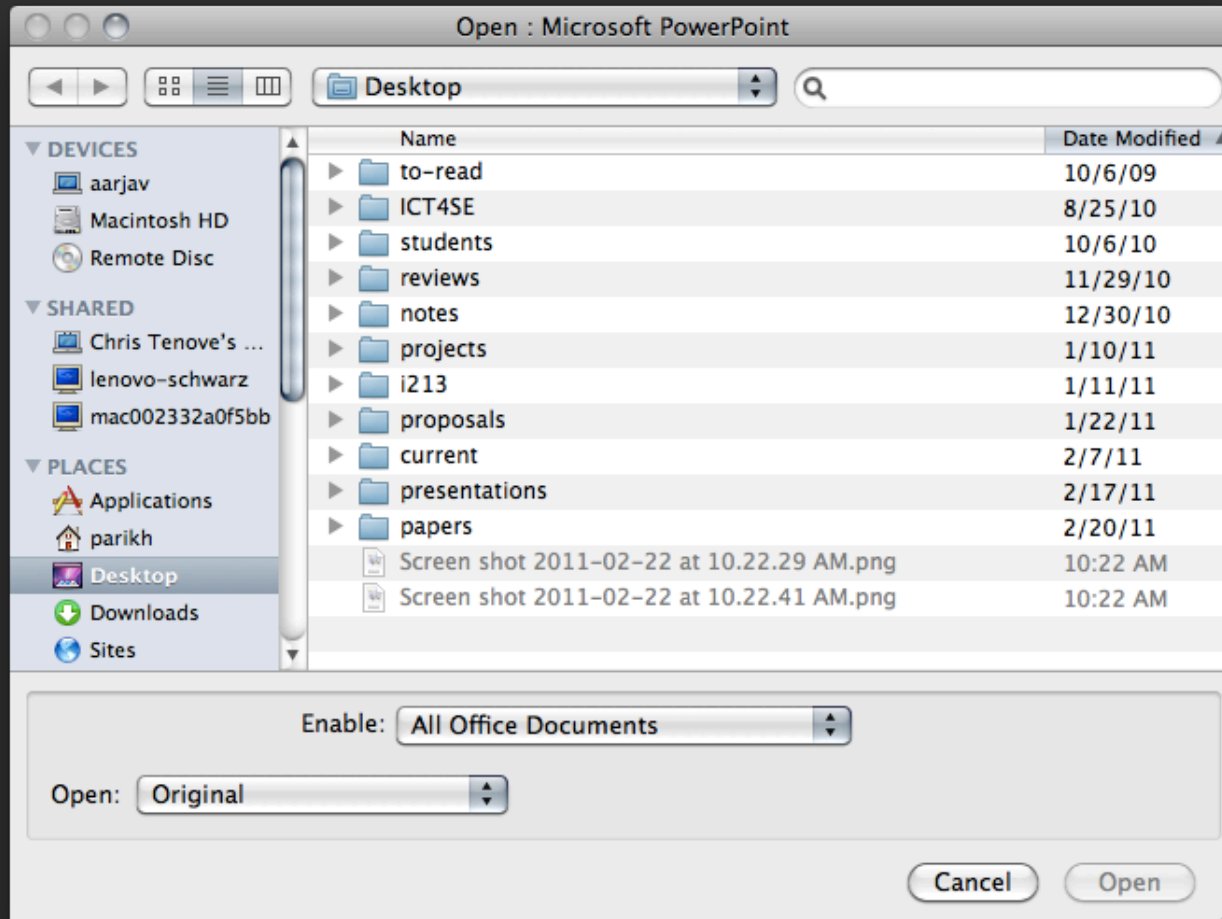
Continuously inform the user about what is going on

Restate and rephrase user input

Provide warnings for irreversible actions

Give informative feedback even if the system fails

what mode am I in now?

how is the system interpreting my actions?

what did I select?

Provide a progress indicator for any operation longer then ten seconds

Reassure the user system hasn't crashed

Indicate how long user has to wait

Provide something to look at

If can't provide specific progress, use generic "working" indicator like the spinning ball in Mac OS X
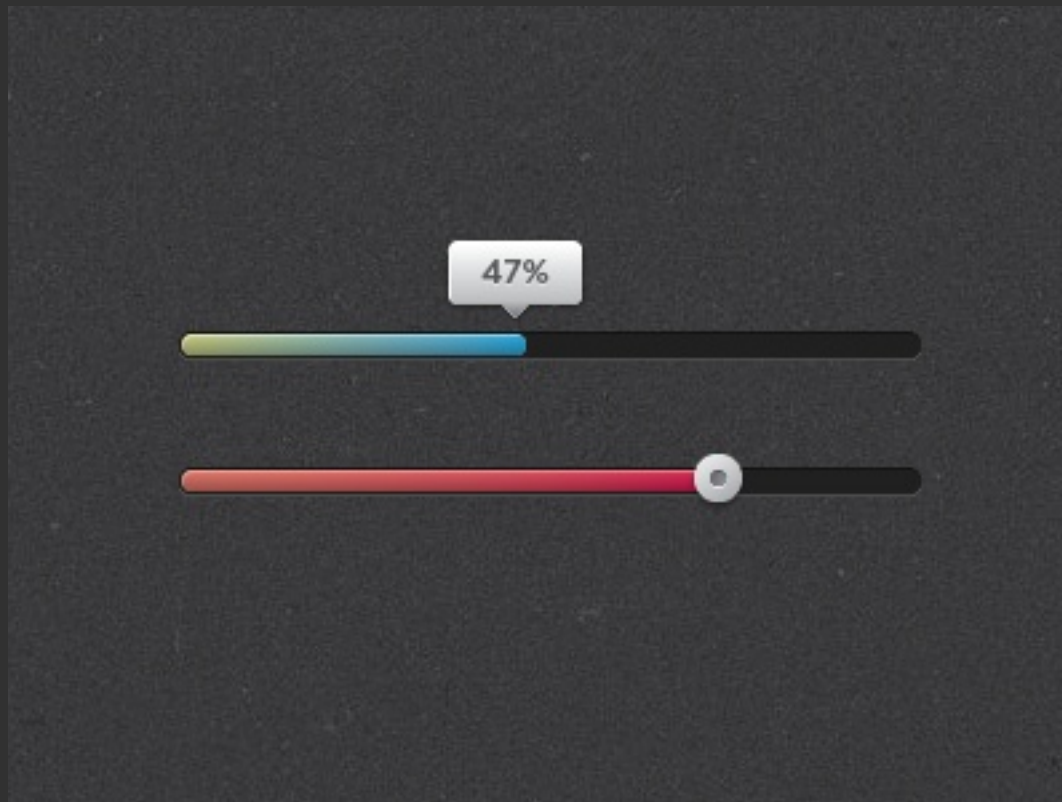
360 degree tour progress location bar

Active Progress
Completed Progress
Available Entry
Unavailable Entry

0.1 second - perceived as instantaneous

1 second - user's flow of thought stays uninterrupted, but delay noticed

10 seconds - limit for keeping user's attention focused on the dialog

>10 seconds - user will want to perform other tasks while waiting

Don't "trap" the user

Provide an easy way out of trouble

Encourage exploratory learning

Mechanisms:
- Cancel
- Undo, Revert, Back
- Interrupt
- Exit

Adobe Illustrator

You are saving this document in Adobe Illustrator 9.0 format. Saving this document in an older format may disable some editing features when the document is read back in.

Yes   No

Now installing files, please wait...

Writing: E:\DRAWLT\SAMPLES\S-06-20.VLM

Percent Copied: 0%   ▐████▌   100%

Press [Esc] To Abort

Allow expert users to go fast

Avoid GUI operations

Mechanisms:
- Keyboard shortcuts
- Macros, scripts
- Type ahead
- Bookmarks, History

Keyboard accelerators for menus

Customizable toolbars and palettes for frequent actions

Split menu, with recently used fonts on top

Double-click raises toolbar dialog box

Double-click raises object-specific menu
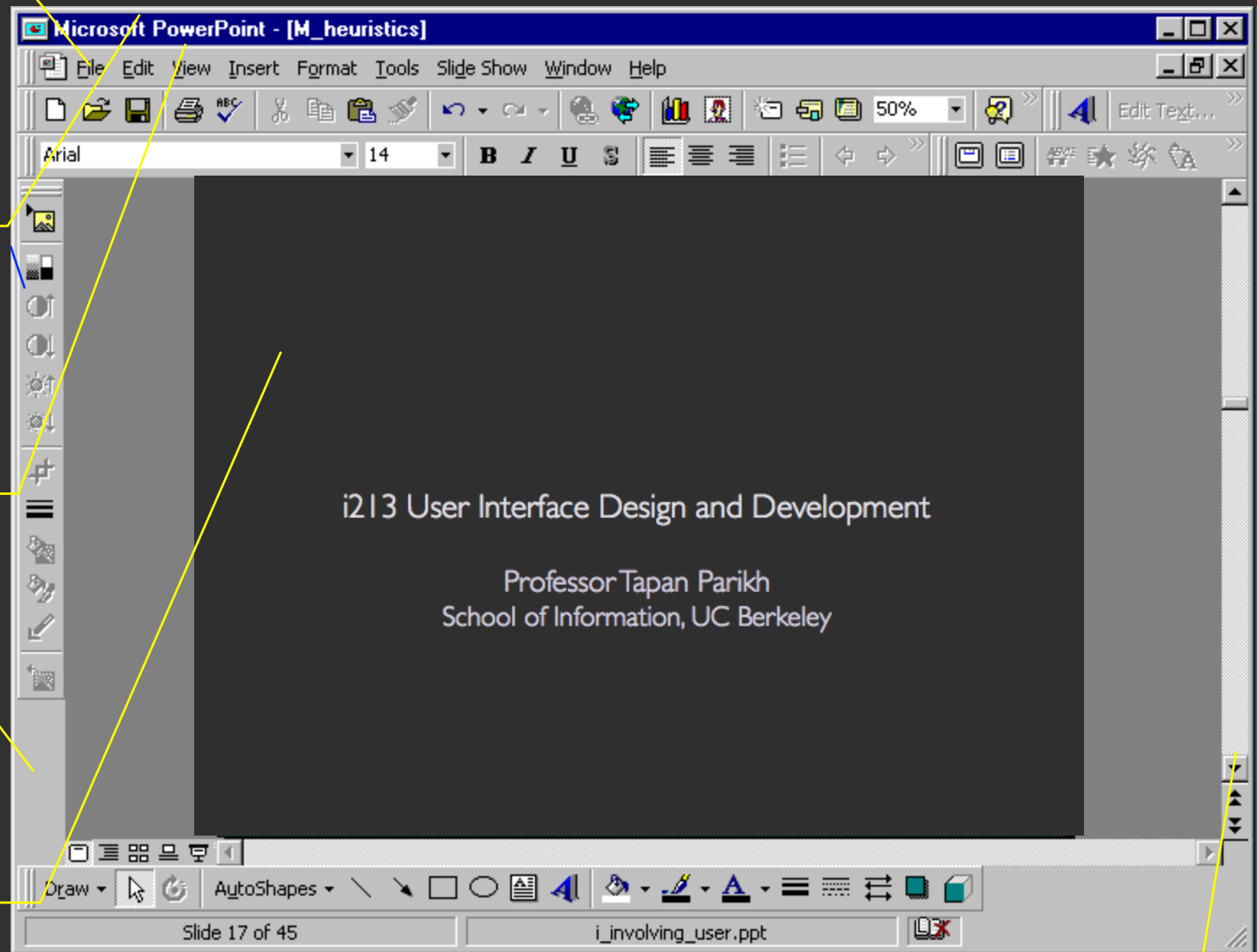
Scrolling controls for page-sized increments

Microsoft PowerPoint - [M_heuristics]

File Edit View Insert Format Tools Slide Show Window Help

Arial   14   B I U S

i213 User Interface Design and Development

Professor Tapan Parikh
School of Information, UC Berkeley

Draw   AutoShapes

Slide 17 of 45   i_involving_user.ppt

GOOD ERROR MESSAGES

Phrased in clear language

Avoid obscure codes

Precisely indicate the problem

Restate user input

Do not blame the user

Constructively suggest a solution
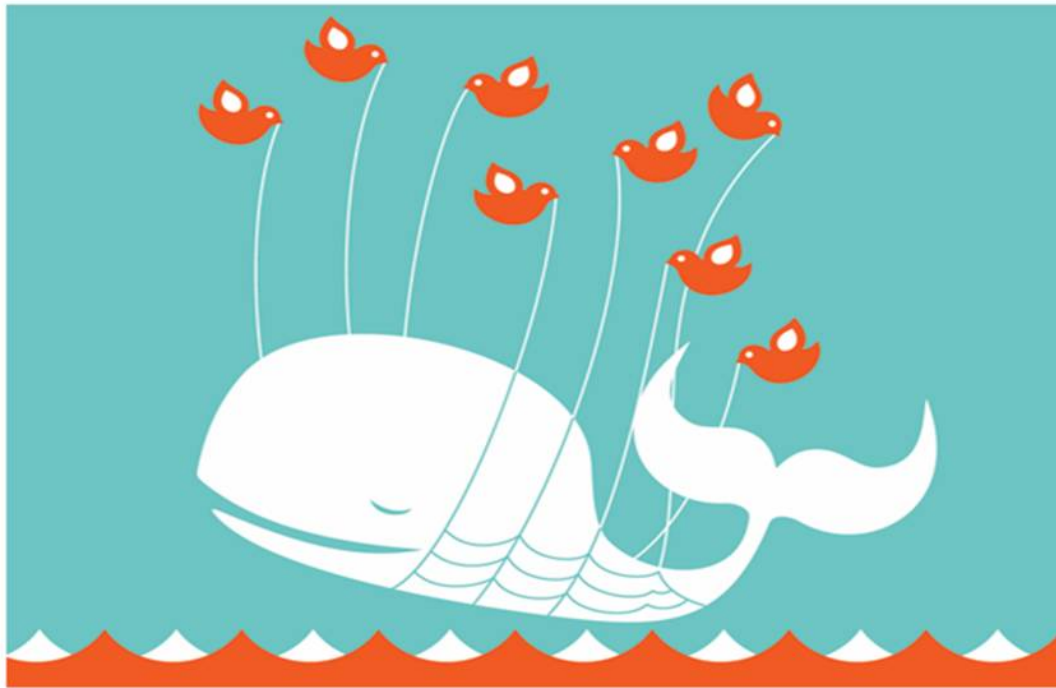
Opportunity to help user in time of need

BAD

Windows Help

? Cannot find the cuecard.hlp file. Do you want to try to find this file yourself?

Yes   No

GOOD?

Applicant Tracking System - Printer Error

The Applicant Tracking System seems to have lost communication with the printer.

To solve this problem, make sure that the printer is switched on, and try to print again.

If printing still fails, try wiggling the cable that runs between the computer and the printer. Make sure the cable is connected securely at both ends, and try to print again.

If the program still fails to print properly, please call Joe Grant at (212) 555-1212, and tell him that the program is reporting Error ATSPR35 at line 31 in module PRNFNC.

OK

PREVENT ERRORS

Bounds-checking

Select rather then Enter

Judicious use of confirmation screens

Avoid modes, unless they are clearly visible or require action to maintain
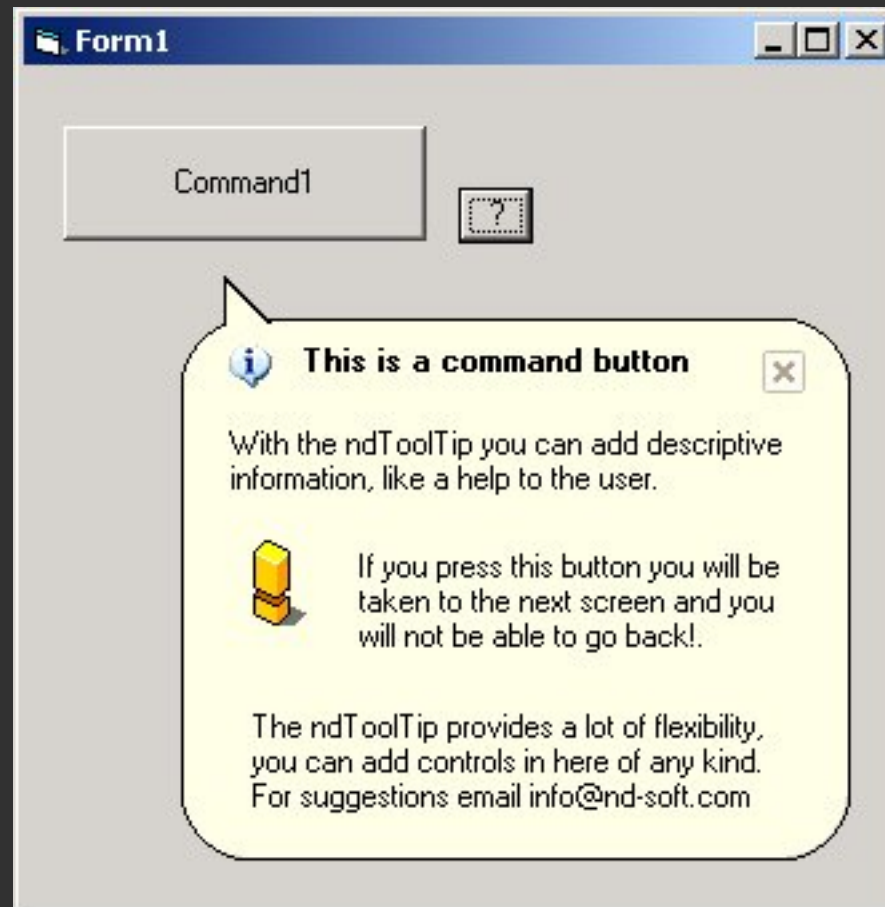
HELP AND DOCUMENTATION

Easy to search

Task-oriented

List concrete steps

Provide context-specific help

Shouldn't be too large

Is not a substitute for good design

HELP AND DOCUMENTATION

Tour / Demo

Tutorials

User Guide / Reference manual

Searchable index

Tooltips, Balloon Help

Reference cards

Keyboard templates

HEURISTIC EVALUATION

Can use hi-fi or lo-fi prototype

Each session should last 1-2 hours

Evaluator should go through the interface several times, with specific tasks in mind

- First pass: overall feel and scope, identify obvious violations

- Second pass: focus on specific elements

CONDUCTING A HEURISTIC EVALUATION

3-5 evaluators are enough to uncover most important problems

Each evaluator should inspect the interface alone (to reduce bias)

After the session, the evaluators aggregate observations

Output is a list of usability problems

CONDUCTING A HEURISTIC EVALUATION

If the system is intended to be "walk up and use", then evaluators should be provided with minimal help

If the system requires training, then evaluators should be trained and given an example scenario

Evaluator can be helped after they have made an attempt and articulated their difficulties

Pre-evaluation training

Evaluation

Severity / Fixability rating

Debriefing

Provided by each evaluator

Based on *frequency, impact, persistence*

Combined into a single numeric index

Average taken across evaluators

Allows for prioritization of fixes

0: don't agree that this is a problem

1: cosmetic problem

2: minor problem

3: major problem; important to fix

4: catastrophe; imperative to fix

Describes how easy each problem would be to fix

Requires some technical knowledge of system & platform

Allows for estimating "cost-benefit"

Can provide possible fix as guidance to development team

0: Impossible to Fix

1: Nearly Impossible to Fix

2: Difficult to Fix

3: Easy to Fix

4: Trivial to Fix

Conducted with evaluators, observers, and development team

Discuss characteristics of UI

Suggest improvements to address major usability problems

Dev team provides fixability ratings (if it exists)

Make it a brainstorming session

Adapted from Saul Greenberg

A list of problems with heuristics, severity, fixability and possible fixes

Evaluator: John T. Doe

Date: January 1, 2008

System: Nokia Mobile Phone Model #9999

Number	Heuristic	Location	Description	Severity	Fixability	Sum	Possible Fix
1	Visibility of system status	Home screen	The home screen does not portray any information about battery power remaining, making it hard for users to tell how much power they have left.	3	3	6	Display a battery life indicator on the home screen.
2	User control and freedom	Screen for writing a text message	Once you are on the screen for writing a text message, you cannot leave without sending the message. Users need a way to get out if they decide not to send a message.	3	2	5	Allow the CLR button to always move the user back one screen no matter where they are.

Adapted from Jake Wobbrock

For next time

Low fidelity paper prototypes due

In class formative evaluation