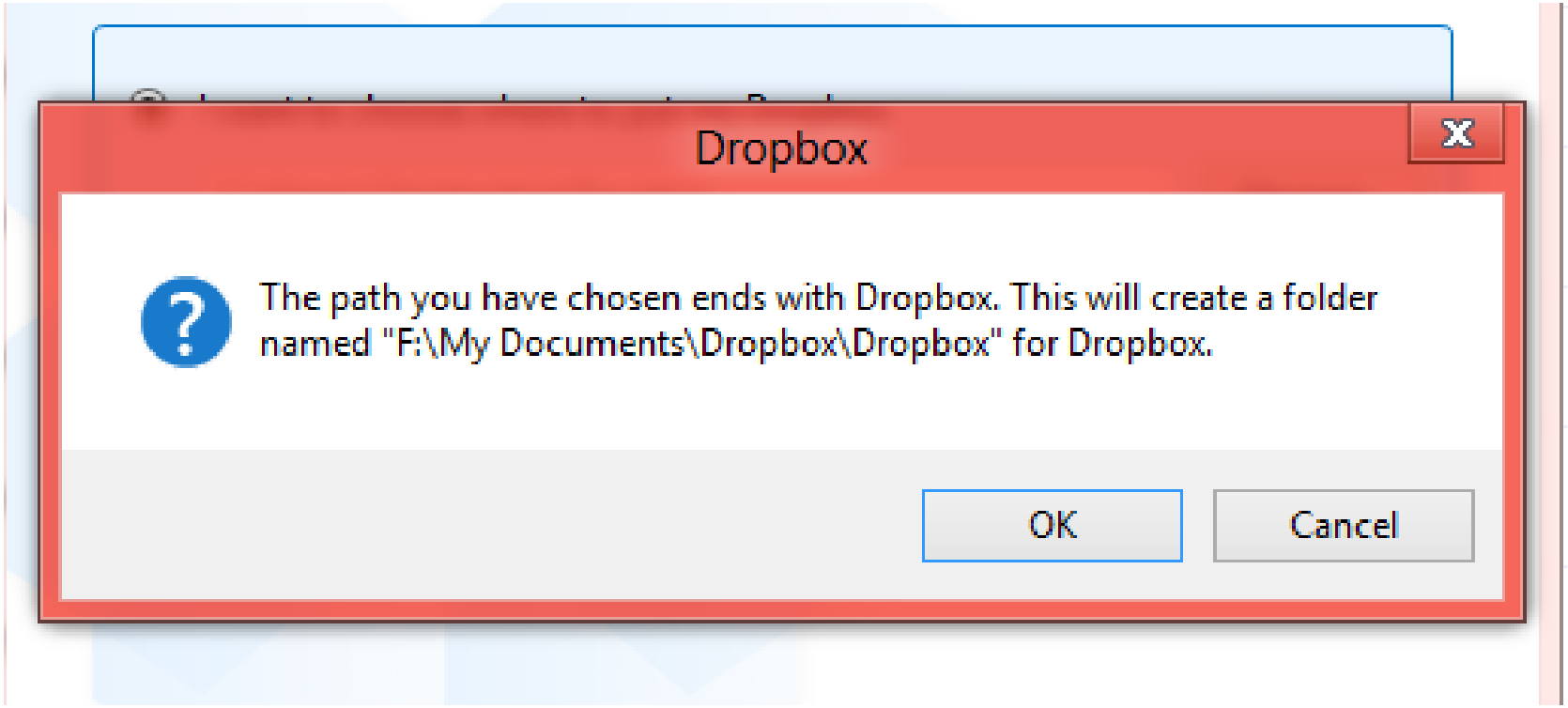
UNIVERSITY OF ONTARIO INSTITUTE OF TECHNOLOGY

Benyon text
Chapter 12 and 13

Styles of Interaction

Human Computer Interaction
CSCI 4620U| SOFE 4850U | CSCI 5540G
Dr. Christopher Collins

Acknowledgement: Parts of these lectures are based on material prepared by Ron Baecker, Ravin Balakrishnan, John Chattoe, Ilona Posner, Scott Klemmer, and Jeremy Bradbury.


Dropbox
The path you have chosen ends with Dropbox. This will create a folder named "F:\My Documents\Dropbox\Dropbox" for Dropbox.
OK
Cancel

Last Time

- Scenarios, Task Analysis, and Requirements

Today

- Styles of Interaction

Don’t forget to check Blackboard for required readings!
This week: Several parts of Benyon Text

HCI Theory

STYLES OF INTERACTION

Defining Interaction

"the communication between user and system"

- Dix, Finley, Abowd, Beale

The Range of Interaction

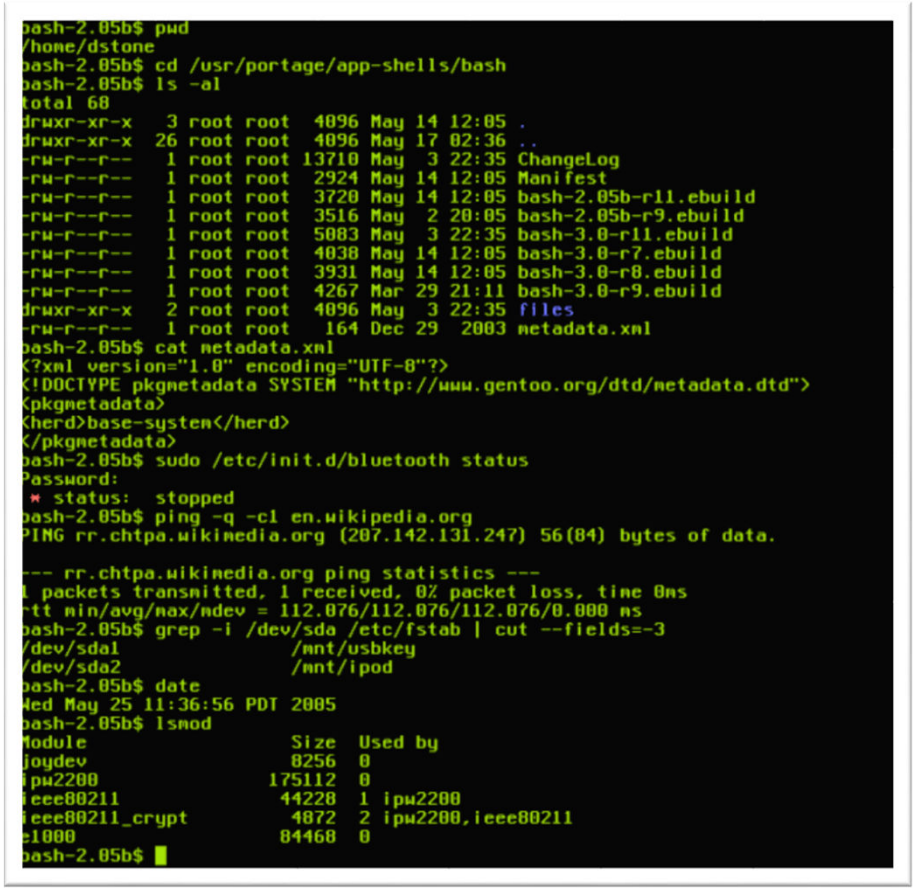
Minimal interaction…
User enters all input into the system and waits for output.
(e.g., punchcards)

High-degree of interaction…
User is constantly entering input and receiving output from the system
(e.g., virtual reality)

Styles of Interaction

- There are many different kinds of interaction between humans and computers – these are often referred to as styles
- Examples of interaction include:
  - Command-line interfaces
  - Menus
  - Natural language
  - Question/answer dialogs
  - Forms
  - WIMP interfaces
  - Point-and-click interfaces
  - 3D interfaces
  - Touch / Gesture

Command-line Interface



(Source: Wikipedia - http://en.wikipedia.org/wiki/Image:Bash_screenshot.png)

Command-line Interface

- **Advantages:**
  - Very expressive and flexible
  - Direct access to the system
  - Ideal for "experts"
- **Disadvantages:**
  - Hard to learn for newbies
    - **Example:** Unix shell. Requires users to learn many different commands. In order to get help users often need to know the command they are looking for (MAN pages)

Menus

- Items in menu-based interfaces can often be selected using the keyboard or mouse

Personal Information Updater (v1.0)

Please select an option:
1. Updated address
2. Update phone number
3. Update email
4. Change password
5. Updated security question
6. Quit

What about touch?

Menus

- **Advantages:**
  - Menu item names and order can provide help to newbies and "non-experts" in navigating the system (recognition vs. recall)
- **Disadvantages:**
  - Limited flexibility
  - Limited power

Natural Language

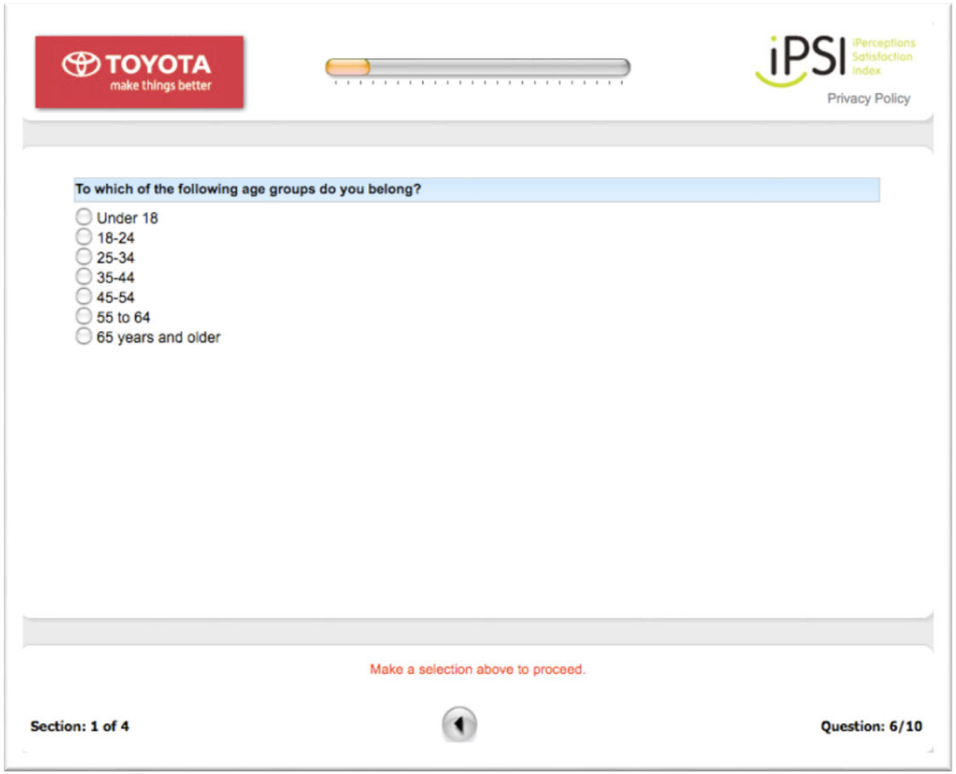
- Natural language interfaces are common in limited domains
- **Example:** Siri (others?)
- General natural language interfaces are difficult to implement

Natural Language

- **Advantages:**
  - Very flexible and expressive (if computer has an open vocabulary) – generally not the case!
- **Disadvantages:**
  - Natural languages are ambiguous – difficult for system to know what you are saying
  - Implementation of natural languages usually requires a limited vocabulary and requires users to know what words/phrases the system will understand
  - Language systems often do not give information regarding what is required next
  - Understanding (logical meaning) is harder than recognition
  - Error handling is difficult

Question/Answer Dialogs

- One common example is web questionnaires



(Source: Toyota Canada website - http://www.toyota.ca/)

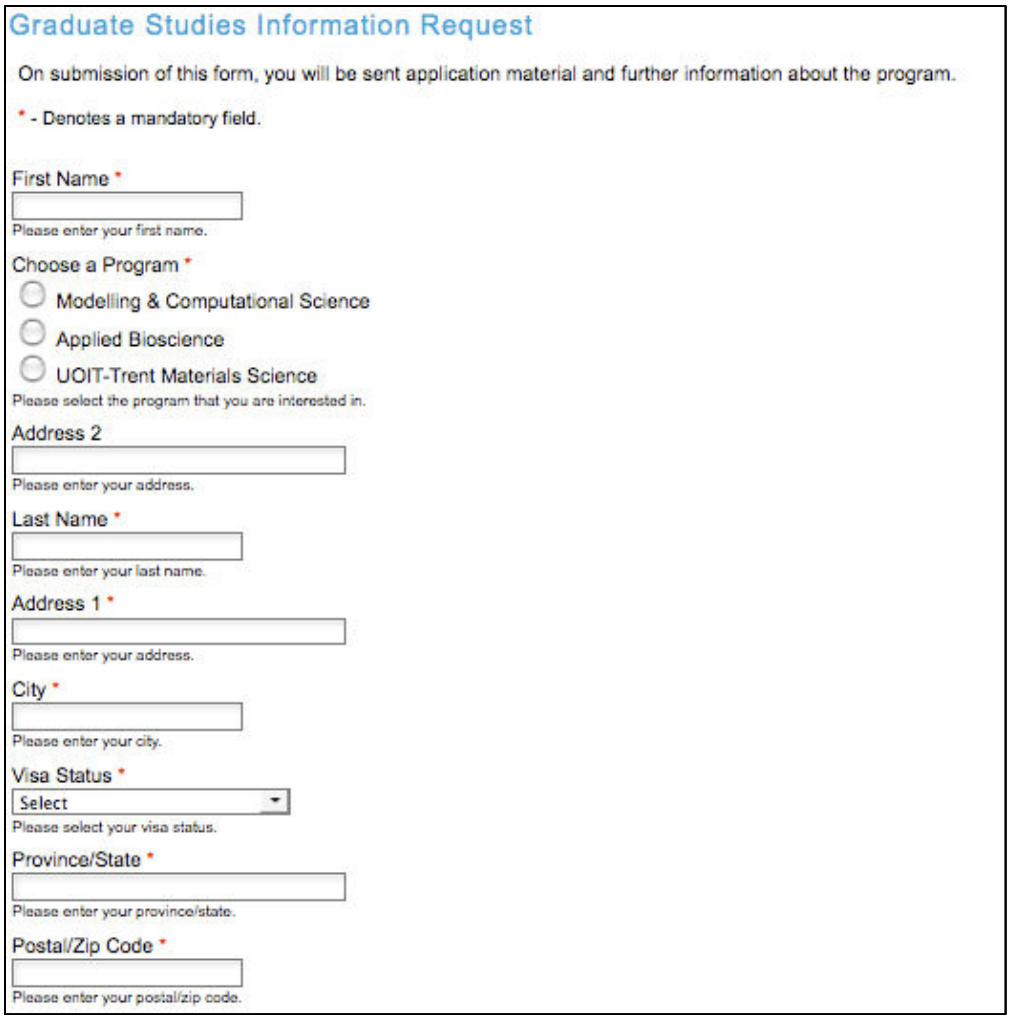
Question/Answer Dialogs

- **Advantages:**
  - Good for obtaining specific input
  - Easy to use – works well for first time users
- **Disadvantages:**
  - Limited power
  - Limited flexibility

Forms

- Form-based interfaces are common on the web, in retail systems, in options dialogs, etc.

(Source: UOIT Faculty of Science website - http://www.science.uoit.ca)



Forms

- **Advantages:**
  - Can provide flexible data entry
    - You can fill in fields in different orders
    - You can choose not to fill in some fields
- **Disadvantages:**
  - Limited applications. Not a general model of an interface

WIMP Interfaces

WIMP = Windows, Icons, Menus, Pointers

- Any Window-based operating system interface is an example of a WIMP interface
- **Examples:** Windows Aero, Mac OSX, KDE,…

Windows

- Areas of the screen that behave as if they were independent
  - can contain text or graphics
  - can be moved or resized
  - can overlap and obscure each other, or can be laid out next to one another (tiled)

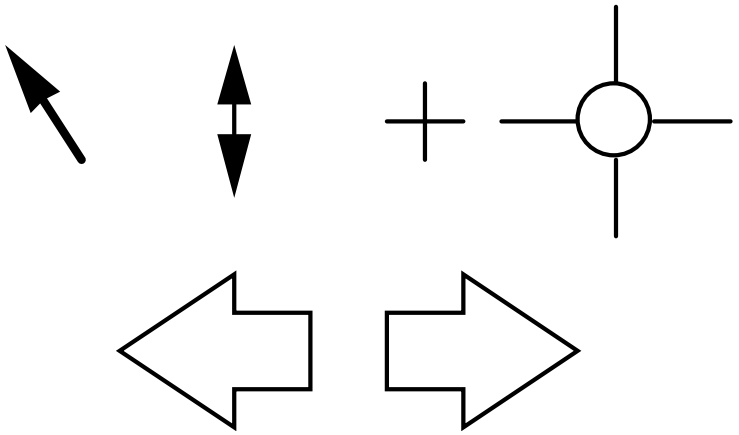
- scrollbars
  - allow the user to move the contents of the window up and down or from side to side
- title bars
  - describe the name of the window

Icons

- small picture or image
- represents some object in the interface
  - often a window or action
- windows can be closed down (iconised)
  - small representation fi many accessible windows
- icons can be many and various
  - highly stylized
  - realistic representations.

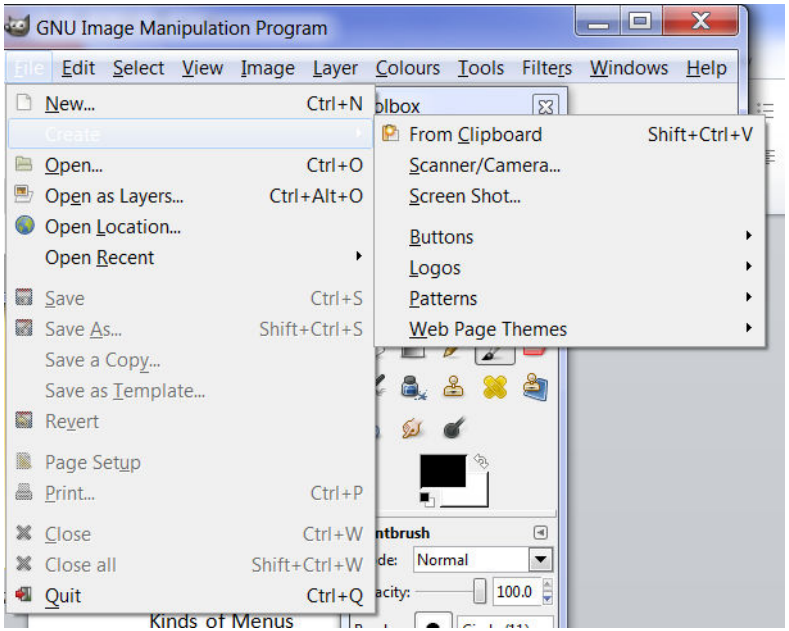
Pointers

- important component
  - WIMP style relies on pointing and selecting things
- uses mouse, trackpad, joystick, trackball, cursor keys or keyboard shortcuts
- wide variety of graphical images



Menus

- Choice of operations or services offered on the screen
- Required option selected with pointer



problem – take a lot of screen space

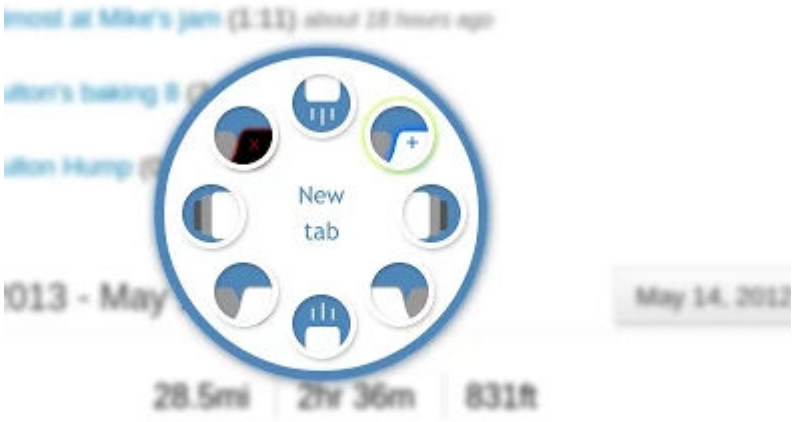
solution – pop-up: menu appears when needed

Kinds of Menus

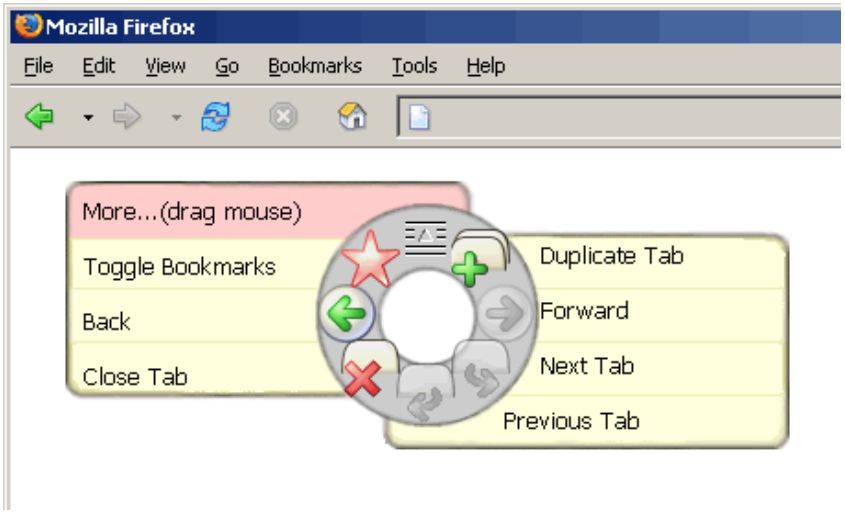
- Menu Bar at top of screen (normally), menu drags down
  - pull-down menu - mouse hold and drag down menu
  - drop-down menu - mouse click reveals menu
  - fall-down menus - mouse just moves over bar!

- Contextual menu appears where you are
  - pop-up menus - actions for selected object
  - pie menus - arranged in a circle
    - easier to select item (larger target area)
    - also called “Marking menus” if you can use them with a gesture
    - quicker (same distance to any option)
      … but not widely used!

Try out Pie Menus!



Marking menu for Chrome:
http://goo.gl/I6fTFy



Firefox Easy Gestures add-on:
http://easygestures.mozdev.org/index.html

Menus extras

- Cascading menus
  - hierarchical menu structure
  - menu selection opens new menu
  - and so in ad infinitum

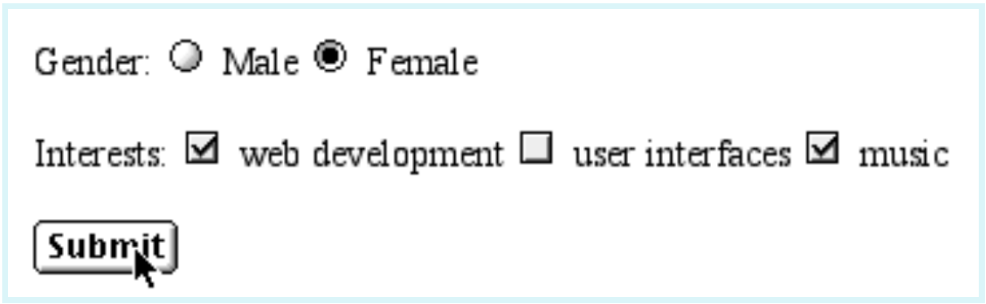
- Keyboard accelerators
  - key combinations - same effect as menu item
  - two kinds
    - active when menu open – usually first letter
    - active when menu closed – usually Ctrl + letter
    - often different!

Menus design issues

- which kind to use
- what to include in menus at all
- words to use (action or description)
- how to group items
- choice of keyboard accelerators

Buttons

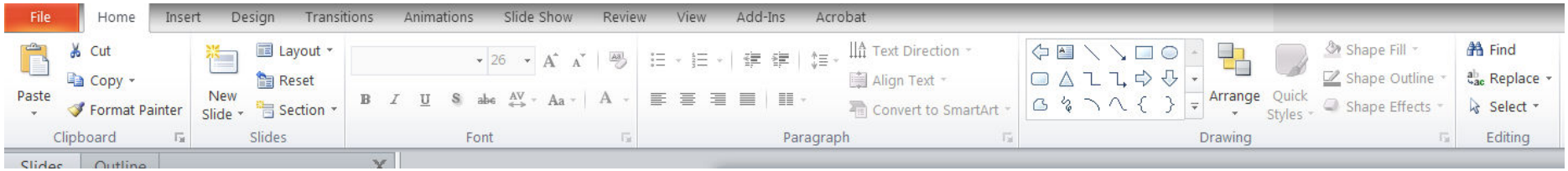
- individual and isolated regions within a display that can be selected to invoke an action



- Special kinds
  - radio buttons
    - set of mutually exclusive choices
  - check boxes
    - set of non-exclusive choices

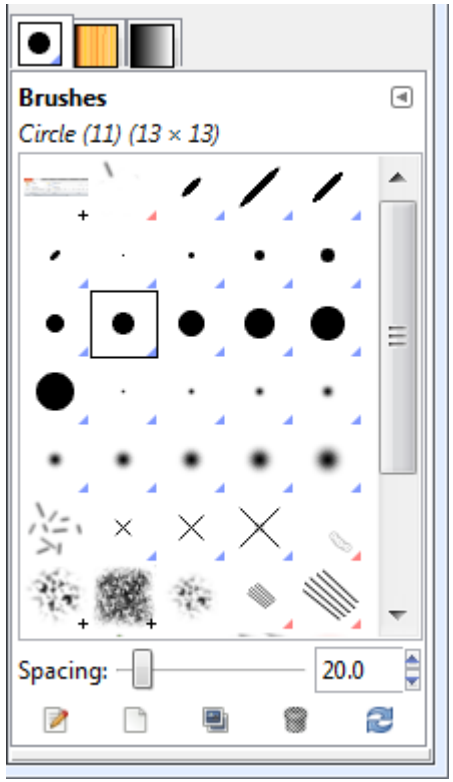
Toolbars

- long lines of icons …
  … but what do they do?
- fast access to common actions
- often customizable:
  – choose which toolbars to see
  – choose what options are on it
  – large toolbars: “the ribbon”



Palettes and tear-off menus

- Palettes – little windows of actions
  - shown/hidden via menu option
    e.g. available shapes in drawing package
- Tear-off and pin-up menus
  - menu ‘tears off’ to become palette



Dialog boxes

- information windows that pop up to inform of an important event or request information.
  - e.g: when saving a file, a dialog box is displayed to allow the user to specify the filename and location. Once the file is saved, the box disappears.

Other WIMP features

- Wikipedia has an extensive list of WIMP features:
  - http://en.wikipedia.org/wiki/Window_manager

(Source: Ubuntu website - http://www.ubuntu.com/products/whatisubuntu/804features/)

WIMP Interfaces

- **Advantages:**
  - Very flexible and expressive
  - Can be used for a variety of different systems
- **Disadvantages:**
  - Some interface features can be hard to learn
    - However, not to the same extent as command-line interfaces

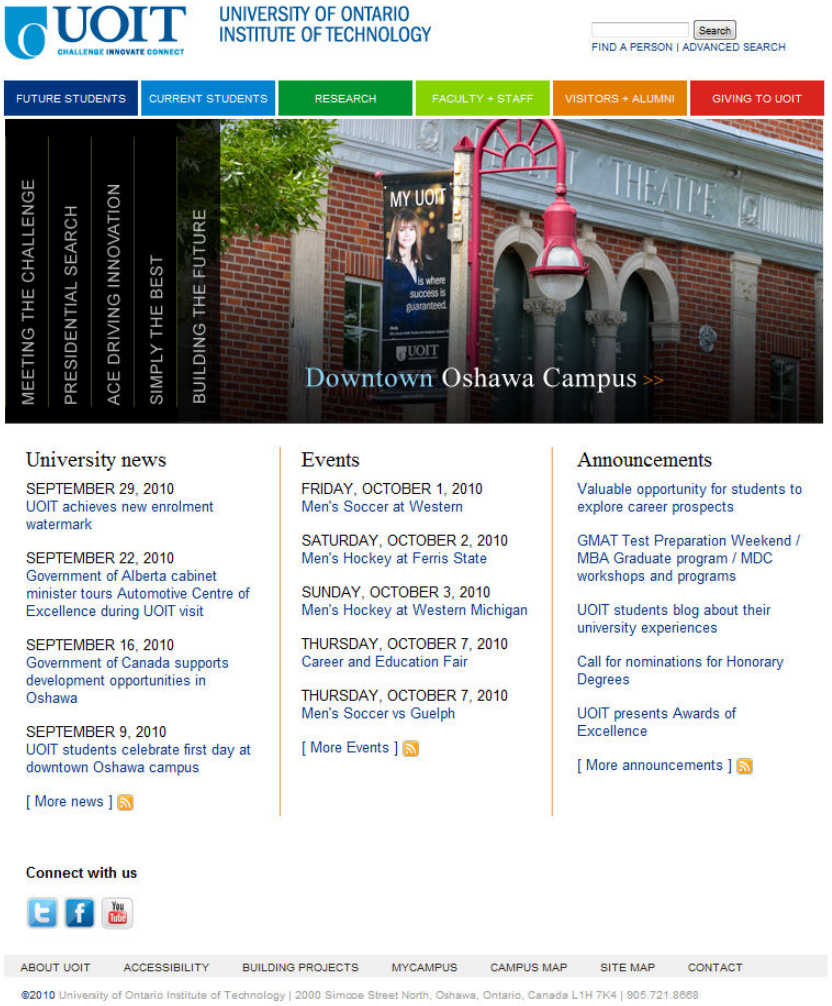
The WIMP story...

Composite Window Managers

- Advanced graphical features
  - Transparency
  - 3D
  - Deformantions
  - Live thumbnails
- Example – Compiz for Linux
- What do you think of this?

Point-and-Click Interfaces

- The most common example of this interface is web pages!



(Source: UOIT website – http://www.uoit.ca)

Point-and-Click Interfaces

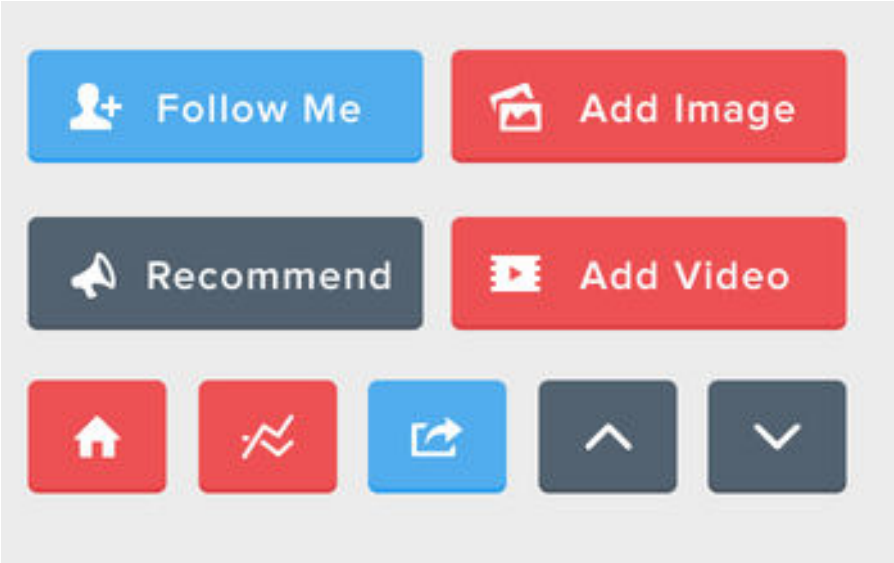
- **Advantages:**
  - Simpler than WIMP
- **Disadvantages:**
  - Doesn’t work for all systems

3D Interface

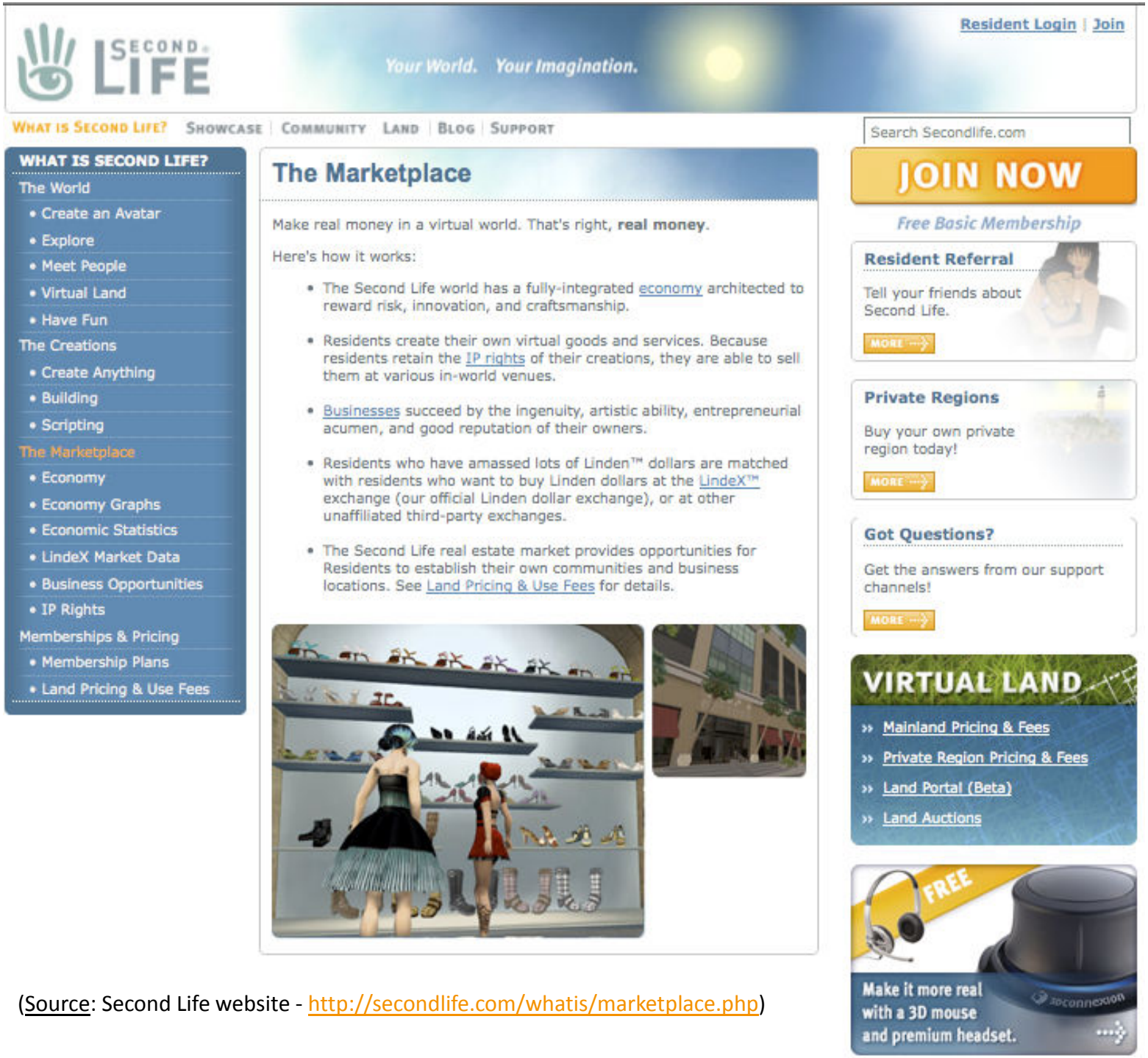
- 3D interfaces are unique from all of the other interfaces from the simple fact that they are not 2D
- There are many different kinds of 3D interfaces such as:
  - Virtual Reality
  - 3D implementations of WIMP interfaces
  - 3D as a visual affordance

3D as a Visual Affordance

flat buttons …



click me!



(Source: Second Life website - http://secondlife.com/whatis/marketplace.php)

3D Interfaces

- **Advantages:**
  - Flexible and expressive
- **Disadvantages:**
  - Depending on the environment can require expensive equipment for input/output (e.g., virtual reality)
  - Very difficult to use with standard input hardware

Touch / Gesture

- Touch is an input modality, but like speech, it is so different that it leads to different models of interaction
- Within touch, there are many types of interaction:
  - Tapping (single touch)
  - Gestures (single touch, sequence of movement)
  - Multitouch gestures (sequence of touch movements)


1:46 PM
AT&T
Done
Notifications
Pull down to update...
Last updated: 10-08-22 1:46 PM
Anne Katz-Hanna commented on Alex Kerner's link. Fri 7:02 PM
Alex . commented on Alex Kerner's link. Fri 4:12 PM
Lindsay MacDonald tagged you in a post. Fri 2:15 PM
m Tohidi likes your link. Fri 11:58 AM
Petra Riedlberger also commented on Anastasia Kutt's photo.
Thu 1:41 PM
Tobias Isenberg also commented on his status. Wed 2:21 PM


Done
Notifications
Release to update...
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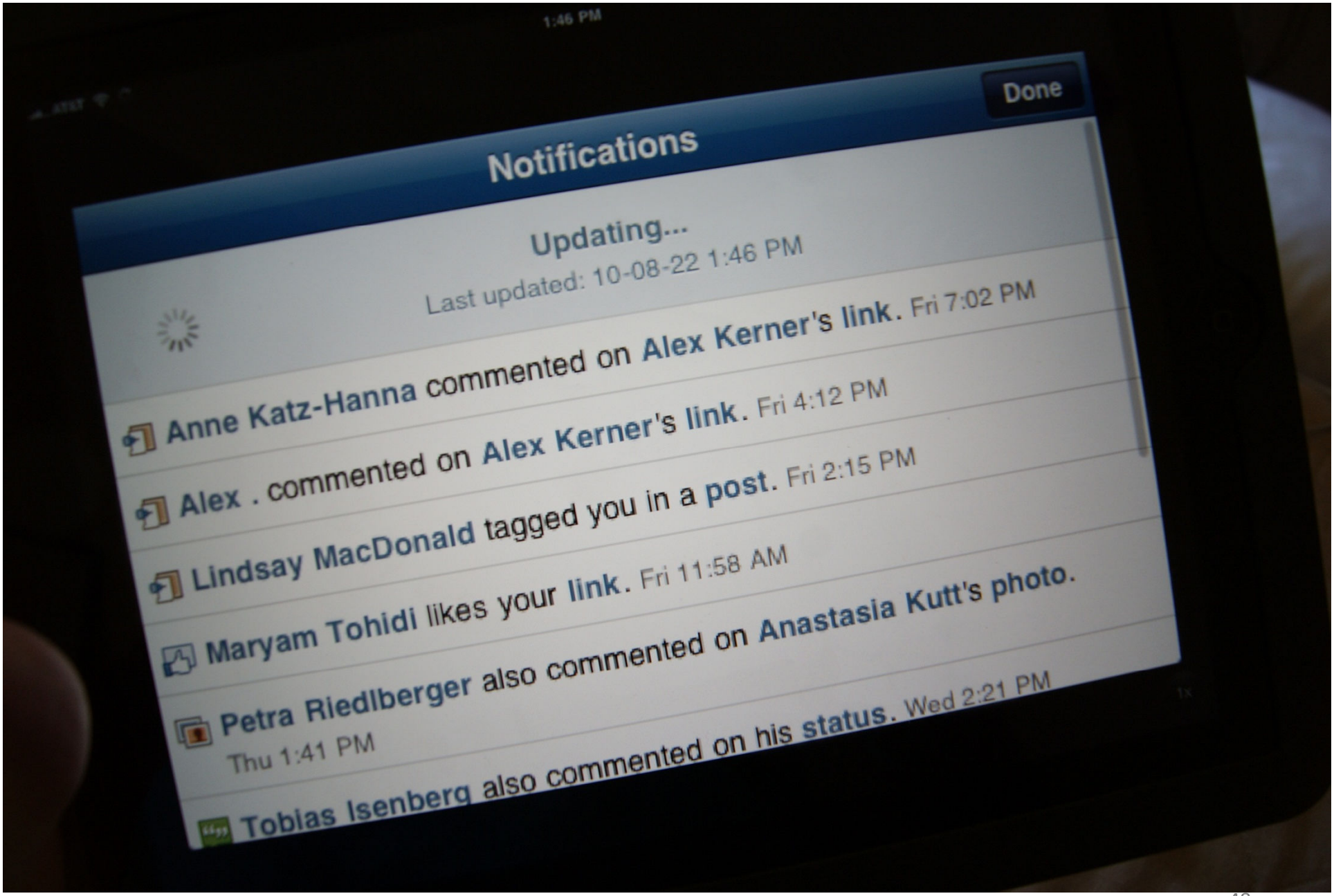
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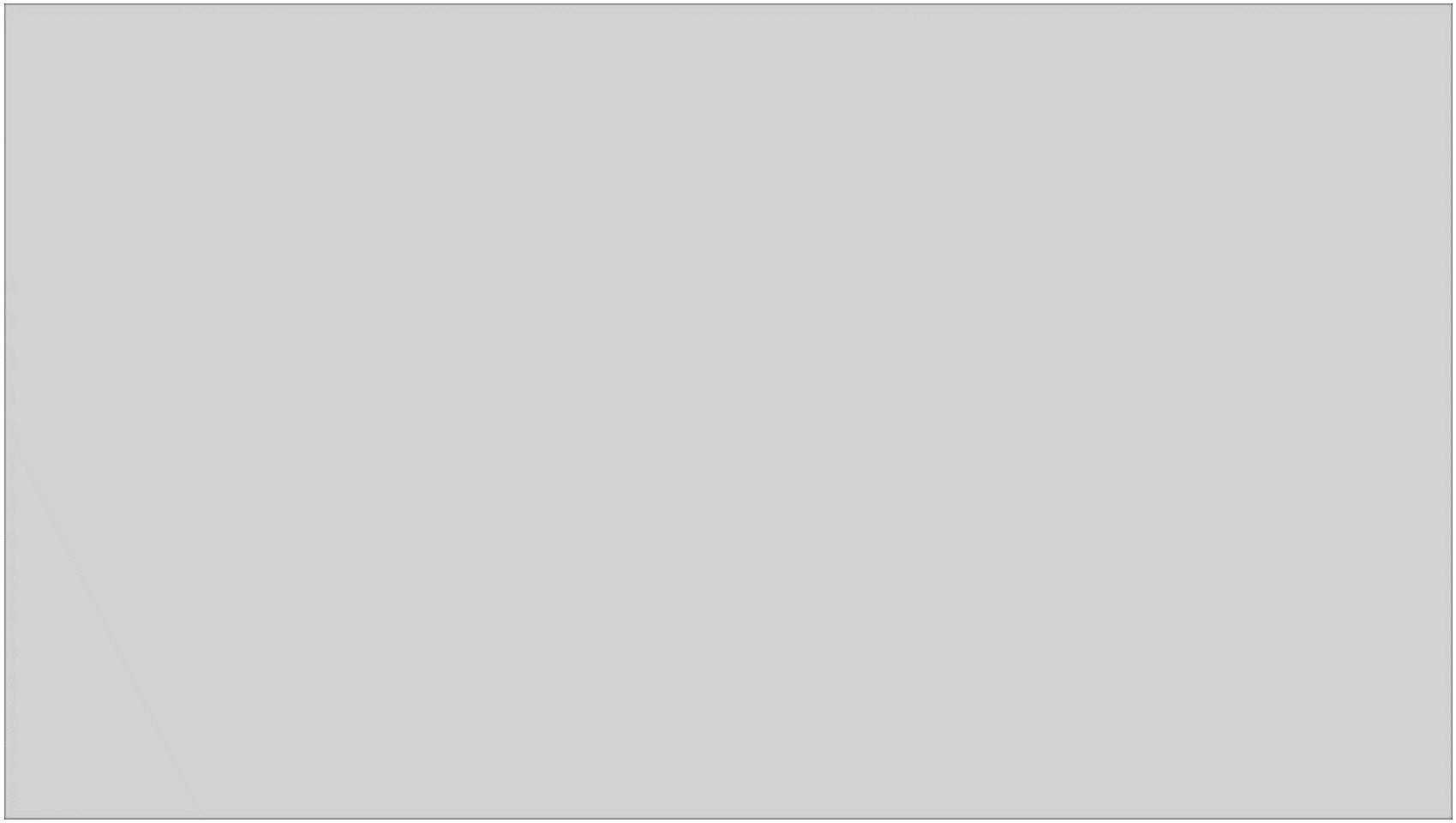
Leap Motion



Touch / Gesture

- **Advantages:**
  - Flexible and natural
- **Disadvantages:**
  - Input modality leads to frequent slips
  - Slower for some tasks (text entry)
  - Poorly designed and inconsistent gestures are difficult to remember

Mixing Styles of Interaction

- We have examined 8 interaction styles:
  - Command-line interfaces
  - Menus
  - Natural language
  - Question/answer dialogs
  - Forms
  - WIMP interfaces
  - Point-and-click interfaces
  - 3D interfaces
- Interfaces also combine or mix different styles
  - **Example:** web pages often combine point-and-click interfaces with forms

Mixing 2D/3D

VisLink: Revealing Relationships Amongst Visualizations

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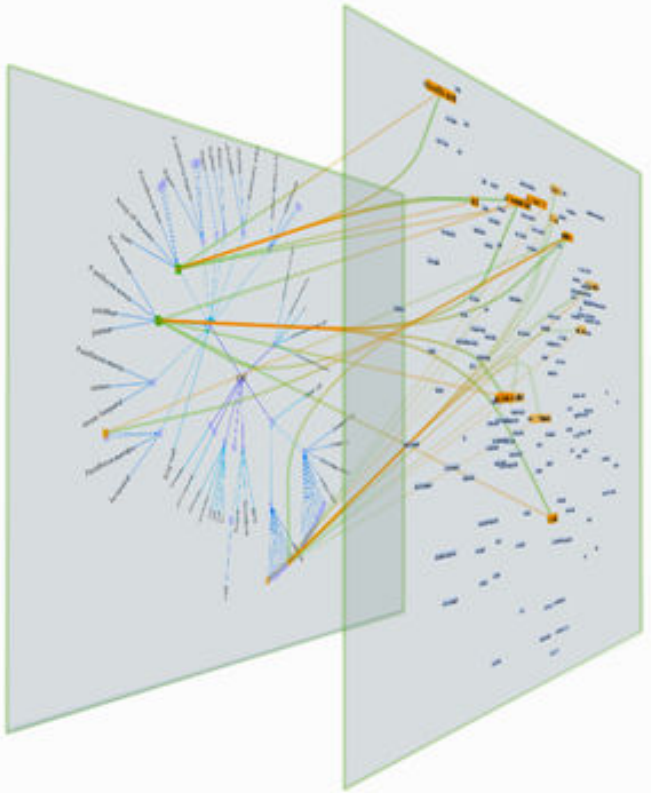

IEEE Information Visualization 2007

Mixing WIMP/3D

Keepin' It Real:
Pushing the Desktop Metaphor with Physics, Piles and the Pen in BumpTop

Anand Agarawala, Ravin Balakrishnan
Dynamic Graphics Project
www.dgp.toronto.edu

Summary

- Today we:
  - Reviewed various *styles of interaction*

Your Action Items

- Group project part 2b
- Readings from the textbook posted online
- Midterm exam on next Friday

Ongoing Course Evaluation

- Please complete the Lecture 10 daily feedback form!