

Chapter 7: Interface Design

The collage displays three distinct web interfaces:

- Left Interface (Research Firm):** Features a green header with navigation links (Home, About, Services, Contact). The main content area includes the headline "The Right Questions. Quality Research. Actionable Results." and a sub-header "Whatever phase your product is in, we can help." Below this are three service icons: "Planning & Ideation", "Design & Development", and "Completed Product".
- Middle Interface (Financial News Site):** A news portal with a header in Arabic. It features a central market summary section with a table of stock indices:

مؤشر السوق السعودي	القيمة	التغير	% التغير
6271.51	-24.67	-0.39	

 Below the table are sections for "مؤشرات الاسواق العالمية" and "مؤشرات الاسواق العربية". The right sidebar contains a list of financial news categories in Arabic.
- Right Interface (Amazon Product Page):** An Amazon product page for the "New Kindle New Lower Price". It features a large product image, a price tag, and a "Buy now" button. Below the product are recommendations for other Kindle devices and books, such as "Call of Duty: Modern Warfare 2" and "The Girl on the Train".

Objectives

- ◆ Understand key user interface design principles.
- ◆ Understand the different interaction styles and understand when these styles are most appropriate.
- ◆ Understand when to use graphical and textual presentation of information

Why is interface design important?

- ◆ Link between system functions & users
- ◆ Critical for system dependability
 - ◆ “User errors” → user interfaces do not consider the capabilities of real users and the context of use



Human Factors Engineering

- ◆ The integration of human characteristics into system definition, design, development, and evaluation to optimise human-machine performance under operational conditions.
- ◆ Human Factor → a physical or cognitive property of an individual or social behavior which can influence interacting with technological systems.

Activity

Short -Term Memory

Take a look at these images for 15 seconds..

Activity

Short -Term Memory

On a piece of paper write down what you remember.

How many items did you remember?

Average = 7+/-2

Human factors in interface design

◆ Limited short-term memory

- ◆ People can instantaneously remember about 7 items of information. If you present more than this, they are more liable to make mistakes.

◆ People make mistakes

- ◆ When people make mistakes and systems go wrong, inappropriate alarms and messages can increase stress and hence the likelihood of more mistakes.

◆ People are different

- ◆ People have a wide range of physical capabilities. Designers should not just design for their own capabilities.

◆ People have different interaction preferences

- ◆ Some like pictures, some like text.

What do you think makes a good interface?

Examine the interfaces in your handout; share your thoughts with the class..

User Interface Design Principles

Principle	Description
User familiarity	The interface should use terms and concepts which are drawn from the experience of the people who will make most use of the system.
Consistency	The interface should be consistent in that, wherever possible, comparable operations should be activated in the same way.
Minimal surprise	Users should never be surprised by the behaviour of a system.
Recoverability	The interface should include mechanisms to allow users to recover from errors. <ol style="list-style-type: none">1. Confirmation of destructive actions2. Undo3. Check-pointing
User guidance	The interface should provide meaningful feedback when errors occur and provide context-sensitive user help facilities.
User diversity	The interface should provide appropriate interaction facilities for different types of system user.

Design Issues

Designers of user interfaces are faced with two key questions:

- ◆ How should the user interact with the system?
- ◆ How should information from the computer system be presented to the user?

Information Presentation



User Interaction Style



→ Read pg 366-376 in your textbook

Interaction Styles



All the ways that users can interact with computers..

Interaction Design

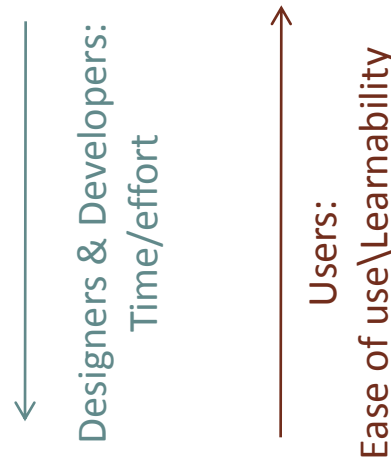
HCI Video: Mouse movements, Eye movements, Facial expressions, In-Session user feedback on the design



Interaction Styles

All the ways that users can interact with computers..

- ◆ Command language
- ◆ Menu selection
- ◆ Form fill-in
- ◆ Direct manipulation
- ◆ Natural language



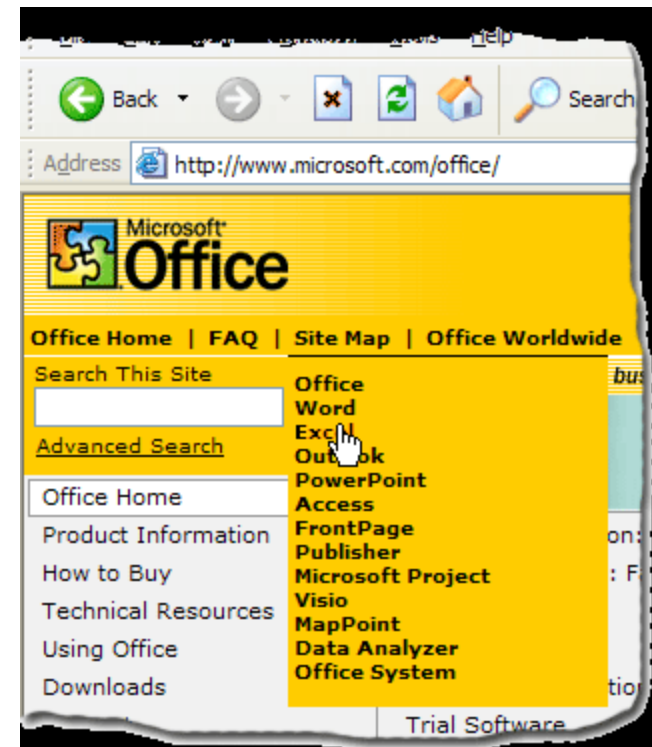
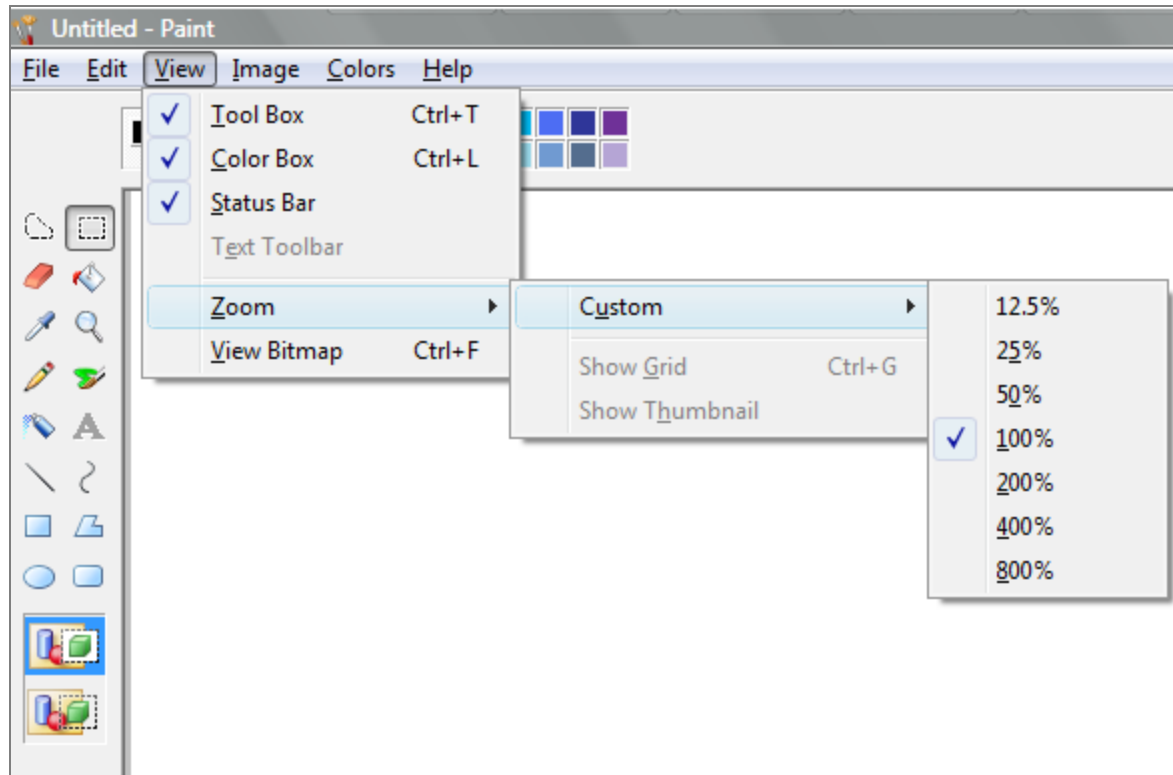
*What do you think are the advantages and disadvantages of each method?
Take a look at the following examples..*

Interaction Styles: Direct Manipulation

The screenshot displays the Morae Manager software interface, which is used for usability testing and recording user interactions. The interface is divided into several sections:

- Top Menu and Toolbar:** Includes options like File, Edit, Create, Search, Play, View, and Help. A toolbar below contains icons for file operations and analysis.
- Left Panel (Project Tree):** Shows a hierarchical view of the project under "Analyze - Project". It lists three users: "User1E_Student", "User3D_Teache", and "User1B_Student". Each user has associated tasks, markers, video clips, and graphs.
- Central Recording Window:** Displays a recorded session of a user interacting with a website. The website content is in Arabic. A yellow circle highlights a specific interaction point on the page. The recording window also shows a "start" button and a "Micro Recorder" status.
- Bottom Panel (Timeline):** Features a detailed timeline for the recording session, showing a total duration of 0:27:41.19. The timeline includes markers for various events and a playback control bar with a "Filter Off" button.
- Bottom Left Panel (Study Settings):** Contains settings for the study, including "Study: Mawhiba's Portal" and options to filter recordings (e.g., "Entire recording", "Selected tasks").

Interaction Styles: Menu Selection



Interaction Styles: Form Fill-in

```

PINE 3.96  ADDRESS BOOK (Edit)

Nickname : NBA
Fullname : Players in the NBA
Fcc      :
Comment  :
Addresses : mjordan@nba.com,
           kmalone@nba.com,
           drobinson@aol.com

^G Get Help  ^X eXit/Save  ^R RichView  ^Y PrvPg/Top
^C Cancel    ^U NxtPg/End

```

Name:

Address:

City: State: Zip:

Interaction Styles: Command Language

```

Telnet daimi.au.dk

Red Hat Linux release 7.1 (Seawolf)
Kernel 2.4.9-31smp on a 2-processor i686
login: madss
Password:

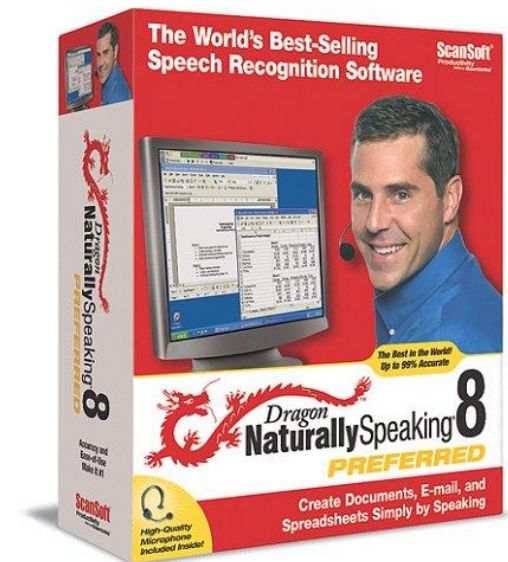
*****
* Welcome to the Daimi mailserver. In most cases it will be more appropriate *
* if you log onto the host alias                                           *
*                                                                           *
*           fresh-horse.daimi.au.dk                                       *
*                                                                           *
* which is also reachable from outside the firewall.                       *
*****

Trying find a remote host
Trying to guess display
DISPLAY is dhcp-11-21-??:0
[madss@daimi:~]$ ls -al
total 100
drwxr-xr-x  3 madss  users      4096 Apr 21 13:20 .
drwxr-xr-x 37 root   root       4096 Apr 21 03:35 ..
-rw-r--r--  1 madss  users      4517 Feb 12 14:59 .Xdefaults
-rw-----  1 madss  users        68 Apr 21 15:35 .bash_history
-r--r--r--  1 madss  users      3671 Feb 12 14:59 .bash_logout
-r--r--r--  1 madss  users    10540 Feb 12 14:59 .bash_profile
-r--r--r--  1 madss  users      5004 Feb 12 14:59 .bashrc
drwxr-xr-x  8 madss  users      4096 Apr 21 15:35 .daimi-setup
-r--r--r--  1 madss  users      5209 Feb 12 14:59 .emacs
-r--r--r--  1 madss  users      1987 Feb 12 14:59 .fvwmrc
-r-xr-xr-x  1 madss  users      1491 Feb 12 14:59 .gnomerc
-rw-r--r--  1 madss  users         46 Feb 12 14:59 .gtkrc
-r--r--r--  1 madss  users         0 Feb 12 14:59 .hushlogin
-rw-r--r--  1 madss  users        204 Feb 12 14:59 .inputrc
-r--r--r--  1 madss  users    11024 Feb 12 14:59 .login
-r--r--r--  1 madss  users     3591 Feb 12 14:59 .logout
-r--r--r--  1 madss  users     4539 Feb 12 14:59 .tcshrc
-r-xr-xr-x  1 madss  users      4018 Feb 12 14:59 .xinitrc
-rw-r--r--  1 madss  users         0 Apr 21 13:20 my-important-file
-rw-r--r--  1 madss  users         0 Apr 21 13:20 my-very-important-file.doc
[madss@daimi:~]$

```

Interaction Styles: Natural Language

- ◆ Writing commands in natural language, such as *'print the file named abc.doc'*
- ◆ Vocal input (e.g. Dragon Naturally Speaking)



Interaction Styles

Interaction style	Main advantages	Main disadvantages	Application examples
Direct manipulation	Fast and intuitive interaction Easy to learn	May be hard to implement. Only suitable where there is a visual metaphor for tasks and objects.	Video games CAD systems
Menu selection	Avoids user error Little typing required	Slow for experienced users. Can become complex if many menu options.	Most general-purpose systems
Form fill-in	Simple data entry Easy to learn Checkable	Takes up a lot of screen space. Causes problems where user options do not match the form fields.	Stock control, Personal loan processing
Command language	Powerful and flexible	Hard to learn. Poor error management.	Operating systems, Command and control systems
Natural language	Accessible to casual users Easily extended	Requires more typing. Natural language understanding systems are unreliable.	Information retrieval systems

Interaction Styles: Web-based Interfaces

◆ What user interaction elements might you see on a web-based interface?

The screenshot displays the website for Click User Experience. The header features the company logo and a navigation menu with links for Home, About, Services, and Contact. A prominent green banner contains the tagline: "The Right Questions. Quality Research. Actionable Results." Below this, the main content area is divided into two columns. The left column includes a section titled "You need to know that you're making smart decisions." followed by a paragraph and a sub-section "Whatever phase your product is in, we can help." which lists three service phases: "Planning & Ideation", "Design & Development", and "Completed Product". The right column provides a brief company description and three call-to-action links: "Find out more about us", "See our list of services", and "Contact us". The footer contains the statement: "At Click User Experience we help you develop the right questions."

Click
user experience

Home About Services Contact

The Right Questions.
Quality Research.
Actionable Results.

You need to know that you're making smart decisions.
You need information to help you shrink your costs, grow your income, and catapult your business to new growth.

Whatever phase your product is in, we can help.

Planning & Ideation
Obtain customer insight to inform product planning and ideation

Design & Development
Evaluate the usability of your product before launch

Completed Product
Evaluate and improve your completed product

Click User Experience is a usability research and design consulting firm located in Seattle, Washington.

- ▶ [Find out more about us](#)
- ▶ [See our list of services](#)
- ▶ [Contact us](#)

At Click User Experience we help you develop the right questions.

Information presentation

Information Presentation



All the ways that users can view information.

Information display factors

- ◆ Is the user interested in precise information or data relationships?
- ◆ How quickly do information values change?
Must the change be indicated immediately?
- ◆ Must the user take some action in response to a change?
- ◆ Is there a direct manipulation interface?
- ◆ Is the information textual or numeric? Are relative values important?

Data Visualisation

- ◆ Concerned with techniques for displaying large amounts of information.
- ◆ Visualisation can reveal relationships between entities and trends in the data.

account? x

Username: _____

Password: _____

Remember me

Login

WordPress.com News Blog

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- [Unlimited Blogs](#)
- [Widgets: It's a Plugin!](#)
- [Check Your Spelling](#)
- [Tag Feeds and Paging](#)
- [Andreas04 and Thirteen](#)
- [Login Errors](#)

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6. [Sam Ideas, Thoughts, Programming](#)
7. [El Blog Oficial de Carlos Sicilia](#)
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Saudis Plan Diplomatic Mission to Baghdad

Roberts' seizure spurs court questions

Another Afghan Hostage Deadline Passes

Japan election claims first cabinet casualty

Senator's financial clerk testifies

House Looks for Answers in Tillman Case

More Wildfires Flare Up In Montana

Sudan 'will support Darfur force'

Despite hopes, headlines, Mideast situation is bleak

Democrats seek independent probe of Gonzales

Nominee Mullen: Little political progress in Iraq

Voting Machine Companies Attack Review

Jim Black Faces State Sentencing

Dr. Rudy's got it covered!

Thompson Raises \$3.46 Million for a Presidential Run (Update2)

Cheney talks up Iraq 'progress'

House overwhelmingly passes ethics, lobbying bill

'Luckiest guy in the world'

Cops: PSL woman got millions to care for children she starved

A Turn For The Better in Iraq?

Bloggers rally around Dutt

Rescuers Pull 69 Trapped Miners From Chinese Coal Mine

Russia downgrades ties with Hamas

UN forces Darfur

Khmer Rouge prison chief is charged

Talks with Musharraf to establish democracy; Bhutto

Obama president tracks away day with speech of from spending

N Ireland SAS hero looks back

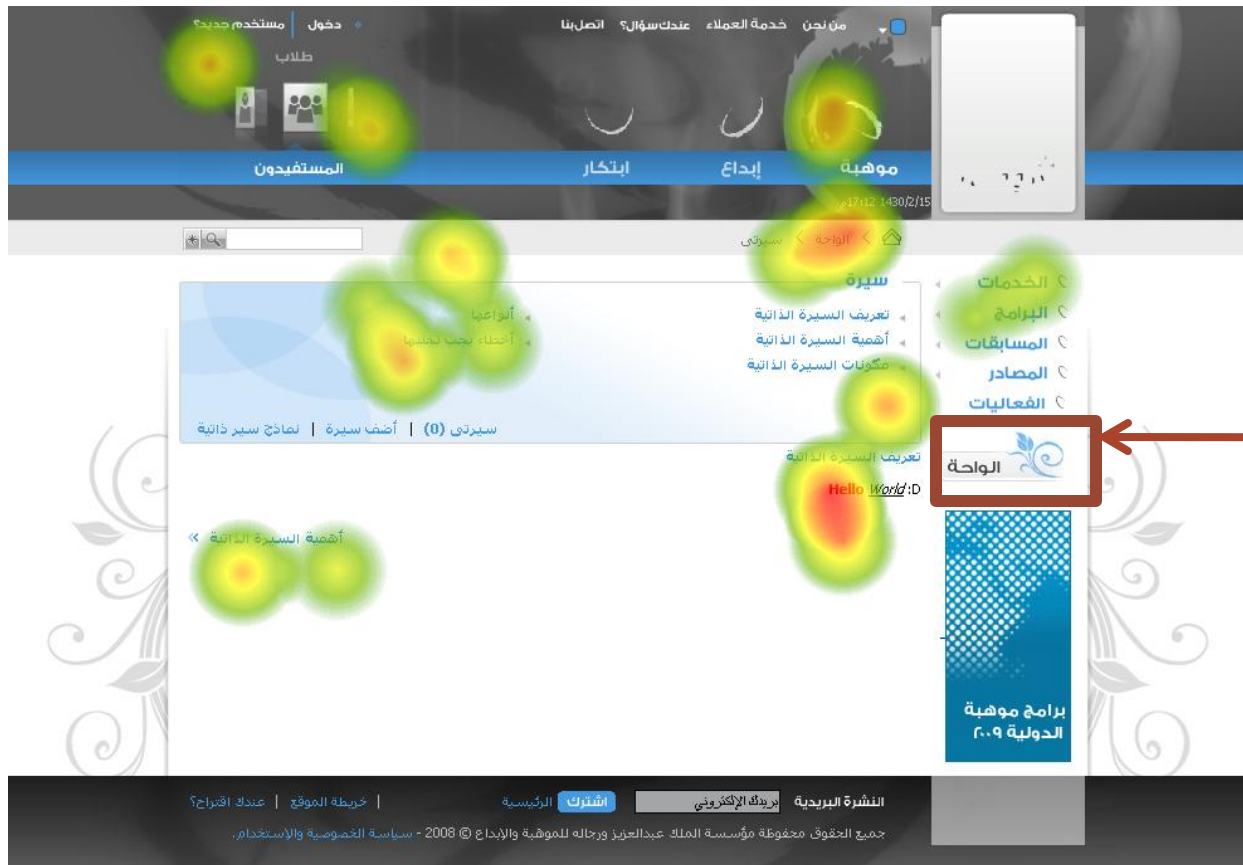
Fires ravage two of Canary Islands

Sunni Arab Bloc Quits Iraqi Government

Wednesday August 1, 2007 12:49

Data Visualisation

- ◆ Visualisation can reveal trends in user behaviour in interacting with systems.

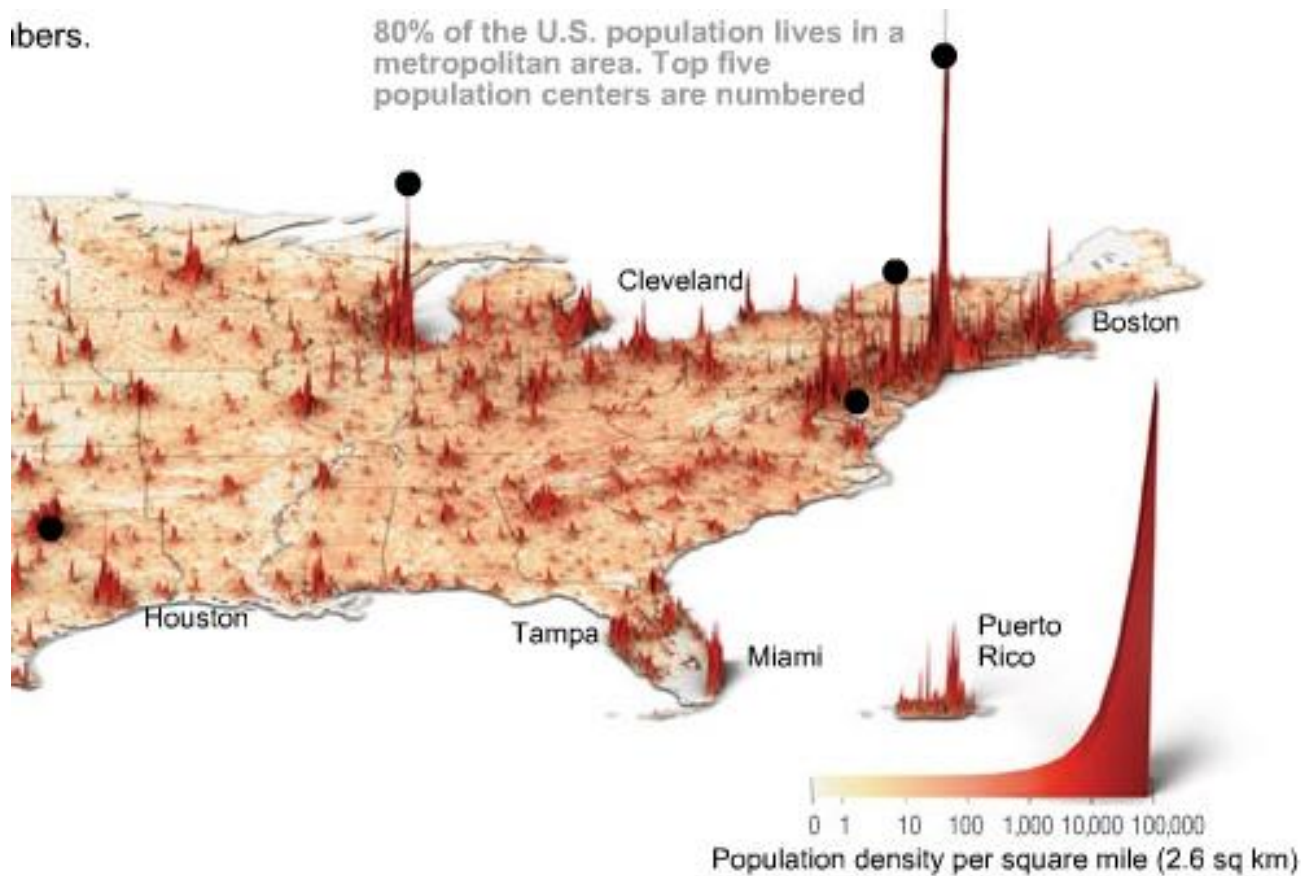


Eyetracking revealed that users did not see target links

Data Visualisation

ibers.

80% of the U.S. population lives in a metropolitan area. Top five population centers are numbered



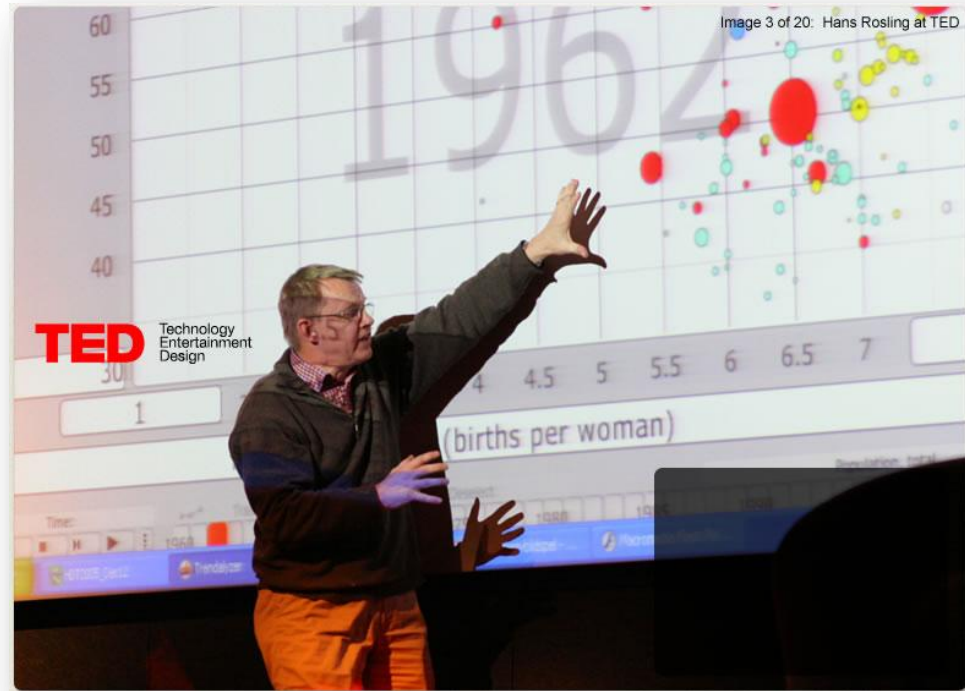
Data Visualisation

- ◆ Gapminder
 - ◆ <http://www.gapminder.org>
- ◆ Web pages as graph
 - ◆ <http://www.aharef.info/static/htmlgraph/>
- ◆ CrazyEgg
 - ◆ <http://crazyegg.com/>
- ◆ Time magazine
 - ◆ http://www.time.com/time/covers/20061030/where_we_live/

Data Visualisation

◆ Bonus assignment:

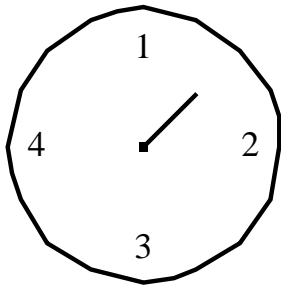
Watch Hans Rosling's TED presentation and write a review/summary of your thoughts on data visualisation.



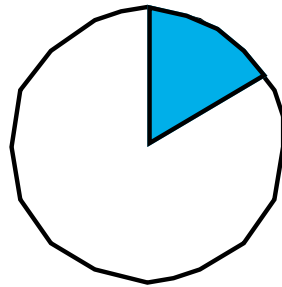
http://www.ted.com/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html

Data Visualisation

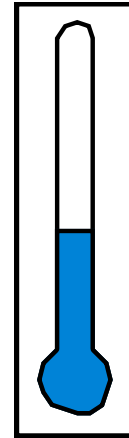
Presentation methods



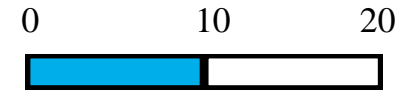
Dial with needle



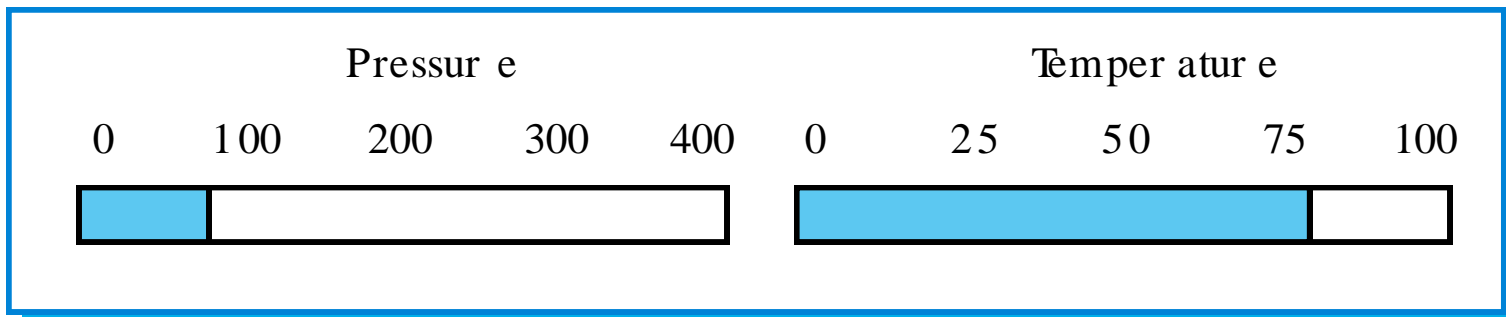
Pie chart



Thermometer



Horizontal bar



Pressur e

0 100 200 300 400

Temper atur e

0 25 50 75 100

Interface Design: Colors

- ◆ Colour adds an extra dimension to an interface and can help the user understand complex information structures.
- ◆ Colour can be used to highlight exceptional events.

Green stop sign?

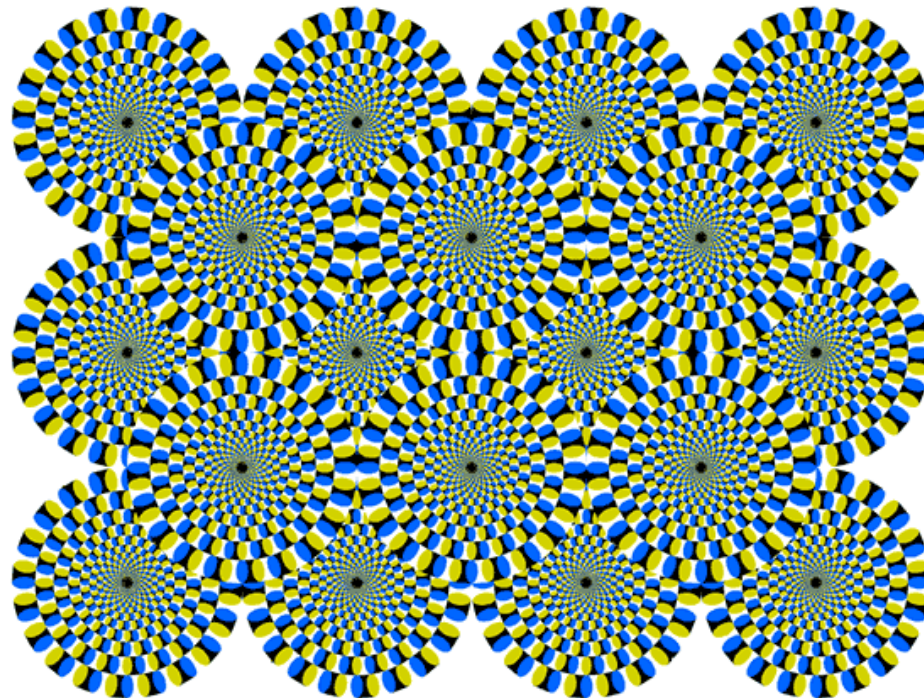


Interface Design: Colors

- ◆ Common mistakes in the use of colour in interface design is the over-use of colour in the display.



Interface Design: Colors



Akiyoshi Kitaoka, *Rotating Snakes* (2003).

This picture by Kitaoka appears to move due to the luminance contrast between the black, blue, white, and yellow.

Interface Design: Colors

- ◆ Limit the number of colours used and be conservative in their use.
- ◆ Use colour change to show a change in system status.
- ◆ Use colour coding to support the task that users are trying to perform.
- ◆ Be careful about colour pairings.

Interface Design: Colors

- ◆ Use colour coding in a thoughtful and consistent way.
- ◆ Individual preferences vary; allow users more control over the interface colors.

Example: MS Windows Accessibility features or the toolbar on <http://www.dyslexia-parent.com/>



Interface Design: Colors

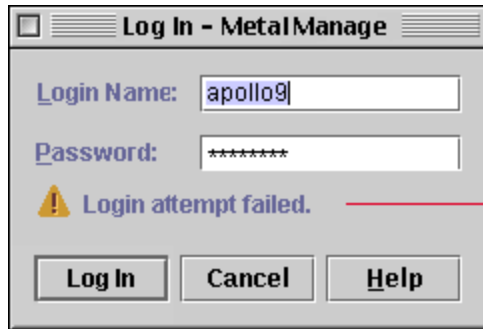
◆ Colour Matters

- ◆ <http://www.colormatters.com/>

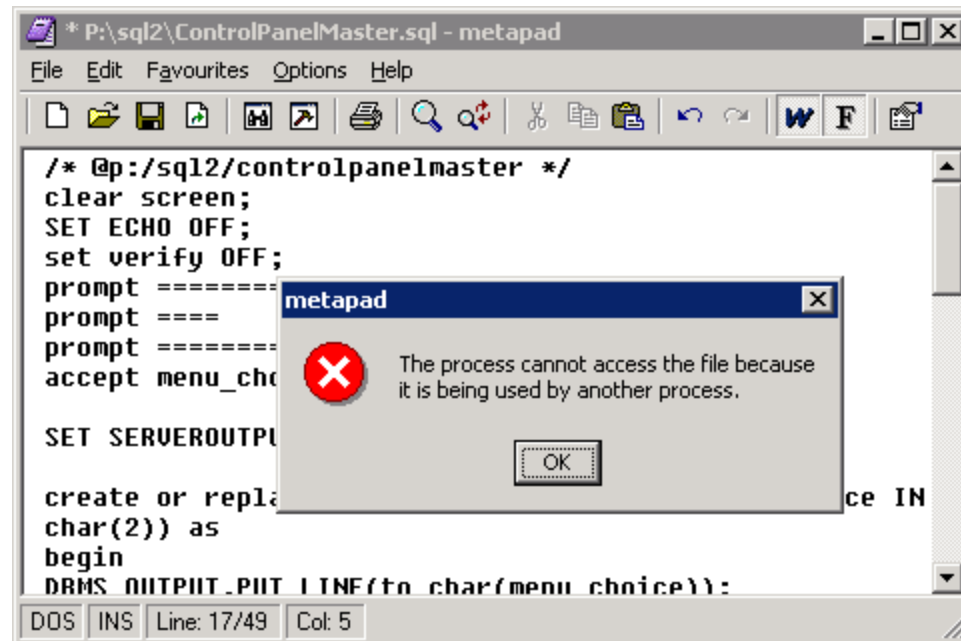
◆ Colour combinations:

- ◆ http://www.webdevelopersnotes.com/design/color_combinations.php3

Interface Design: Error Messages



Error message



Interface Design: Handling User Errors

Please type the patient's name in the box then click on OK

Patient's name

MacDonald, R.

OK Cancel

System-oriented error message

?

Error #27
Invalid patient id

OK Cancel

User-oriented error message

R. MacDonald is not a registered patient
Click on Patients for a list of patients
Click on Retry to re-input the patient's name
Click on Help for more information

Patients Help Retry Cancel

Interface Design: Error Messages

Factor	Description
Context	Wherever possible, the messages generated by the system should reflect the current user context. As far as is possible, the system should be aware of what the user is doing and should generate messages that are relevant to their current activity.
Experience	As users become familiar with a system they become irritated by long, <i>“meaningful”</i> messages. However, beginners find it difficult to understand short terse statements of a problem. You should provide both types of message and allow the user to control message conciseness.
Skill level	Messages should be tailored to the user’s skills as well as their experience. Messages for the different classes of user may be expressed in different ways depending on the terminology that is familiar to the reader.
Style	Messages should be positive rather than negative. They should use the active rather than the passive mode of address. They should never be insulting or try to be funny.
Culture	Wherever possible, the designer of messages should be familiar with the culture of the country where the system is sold. There are distinct cultural differences between Europe, Asia and America. A suitable message for one culture might be unacceptable in another.
