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HCI (Human Compute Interaction)

Supporting Design

Importance of interface design

- Consequences of poor interface design:
  - User frustration and stress
  - Low productivity: under-utilisation of system
  - Increased mistakes in data entry
  - Poor volume of throughput
  - Systems failure

Design support tools & techniques

- User Interface Management Systems (UIMS)
- Guidelines, principles, heuristics
- Storyboards and paper mock-ups
- scenarios
- Navigation maps
- Text processing tools
- Image/sound processing tools
- Multimedia & web authoring tools

UIMS

- **User Interface Management Systems**

  "A UIMS is a tool which assists in the design, construction and run-time management of the user interface"

  (Clarke 1993)

  – Other terms:
    - UIDS (User Interface Design System)
    - GUIMS (Graphical UIMS)
    - UIE (User Interface Environment)

UIMS Goals (advantages?)

- Separate the user interface from the application

- Develop at a high level of abstraction
- Advocate reuse of existing designs and code

Interface Design Principles-Gould and Lewis

- **Early focus on users.** Developers need direct contact with end users in order to understand users' mental maps of their tasks and work environment. Assess user characteristics/computer experience/tasks
- **Early user testing.** Nothing can prepare us for actual user behaviour, so there is no substitute for actual testing with typical end-users.
- **Iterative design**. Prototype design, user testing, feedback and re-design continually until acceptance criteria are met.
- **Integrated design.** Design of the interface, training materials, manuals, on-line help etc. should all be integrated and take place in parallel.

Nielsen's usability engineering lifecycle

- Know the user: characteristics; ethnography; task analysis
- Competitive analysis: usability tests with competing systems
- Set usability goals: objective, measurable; financial
- Parallel design: explore design alternatives
- Participatory design: access to real users
- Apply guidelines/heuristics
- Prototype: scenarios; paper mock-up
- Empirical testing
- Iterative design
- Collect feedback from field use

Achieving good usability

- define usability goals through metrics
- set planned levels of usability to be achieved
- analyse the impact of possible design solutions
- incorporate user-derived feedback in product design
- iterate through the design-evaluate-design loop until planned levels are achieved

Purpose

- Set goals for the interface: what do I want it to do?
- Who are the users: what do they need?
- Consider economic issues
- Set measurable performance criteria based on dialogue with users

Form-visual design

- Design top-down, e.g. from home page to sub-sections, then content pages
- Use HTA (hierarchical task analysis) to structure the I/F
- Assemble content before design
- Users look at text rather than graphics
  - Eye tracking studies (Nielsen May 2000) show that 78% of web users' first 3 eye fixations were on text not graphics
- Users are goal driven
- Form should support user tasks-do we know what users do?

Form-design issues

- Use design elements to reduce users workload: graphics can support meaning
- Text should be readable: for body text use common fonts in 10-12 point proportional serif fonts such as Times New Roman
- Line length should be 50-70 characters
- Screen resolution is only 72dpi, so use low resolution images.
- Avoid pdf for reading online: it’s designed for printing
- Keep text short and concise: get straight to the point
- Reading on-line is more tiring than reading print

Users first!

- Each element of PUFCT needs separate consideration
- User centred design focuses on users, their requirements, and the usability of resulting systems
- Website usability is often very poor-56% of e-commerce transactions fail Nielsen Aug 2001)
- 70% of WAP users, in a Dec 2000 study, said they wouldn’t continue to use WAP
- Approximately 55% of large IS projects fail, e.g. CRAMS
- Don’t use technology for its own sake

Approaches to usability design

- **The following can be used to explore design**
  - **Guidelines**
  - **Paper mock-ups**
  - **Storyboarding**
  - **Flowcharts**
  - **Scenarios**
  - **Limited functionality simulation**
  - **Card sorting**
  - **Prototyping**

Guidelines

- **Typically extensive research is carried out in an area, resulting in substantial findings**
- **the findings are analyzed, and main issues highlighted**
- **these are modeled into ‘rules’**

  - offer the benefit of being easy to follow, e.g.

  For spatial information = prefer visual media

  - as a negative point they are often too simplistic
  - can suffer from problems of author terminology
  - often lack coverage of all potential design situations

Paper mock-ups

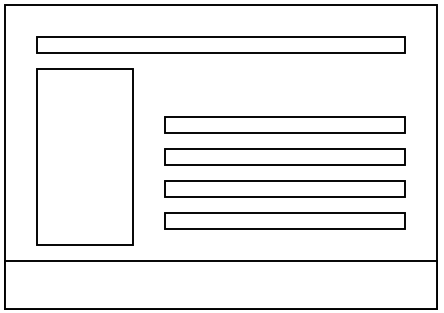
- **Main screens can be drawn out to show their intended appearance, and included dialogues (separately on A4)**
- **Provides a simple method to test ideas with the user**

  - good for visual appearance

  - limited on interaction, but shows screen sequences
- **Can be made more valuable in the terms of gaining feedback if drawn**

  on computer, giving a clearer

  (more precise) idea to the user



Storyboarding

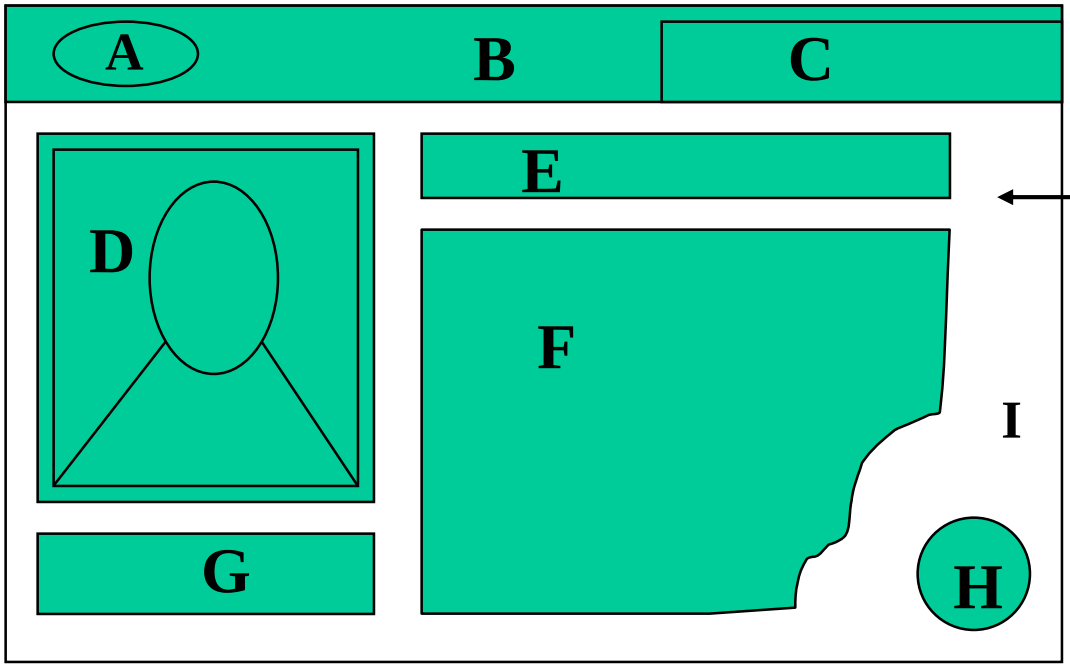
- **Another simple paper based technique**
- **involves the use of pictures and text to roughly illustrate the make up/appearance of a set of screens**
- **is not intended to be elaborate, or totally accurate, as aims to get across the basic idea**

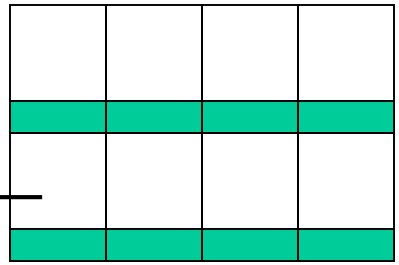
  - limited on interaction, but shows screen sequences
- **Showcases key screens as a series**

  - each screen is accompanied by text to describe the scene, user interaction and any dynamic media (e.g. sound)

  - making it more detailed than paper mock-ups

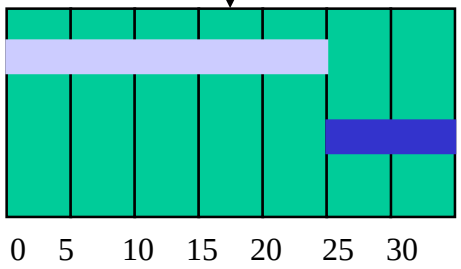
A typical storyboard approach





Series

A time-line will be needed for animation, sound and video



A = link to home page

B = menu bar

C = current page

D = photograph

E = Screen title

F = Text

G = Sub-title

H = Navigator to screen 3

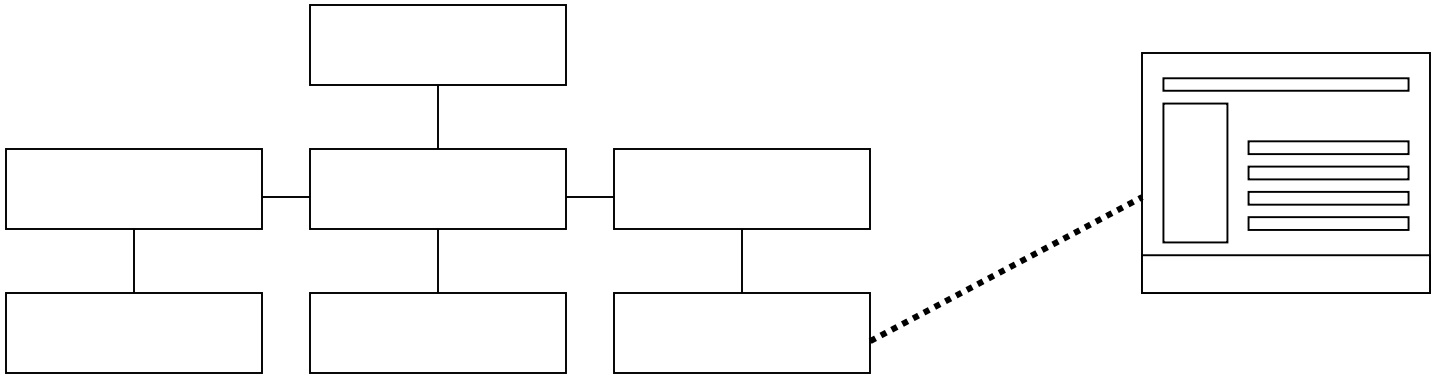
I = Background

Flowcharts

- **Give a sense of sequence and structure**

  - show interaction routes to the user

  - how screens are linked to each other
- **on its own may appear not too useful for testing, but in combination with paper mock-ups or storyboards begins to give a user a complete picture of how an application works**



Scenarios

- **Enables the designer to explore their thinking**
- **Need to identify ‘types of user’ and ‘a task activity’**
- **The designer builds a clear scenario for the task activity, i.e. install a CD-ROM on a PC**
- **Set up thinking on outcomes, anticipating problems that may occur e.g. Brian will do…, Tom will do...**
- **Think the scenario through to highlight problems**

  - Brian will explore with success

  - Tom will press everything and may cause damage
- **enables adjustments to be made to correct problems found**

Navigation maps

- Particularly important for multimedia and websites
- Xerox inxight has a range of tools
  - e.g. hyperbolic tree
    - http://www.inxight.com/Demos/SLS_Demos/Site_Lens_Studio_Demos.html#

Inxight Hyperbolic Tree - Netscape

To explore the structure of the tree, click and drag any part of it.

To read the contents of a node, click on it with the left mouse button.

To hide and show the branches of a single node, click on it with the right mouse button.

Home
Click here to move the tree to its original position.

Images and Labels
Click here to hide the labels or the images on the tree. Click again to show them.

Layers
Click here to expand or collapse the tree one layer at a time.

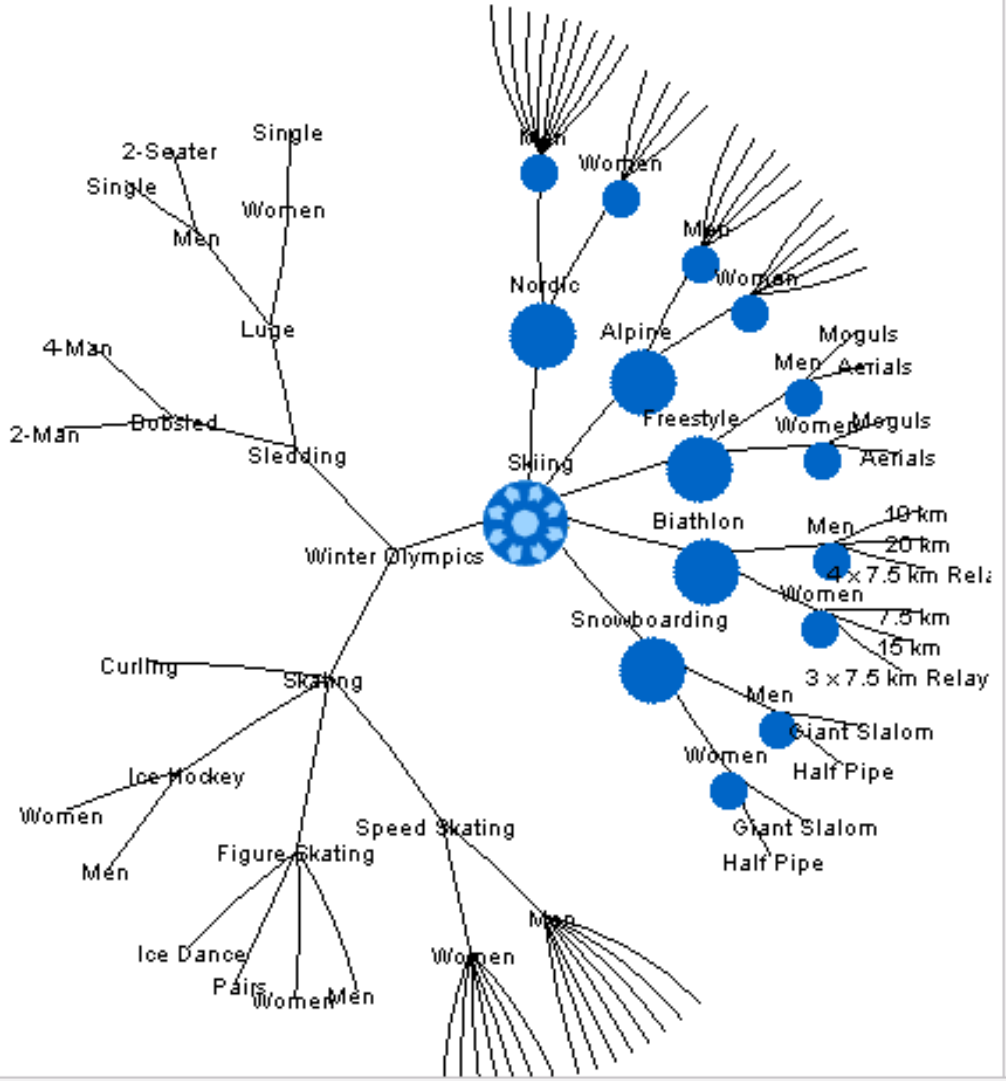
Branches
Click here to lengthen or shorten the branches of the tree.

Trees
To view a different tree, click on the list below.

Winter Olympics **Summer Olympics**

Information Visualization

Return to Introduction



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Further reading

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- Rosenbaum, Rohn, Hamburg, *A Toolkit for Strategic Usability: Results from Workshops, Panels, and Surveys,* CHI 2000 http://www.teched.com/PDFs/Chi2000sr.pdf
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