HCI

- What is HCI?
- Why is the User Interface Important?
- HCI and the Software Designer
- User Interface design goals
- Goals for our profession
- Where do CA students fit in to all this?
- HCI Lifecycle

What is HCI?

- Human Computer Interaction
  - USA: Computer-Human Interaction (CHI)
  - USA: Man-Machine Interface (MMI)
- Human Computer Interface
  - is the study of the interaction between people, computers and tasks
  - involves the development and application of principals, guidelines and methods to support the design and evaluation of interactive systems

Disciplines

- Psychology
  - understanding the user
  - modelling the user
- Sociology
  - groupware
- Art
  - aesthetic appeal
- Design
  - user interface layout
Disciplines

• Engineering/Computer Science
  – faster machines
  – faster systems
  – means of building better interfaces
• Linguistics
  – language for commands
• Philosophy
  – creating consistency

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Main Factors

1. Organisational Factors
   – training, job design, politics, roles, work organisation
2. Environmental Factors
   – noise, heating, lighting, ventilation
3. Health and Safety Factors
   – stress, headaches, musculo-skeletal disorders
4. The User
   – motivation, enjoyment, satisfaction, experience level
5. Comfort Factors
   – seating, equipment layout

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Why is UI important?

• main point of contact user/computer system
• poor UI problems:
  – reduced user productivity
  – unacceptable learning times
  – unacceptable error levels
  … lead to frustration/potential rejection of system by user
• applications software developers:
  – 50-70% program code for manipulation of UI
  – time and cost of UI is very significant
• Graphical User Interfaces (GUI)
  – less: mistakes, frustration, fatigue; learning time
  … but … difficult to design as user interaction is more complex

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Why is UI important?

• Groupware Systems
  – support groups of users working together (e.g. Computer Supported Cooperative Work - CSCW)
  – are capable of bringing productivity gains to organisations
  – normally graphical, but with added complexity
  – difficult class of systems
• System designers
  – must understand the feelings of the user
  – make system easy and natural to use
  – must allow user to concentrate on the task alone

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Main Factors

6. User Interface
   – input devices, output devices, dialogue structures, use of colour, icons, commands, graphics, natural language, 3D, multimedia
7. Task Factors
   – easy, complex, novel, task allocation, repetitive, monitoring, skills
8. Constraints
   – costs, timescales, budgets, staff, equipment, building structure
9. System Functionality
   – hardware, software, applications
10. Productivity Factors
    – increase: output, quality
    – decrease: costs, errors, labour requirements, production time
HCI and S/W Designer

- Users’ world
  - business objectives
  - constantly changing
    - external factors (competitors, trade regulations etc)
    - internal factors (technical strategy, management personnel)
- Designer’s world
  - technical
  - different organisation?
- Design process
  - political (management vs user view)

UI Team

- Ideally, there will be a team of specialists:
  - Graphic designers
  - Interaction/interface designers
  - Technical writers
  - Marketing personnel
  - Test engineers
  - Software engineers
- … but the reality may be different

UI Design Goals

- Define target user community
  - communities evolve and change
- 5 human factors central to community evaluation:
  1. Time to learn
  2. Speed of performance
  3. Rate of errors by users
  4. Retention over time
  5. Subjective satisfaction

Goals for our Profession

- Influencing academic and industrial researchers
- Potential research topics
  - reducing anxiety and fear
  - graceful evolution
  - specification and implementation of interaction
  - direct manipulation
  - input devices
  - online assistance
  - information exploration

Goals for our Profession

- Providing tools, techniques and knowledge for system implementers
  - rapid prototyping
  - guideline documents
  - use feedback
- Raising the computer consciousness of the general public
  - fearful novice users
  - good designers can help overcome these fears
Role of CA Students

- Human Factors in Computing
  - a subset of HCI
- already know how to design and write programs
- learn about aspects of UI that we can design
- involves understanding …
  - the user
  - limitations
  - potential of the tools available

Designing/Building UIs

- Design cycle
- User-centred design
- Task analysis
- Rapid prototyping
- Evaluation
- Programming
- Iteration

Stage of the HCI Lifecycle

HCI Lifecycle

- Tradition view of software development
- The Waterfall Model

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Stage of the HCI Lifecycle

- Allocation of functions & reqs
- Evaluation
- System design
- Database design
- Network design
- Conceptual design
- Prototype & evaluation
- Design for system evolution

Design Activities

- Allocation of functions & reqs
- Evaluation
- Design
- System design
- Database design
- Network design
- Conceptual design
- Prototype & evaluation
- Design for system evolution