Human Computer Interaction

The Interaction

Lecture # 4b

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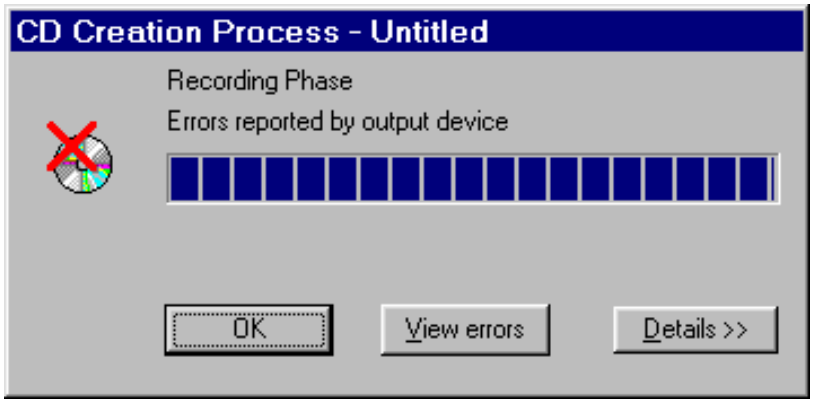
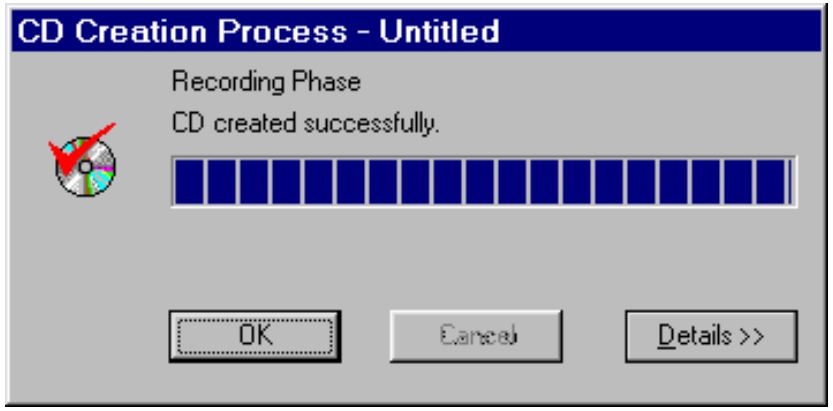
Today's Interface Hall of Shame

- Problem?
- Dialogs are far too similar
- Heavy red icon



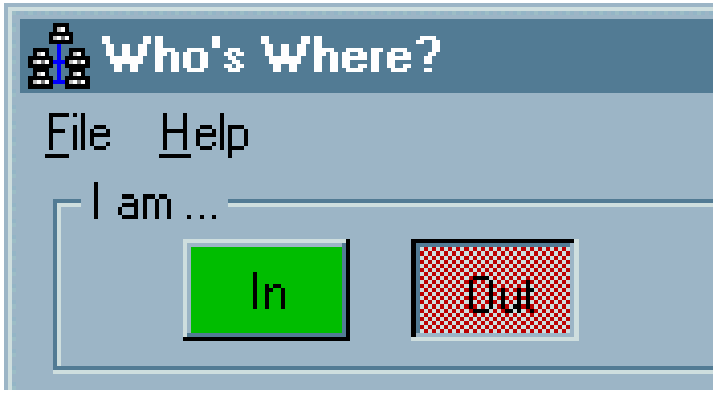
Error in CD creation



CD creating successful

Today's Interface Hall of Shame

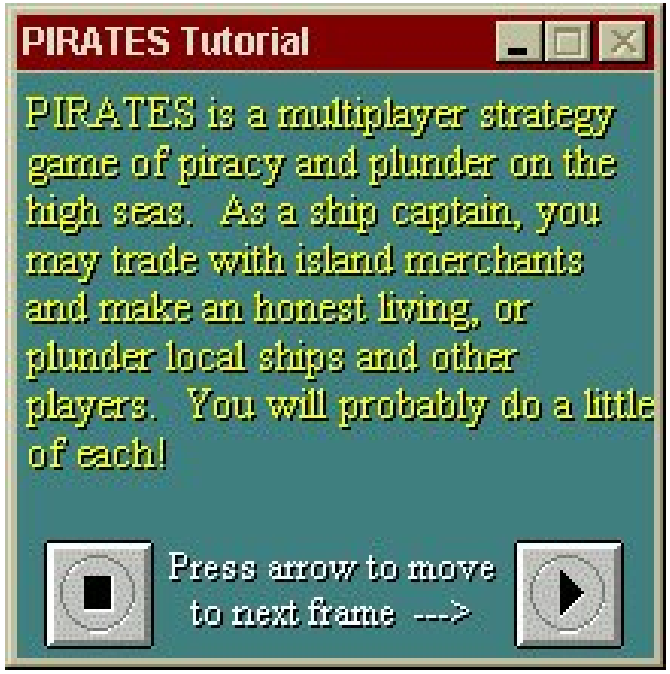
- In/Out Whiteboard application
- Is the individual 'in' or 'out'?



- Given the bright green color and the raised appearance of the 'In' button, one gets the impression that the individual is 'in'
- Actually, the individual is 'out'

Today's Interface Hall of Shame

- Improper use of colour
- Color combination particularly hurtful on the eyes
- Use of 3D Font – even harder to read



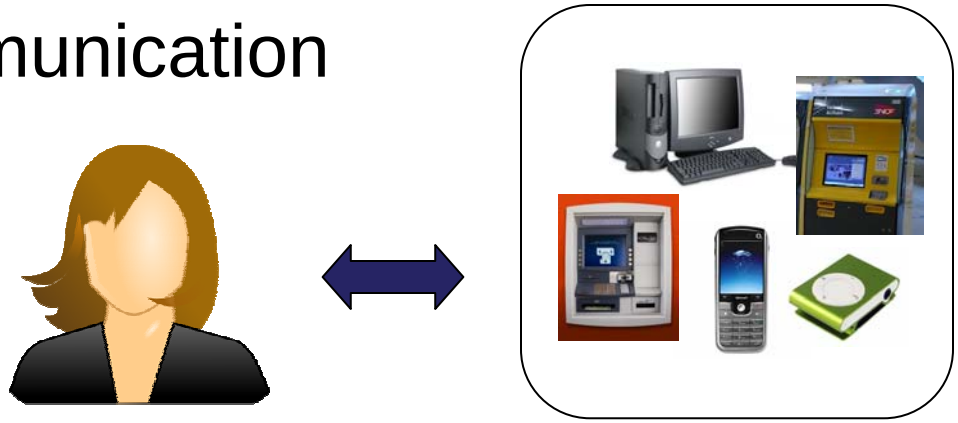
Contents

- Introduction
- Models of Interaction
- Ergonomics
- Interaction Styles
- Interactivity
- Experience, Engagement & Fun

Introduction

- What is Interaction

Communication



Machine is capable of doing the job

Humans need to get the job done from the system

User must communicate his requirements to the system

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Models of Interaction

- Communication: Complex Human – Complex Systems
- Models of Interaction
  - Help Understand what is going on in the Interaction
  - Identify the likely root of difficulties
- Two Models
  - Norman's Model (The execution-evaluation cycle)
  - Abowd and Beale framework

Some Terms of Interaction

- Domain
  - The area of work under study
  - Graphic design ➔ Graphic shapes, drawing surface, drawing utensils

    Domain

    Concepts of Domain
- Goal
  - What you want to achieve
  - **e.g**. create a solid red triangle

Some Terms of Interaction

- Task
  - How you go about doing it – Ultimately in terms of operations or actions
  - **e.g**. … select fill tool, click over triangle
- Task Analysis
  - Identification of problem space for user of an interactive system in terms of the domain, goals and tasks

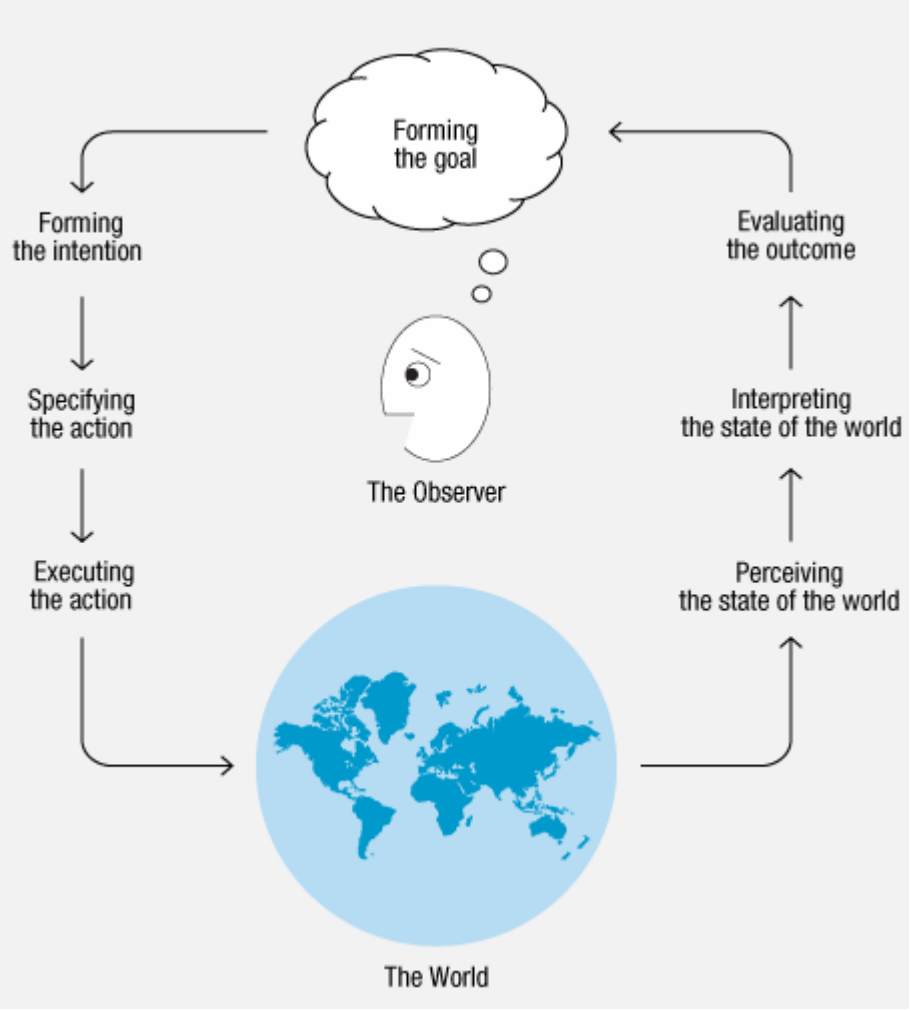
Some Terms of Interaction

- Task Language
  - User's language: Describes attributes of domain relevant to the User state
- Core Language
  - System's Language: Describes attributes of domain relevant to the System state

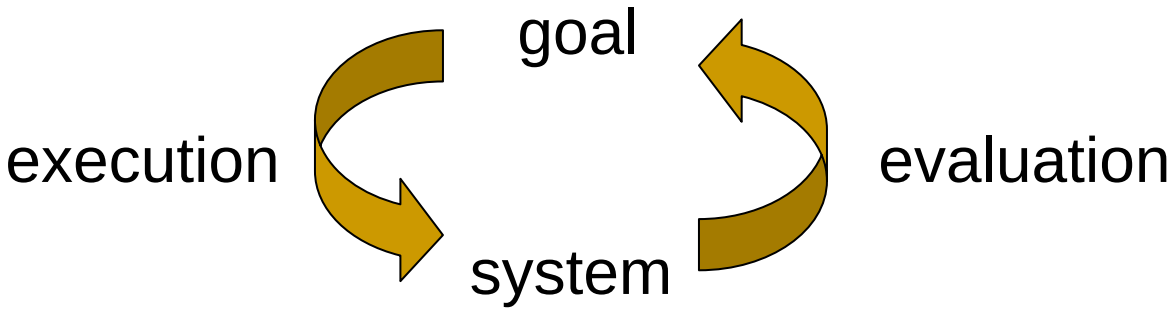
Norman's Model of Interaction

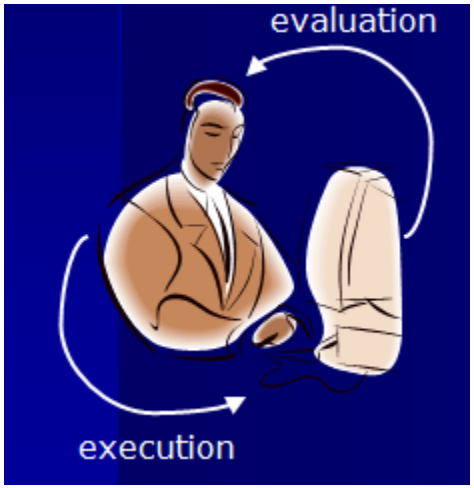
- Based on Execution – Evaluation Cycle
- Two major stages: Execution & Evaluation
- Execution
  - Establishing the goal
  - Forming the intention
  - Specifying the action sequence
  - Executing the action
- Evaluation
  - Perceiving the system state
  - Interpreting the system state
  - Evaluating the system state with respect to the goals and intentions

Norman's Model of Interaction

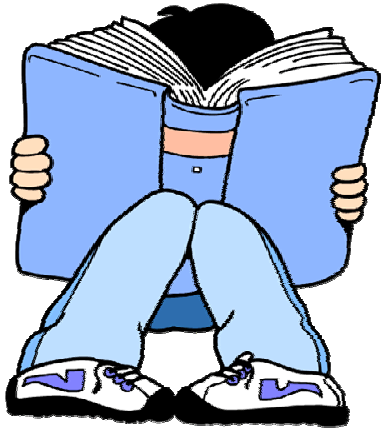


Execution – Evaluation Cycle



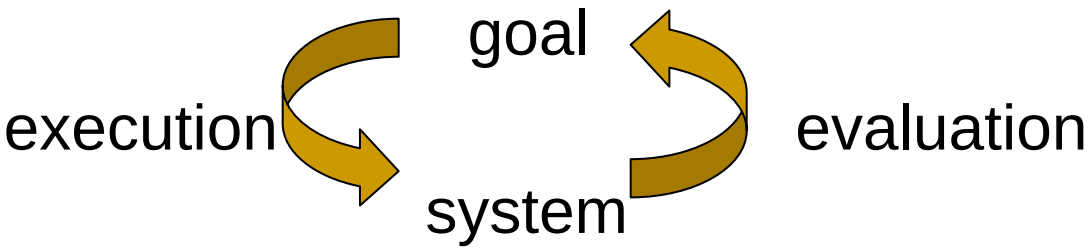


- Example – Switching on the Light
  - Evening falls while reading



Execution – Evaluation Cycle

- Establishing the goal
- Forming the intention
- Specifying the action sequence
- Executing the action
- Perceiving the system state
- Interpreting the system state
- Evaluating the system state



- You decide you need more light. Goal : Get more light
- Intention: Switch on the lamp
- Specify the Action Sequence to reach over an press the lamp switch
- Action executed – Perceive the results: Light is on or not
- Interpret – e.g. No light: Bulb has blown, Lamp not plugged in -> New Intentions
- Light comes out – Evaluate the new state according to your goal
  - If the light is enough – Cycle Completes
  - If NOT, formulate a new intention of switching on the ceiling light for example

Using Norman's Model

- Some Systems are harder to use than others
- Gulf of Execution – Difference b/w
  - User's formulation of actions & Actions allowed by the system
  - I can't accomplish my goal using the Interface
  - AIM: Reduce this gulf
- Gulf of Evaluation – Difference b/w
  - Presentation of the system state & User Expectation
  - I can't figure out whether I accomplished my goal or not
  - More effort required to interpret presentation: Less effective Interaction

Human Error – Slips & Mistakes

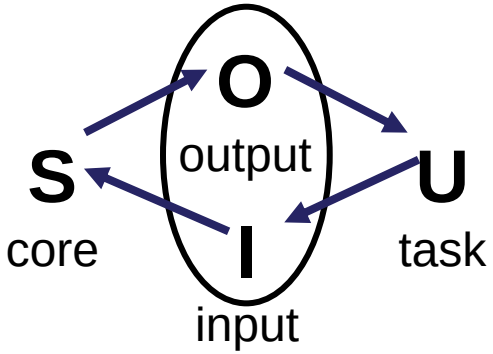
- Slip
  - Understand system and goal
  - Correct formulation of action
  - Incorrect action
- Mistake
  - May not even have right goal!
- Example
  - Slip: Mistype, accidental mouse press
  - Mistake: Magnifying glass icon – Find/Zoom

Human Error – Slips & Mistakes

- Fixing Errors
- Slips
  - Better interface design
  - E.g. Putting more space b/w buttons
- Mistakes
  - Better understanding of the system
  - Improved training, radical redesigning

Abowd & Beale Framework

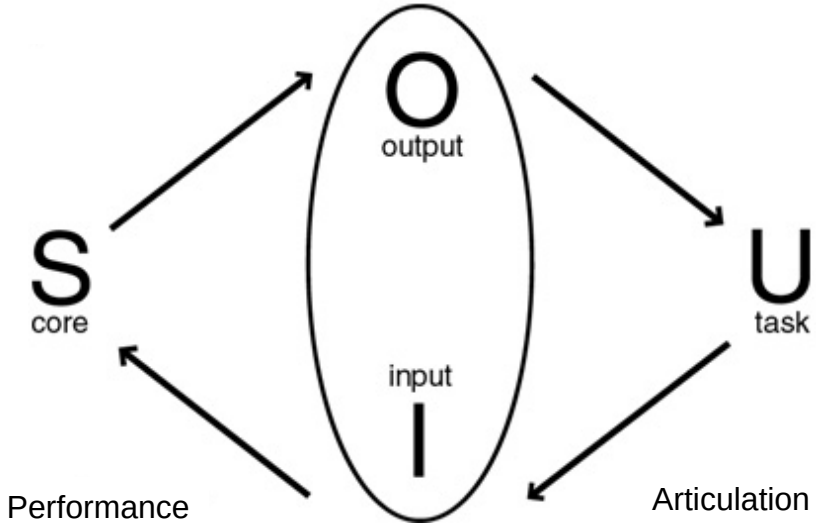
- Interaction framework – Four parts
  - User
  - Input
  - System
  - Output



- Each part has its own unique language
- Interaction = Translation b/w languages
- Input + Output = Interface
- Interface sits b/w User and System

Abowd & Beale Framework

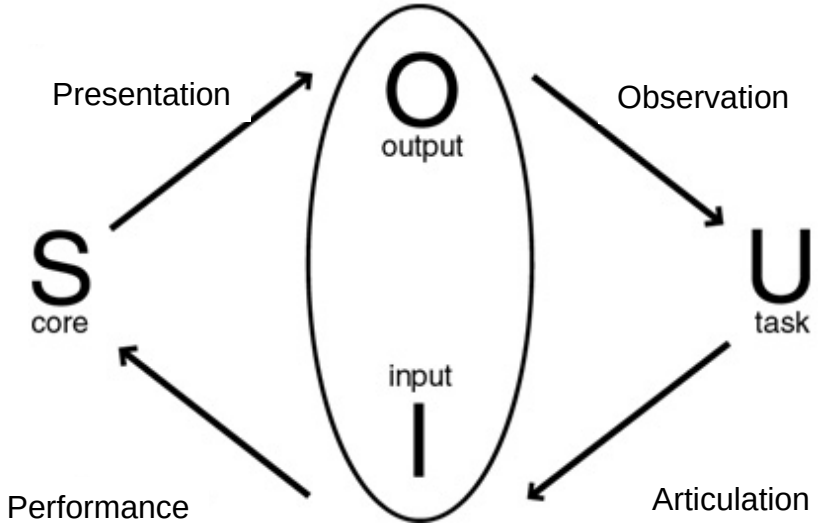
- Interactive Cycle
  - User begins with formulation of a Goal/Task
  - Task articulated within the input language
  - Input language is translated to core language as operations to be performed
  - System transforms itself



System is in a new State

Abowd & Beale Framework

- Interactive Cycle (Contd…)
  - System attribute values rendered to Output
  - User observes the output and asses the result of interaction w.r.t the Goal



Problems in interaction = Problems in translation

Abowd & Beale Framework

- Example: Video Recording using a remote control
- Ineffective Interaction: User not sure VCR is set to record properly
- Articulation: User pressed the keys on the remote in the wrong order
- Performance: VCR may record any channel but remote control lacks the channel selection
- Presentation: VCR display does not indicate the setting of program
- Observation: User does not interpret the feedback properly

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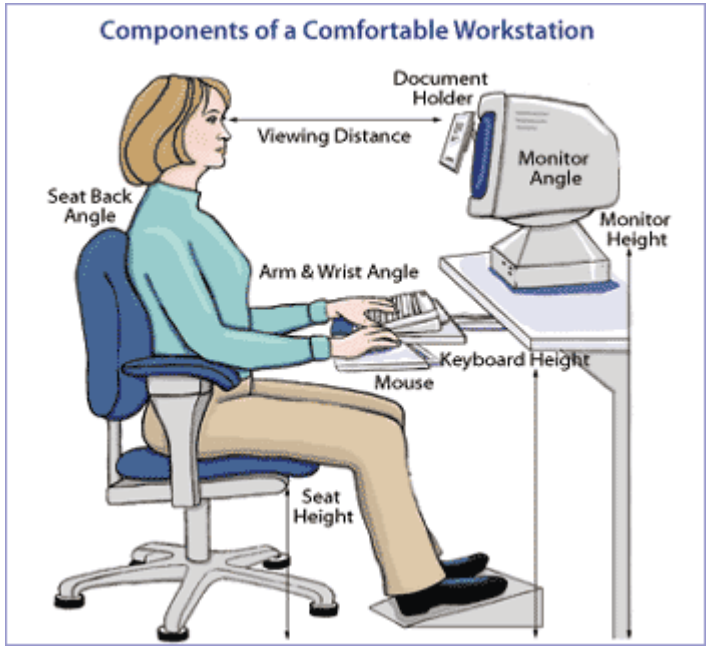
Ergonomics

Physical Aspects of Interaction

Ergonomics

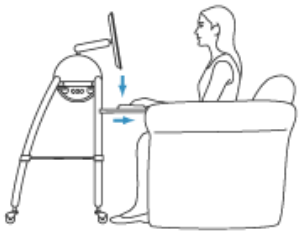
- **Ergonomics** is the science of designing the job equipment, and workplace to fit the worker
- Ergonomics involves arranging the environment to ‘fit’ the person in it
- Ergonomic Design/Products
  - Easy to use and comfortable
  - Reduce fatigue, strain
  - Enhance productivity



Ergonomics Examples

- Arrangement of Controls & Displays
  - Grouped according to: Function, Sequence, Frequency
- Surrounding Environment
  - Design of work Environment
  - Where will the system be used?
  - Who will use it?
  - For how long will it be used?
  - Seated users: Comfort, Back support etc.


Office chair

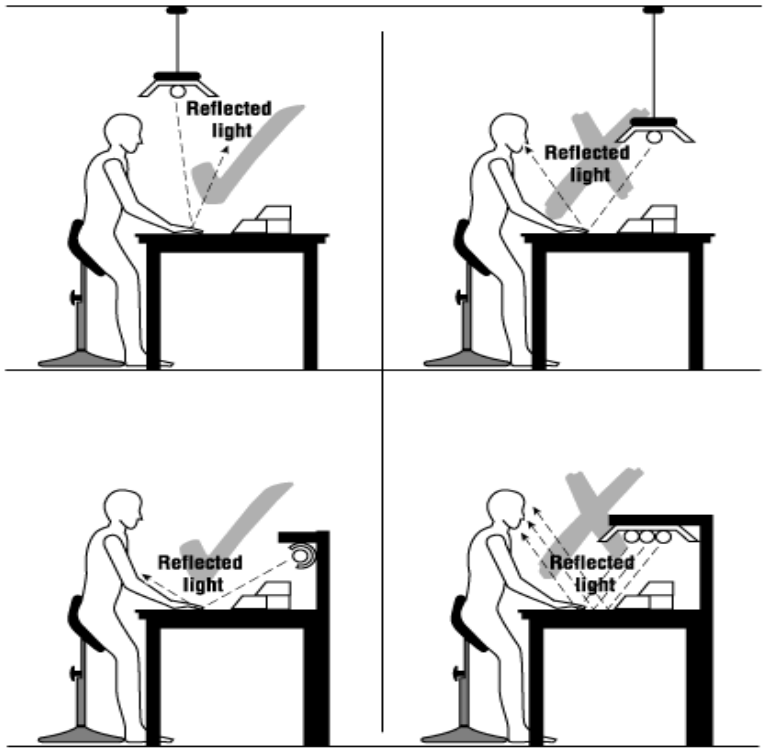

Sofa

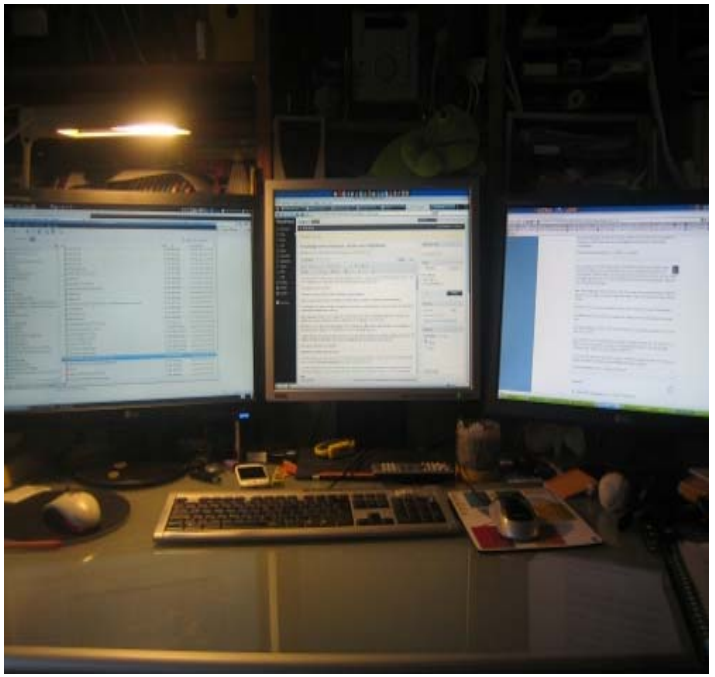

Standing


Bar counter stool

Ergonomics Examples

- Health Issues
  - Lighting, Noise, Temperature, Time Spent etc.

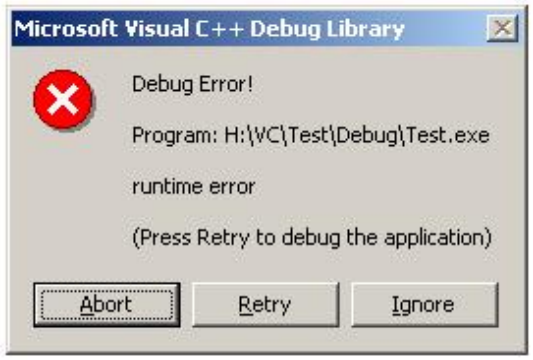




Lighting Ergonomics

Ergonomics Examples

- Use of Colour
  - An indicator – Not the only Cue
  - Color use – Coherent with common conventions
    - Red for Warning etc.



References

- Chapter 3 - Human Computer Interaction by Dix et al.
- User Interface Hall of Fame/Shame