HUMAN COMPUTER INTERACTION

LECTURE 1 INTRODUCTION

TEST BEFORE CLASS

INTRODUCTION

ข้อ 1

- วิชา Human Computer Interaction เป็นวิชาเกี่ยวกับอะไร
- มีเนื้อหาของวิชาอะไรหลักๆ ที่ควรจะต้องเรียนรู้
- มีความเกี่ยวข้องอย่างไรกับสาขาวิชาที่เรียน

ข้อ 2

- คาดหวังอะไรหลังจากเรียนจบวิชานี้ไป

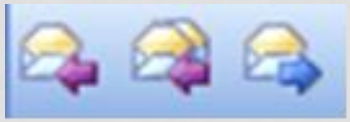
ข้อ 3

นึกถึงถ้าเราต้องการกดเงินที่ตู้ ATM จำนวนเงิน 500 บาท

- จงอธิบายขั้นตอนการกดเงินอย่างละเอียด
- คิดว่าการออกแบบขั้นตอนการกดเงินนั้น ดีหรือไม่ดีอย่างไร ถ้าดีแล้ว ข้อดีคืออะไร ถ้าไม่ดี ข้อเสียคืออะไร

ข้อ 4

จงอธิบาย 3 สิ่งที่เห็นนี้ คืออะไร อธิบายการใช้งาน

อะไรคือปัญหาของคำถามข้อนี้

ข้อ 5

จงเขียนเลขที่เห็นลงกระดาษ

***** กรุณาอ่านให้จบก่อนแล้วค่อยเขียน *****

ข้อ 5.1

00441280814080

ข้อ 5

จงเขียนเลขที่เห็นลงกระดาษ

***** กรุณาอ่านให้จบก่อนแล้วค่อยเขียน *****

ข้อ 5.2

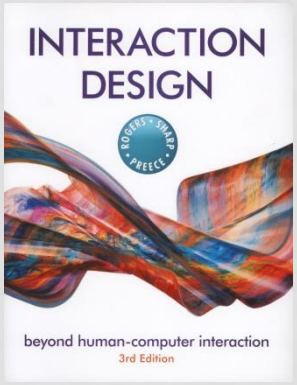
00 44 1280 828 298

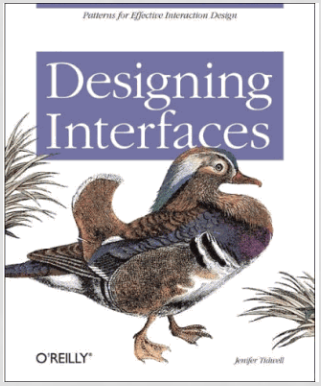
ข้อ 6

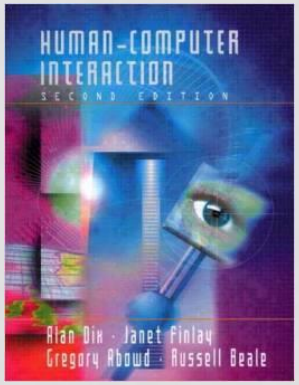
Human Computer Interaction และ User Interface

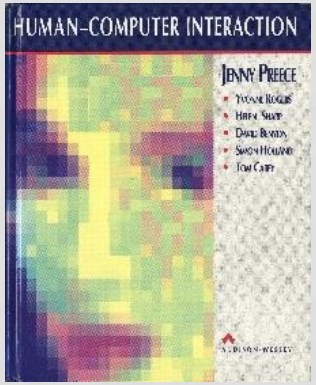
คืออะไร มีความแตกต่างกันหรือไม่ อย่างไร จงอธิบาย

BOOK IN USE


INTERACTION DESIGN
ROGERS · SHARP · PREECE
beyond human-computer interaction
3rd Edition


Patterns for Effective Interaction Design
Designing Interfaces
O'REILLY


HUMAN-COMPUTER INTERACTION
SECOND EDITION
Alan Dix · Janet Finlay
Gregory Abowd · Russell Beale


HUMAN-COMPUTER INTERACTION
JENNY PREECE

DESIGN

Design of Beauty

Design of Usability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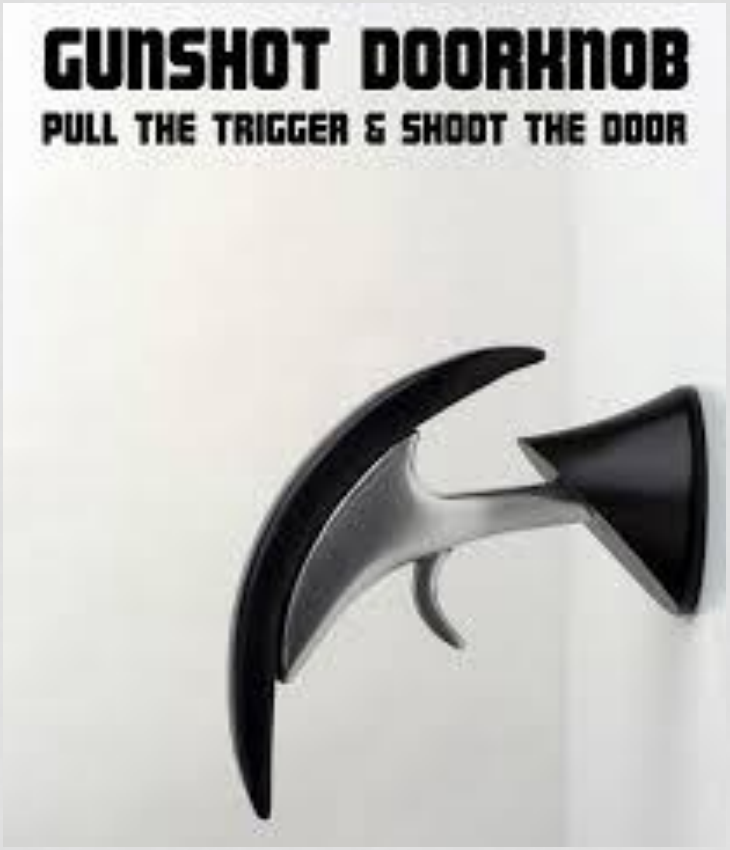
COLE & MASON
COLE & MASON


COLE & MASON
COLE & MASON


GUNSHOT DOORKNOB
PULL THE TRIGGER & SHOOT THE DOOR


on
off
on
off


15%


15%

WHAT IS THIS COURSE ABOUT

WHAT IS THIS COURSE ABOUT

- About human issues
- About computer issues
- About interaction of the two (human and computer)
  - Specifying interaction - แจกแจงวิธีการปฏิสัมพันธ์
  - Choosing a suitable style of interaction - เลือกรูปแบบที่เหมาะสมในการใช้งาน
  - Designing a system for the interaction - ออกแบบการปฏิสัมพันธ์
  - Testing whether a system is effective in interaction or not - ทดสอบว่ารูปแบบการออกแบบมานั้นเหมาะสมแล้วหรือไม่

HOW TO STUDY THIS COURSE

- Quite some reading to do
- Lecture notes are NOT enough
- Discussions among students are useful
- Case study exchanges are important

MARKING SCHEME

Lecture (preference?)	2 hrs. per week
Discussion / Tutorials	1 hrs. per week

Total 100%

Assignment	30%
Final	70%

Quiz / Discussion(no mark) everyone needs to participate

The marking scheme can be changed with the priority before midterm exam
****** All students can not complain ******

OUTLINE OF THIS LECTURE

- Understand about HCI.
- Why is it important?
- Some bad design sample
- Understand the word usability, user interface and accessibility
- Evolution of user interfaces

WHY DO I NEED TO STUDY THIS COURSE

WHY DO I NEED TO STUDY HCI

- Computer, electronic devices, mobile etc. are one of the most important thing for human in the real world.
- The designing of those devices, some of them are hard to use, to learn and to train.
- For the computing and electronic people, it is important to understand users before designing any devices.
- The interaction and devices designing need to design to help user easy to use and learn, take less time to train.

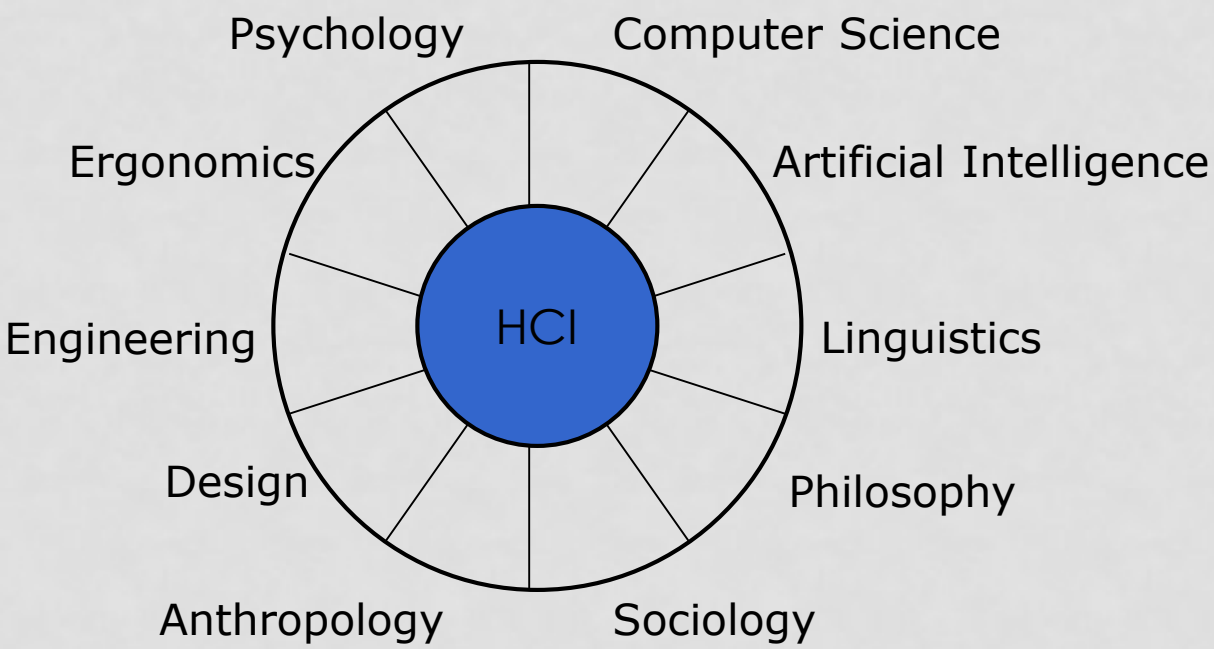
WHAT IS HCI?

- HCI : Human Computer Interaction
- The study of interaction between people and computer-based systems
  - Computer, Mobile, keyboard etc.
- Concern with the physical, psychological and theoretical aspects [Dix et al. p3]
  - Vision, hearing, touch

WHY DO HCI IMPORTANT?

- To enable us to design interactive products to support people in their everyday and working lives. [Rogers et al, preface, V]
- There is a lot of devices/processing design that can cause problem for users such as ATM process.
- Good design involves understanding how users interact with computers, and enabling them to do so effectively
- The designer can develop usable products (Goal of HCIs)

THE MAIN FIELDS THAT HCI COVER



USABLE PRODUCTS: GOALS OF HCI

- Allow users to carry out tasks
  - Understanding
  - Safely to use
  - Effectively/Efficiently
  - Easy to learn
  - Enjoyable experience
  - Timeless to use and understand
  - No training

BACKGROUND

- Traditionally, software development is about **functions**. The ***usability*** is a secondary concern or an issue for training.

- Increasingly, ***usability*** has become as ***important*** as the functionality to ensure the ***smooth running*** of the organisation and ***improving productivity***.

- Often a powerful software system is devalued by a poorly designed human-computer *interface*, known as **user interface**

***** Sample of Macintosh and PCs first users**

GREAT HCI

www.interaction-design.org

WHAT IS USABILITY

- Usability means making products and systems **easier to use** and **learnability** , and closely to **user needs and requirements**

- Describes the effectiveness, efficiency and satisfaction with which users achieve their goals.

  - It is important because:
    - Good interface design makes people more productive
    - Bad interface design can lead to disaster

MAIN OUTCOME OF USABILITY

- **Effectiveness** - can users complete tasks, achieve goals
- **Efficiency** - how much effort do users require to do this? (Often measured in time/error rate)
- **Satisfaction** – what do users think about the products ease of use?
- **Familiarity** – how much time do user need to get familiar with the system?

WHY USABILITY IS IMPORTANT

- If a system is difficult to use, people **leave**.
- If the main page of the system fails to clearly state and users don't know how to fix it, people **leave**.
- If users get lost on the system, they **leave**.
- If a system information is hard to read or doesn't answer users' key questions, they **leave**.
- If all users **leave** … we **lose** !!!

Neilsen Norman Group [www.nngroup.com]

USABILITY DEFINE 5 QUALITY COMPONENTS

Neilsen Norman Group [www.nngroup.com]

- **Learnability**: How easy is it for users to accomplish basic tasks the first time they encounter the design?
- **Efficiency**: Once users have learned the design, how quickly can they perform tasks
- **Memorability**: When users return to the design after a period of not using it, how easily can they reestablish proficiency
- **Errors**: How many errors do users make, how severe are these errors, and how easily can they recover from the errors
- **Satisfaction**: How pleasant is it to use the design

Users - who is using the product? Are they highly trained and experienced users, or novices

MAIN OF USABILITY GOALS

- User friendly
- Ease of learn and use
- Memorability
- High speed of user task performance and safety
- Low user error rate
- Subjective user satisfaction
- User royalty

[Rogers et.al, pp.14-18]

HOW TO IMPROVE USABILITY

- Ask the users to perform **representative tasks** with the design.
- **Observe** what the users do, where they succeed, and where they have difficulties with the user interface. Shut up and let the users do the talking.
- It's important to test users individually and let them solve any problems on their own.

ACCESSIBILITY

- Access for all, usable by as many people as possible.
- Including elderly and people with disabilities.
- Disabilities is the group of people who has visual, hearing, cognitive and motor impairment. [www.adobe.com]

SOME PROBLEMATIC DESIGNS

- How fast am I going?

[www.baddesigns.co]

SOME PROBLEMATIC DESIGNS

- How Do I get out of this lift?

[www.baddesigns.co]
[http://uxdesign.cc]

HCI VS UI

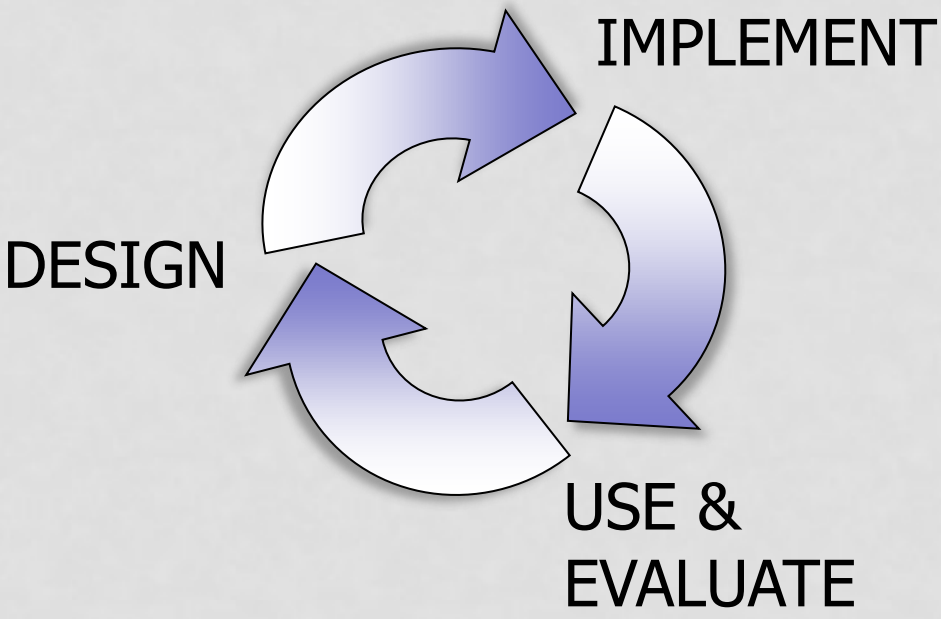
- Human Computer Interaction VS User Interface

USER INTERFACE - UI

- is everything designed into the device with which people can interact. [Magaret Rouse]
- is everything where user will interact with a computer or machine to complete task.
- UI designer will often use visualization software before it is build in code.
- UI design is the largest part of the production.

UI DESIGN/DEVELOP PROCESS

- The User-Centered Design
  - Analyze user's goals & tasks
  - Create design alternatives
  - Evaluate options
  - Implement prototype
  - Test
  - Refine



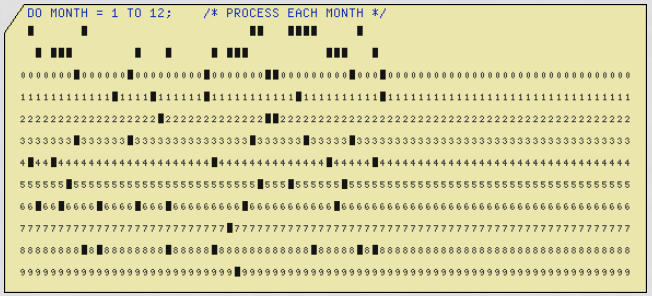
INTERFACES IN THE REAL WORLD

- Not just computers!
  - VCR
  - Wristwatch
  - Phone
  - Copier
  - Car
  - Plane cockpit
  - Airline reservation
  - Air traffic control
  - Running shoes!

EVOLUTION OF USER INTERFACE

EVOLUTION OF USER INTERFACE

- Early days (Up to 1960s)
  - Isolated computer centres with mainframe computers
  - Punched card input
  - line-printer output
  - Batch processing (even the command)



http://www-03.ibm.com/ibm/history/exhibits/mainframe/mainframe_album.html

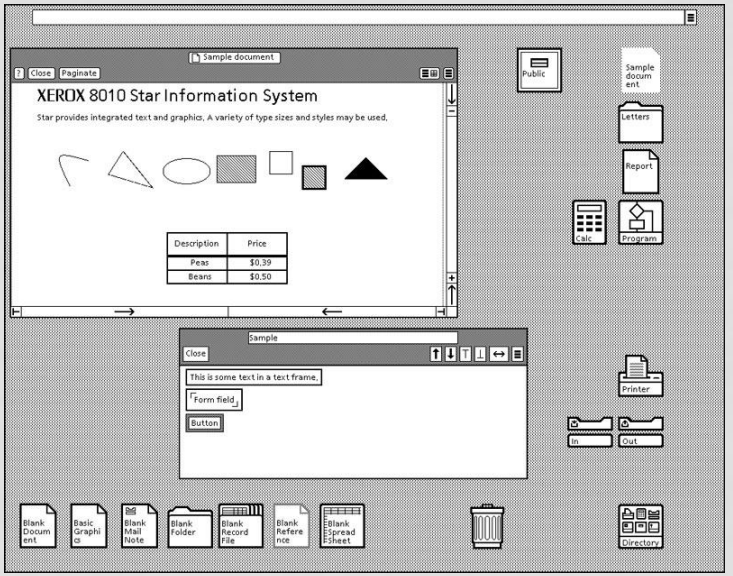
EVOLUTION OF USER INTERFACE

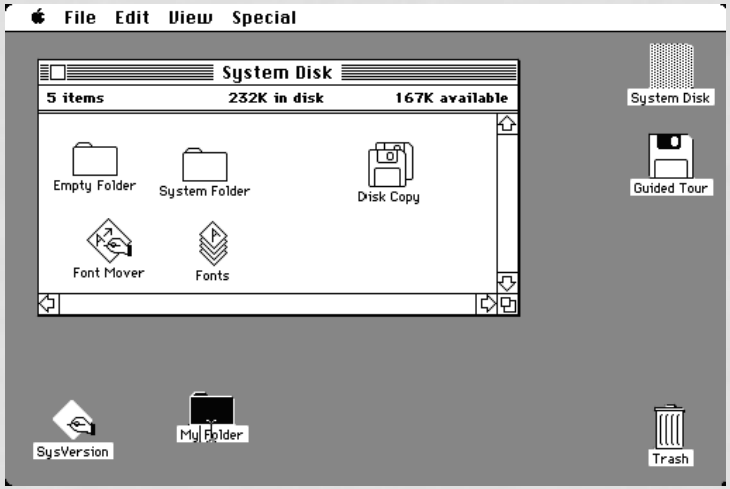
- Start of interaction (Mid 1960s - early 1980s)
  - Mechanical or 'glass' teletype alphanumeric displays
  - Users interact via command line or menu-driven interfaces through terminal stations

http://www-03.ibm.com/ibm/history/exhibits/mainframe/mainframe_album.html

EVOLUTION OF USER INTERFACE

- Age of Personal Computers (Early 1980s - mid 1990s)
  - A lot of interaction required
  - Graphical user interfaces (GUI) based on windows, icons, menus and pointing devices (WIMP)
  - Users manipulate graphical representations of objects *directly* on the screen

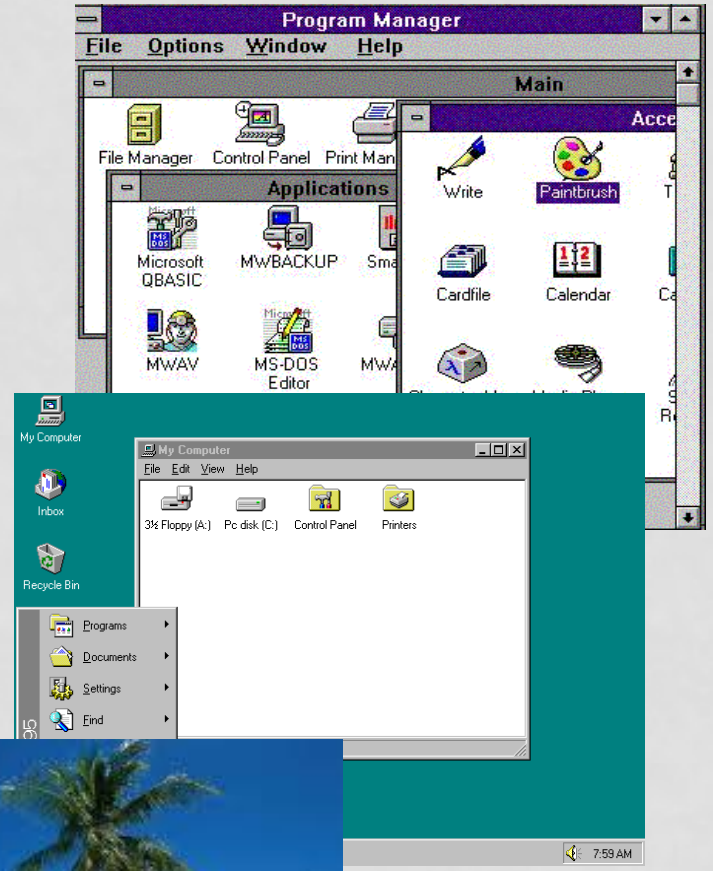




http://images.appleinsider.com/leopard-preview-desktop-3.jpg

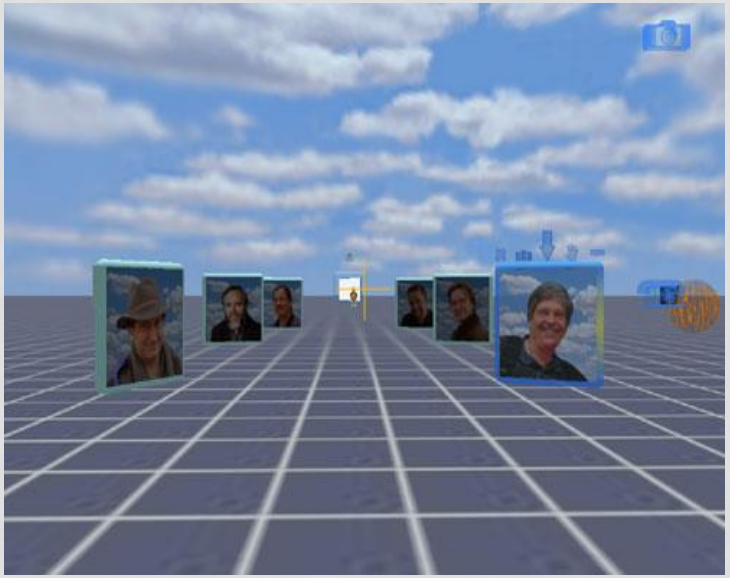
EVOLUTION OF USER INTERFACE

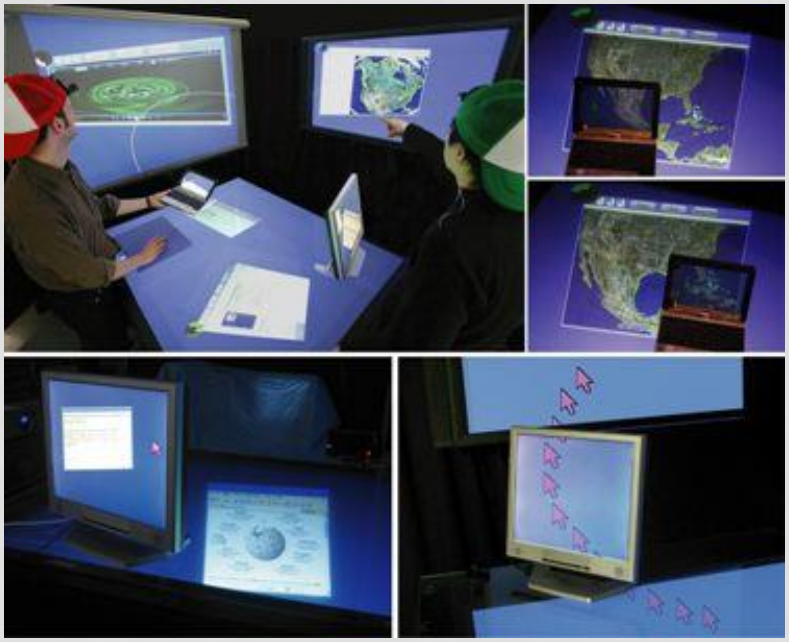
- Use of Graphics (Mid 1990s - early 2000s)
  - Multimedia machines with animation, sound, moving image and voice input
  - Interaction still limited
  - GUI improvement with rich colour and realistic icons and desktop
  - Start of adaptive interface

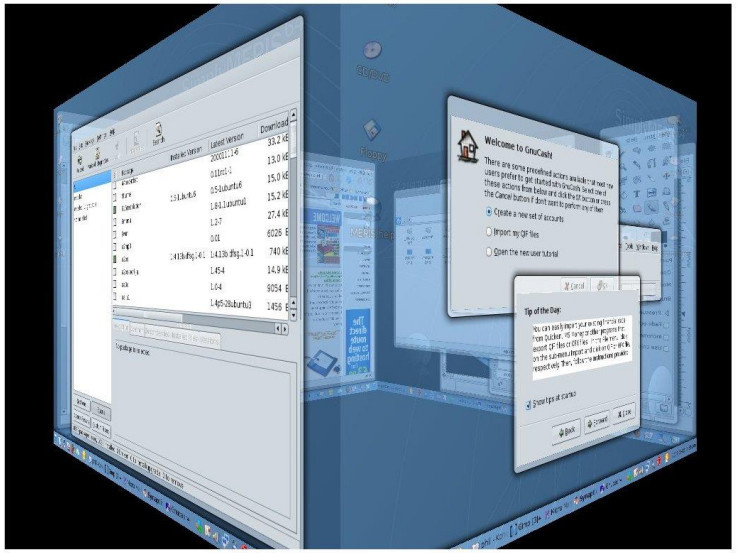


EVOLUTION OF USER INTERFACE

- Next Generation
  - Multimodal interfaces will exploit different user senses and different types of human interaction
  - Virtual reality?
  - Full range of user interaction will be opened up







THE NEED FOR GOOD INTERFACE DESIGN

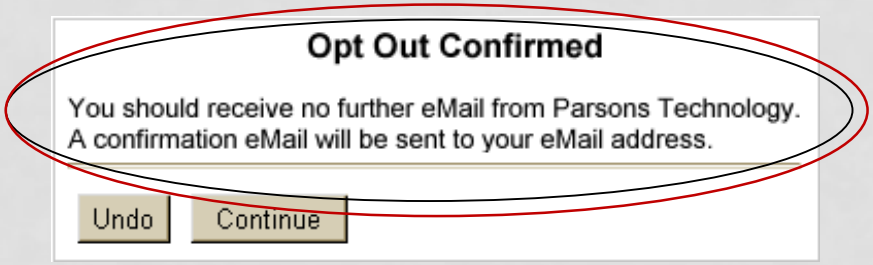
Benefits of good design

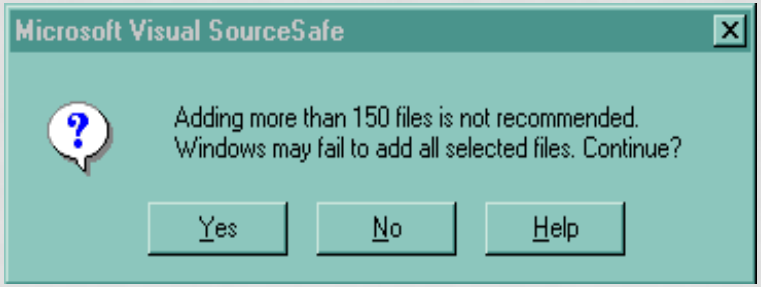
- Increases in:
  - Productivity
  - Sales
  - Customer royalty
- Decreases in:
  - Training time
  - User errors
  - Development time
  - Customer support

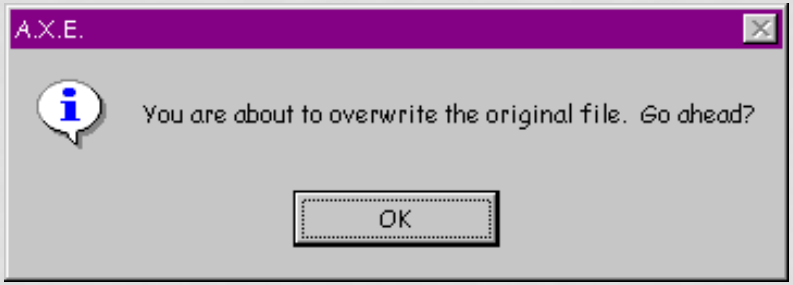
Risks of poor design

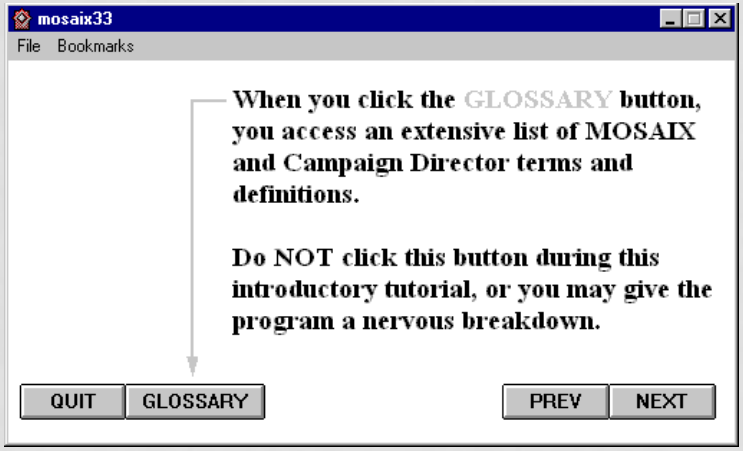
- Misinformation
- Incorrect decision making
- Increased training cost without improvement of productivity
- Customer dissatisfaction
- Ill-health (eyesight, repetitive strain injuries)

WHEN THINGS GO WRONG: ERROR MESSAGES









WHEN THINGS GO WRONG: IRAN AIR 655

3 July 1988: IR655 shot down, 290 passengers including 66 children dead

U.S. government claimed the aircraft was mistakenly identified as an attacking F-14.

http://en.wikipedia.org/wiki/Iran_Air_Flight_655

SUMMARY

Define the basic concepts of:

- User interface
- Human-computer interaction (HCI)
- Usability
- Accessibility

Explain why they are important and give examples of:

- The benefits of good design
- The risks of bad design

Further reading and revision:

- Dix et al, Introduction, pp. 1- 8

UN-ANSWERED QUESTIONS:

- What human factors should be thought about?
- Does the human mental model works in the same way as computer's (check this when learning programming)?
- Are devices design with a human consideration? What devices are suitable for what circumstances?
- How do we describe formally the human-machine dialogue before an interface is designed?
- What interaction style are there, and which to use?
- How tasks are decomposed, and how to shared them effectively between the human and the machine?
- What are interface design guidelines? What are the use for these guidelines in practice?
- How do we evaluate usability of something?

PREPARE FOR NEXT WEEK

Human

- Memory
- Vision
- Eyes
- Fingers

Senses

- Sight
- Hearing
- Touch