

# **Mensch-Maschine-Interaktion (Human-Machine Interaction)**

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# Example: „I am not able to program my VCR.“

## Timer recording



The timer recording system allows you to select the date, time and channel and record the desired programs. Up to 8 timer programs within a month can be stored in this unit.



**NOTE:**  
In the event of a power failure the data of the automatic recording will be maintained in the built-in memory for about 30 minutes. Also, the clock will continue to run for this period of time. Thereafter the data will be deleted. When the power resumes, the time display will change to "00:00" that the timer setting will have to be set.

### Setting timer recording

#### Preparation:

- Turn ON the TV and select its AV channel (this may be labeled SV / AUX etc.)
- Load a recordable DVD or video tape.
- Press DVD/VCR to select the appropriate mode.
- Confirm that the clock is indicating the correct time.

**Example:** Set the recording mode to LP and record on DVD; the T program is on channel 1 starting at 23:00 and stopping at 23:00 on date of 20/11.

- 1 Press **SETUP**.  
The SETUP MENU screen appears.



- 2 Press **▲** or **▼** to select "TIMER REC SET" and press **ENTER**.  
The TIMER REC SET screen will appear.



- 3 Press **▲** or **▼** to select "NEW" and press **ENTER**.  
The program screen will appear.



## Timer recording



### NOTES:

- If you select timer recording on a specified date only one time, select "ONCE" as the "TYPE" for recording. You can record same days of every week or from Monday to Friday using the item "TYPE". The items you can select are as follows: ONCE: Recording on the selected "DATE" EVERY SUN: Recording every Sun. EVERY MON: Recording every Mon. EVERY TUE: Recording every Tue. EVERY WED: Recording every Wed. EVERY THU: Recording every Thu. EVERY FRI: Recording every Fri. EVERY SAT: Recording every Sat. MON-FRI: Recording from Mon. to Fri. MON-SAT: Recording from Mon. to Sat. EVERY DAY: Recording everyday.
- The initial setting of "REC TO" and "REC MODE" can be changed using "Setting the recording". (See page 24.)

- 4 Press **▲** or **▼** to select "TYPE" and press **ENTER**.  
Press **▲** or **▼** to select "ONCE" from the list and press **ENTER**.



- 5 Press **▲** or **▼** to select "DATE" and press **ENTER**.  
Press **▲** or **▼** to select the date to be recorded and press **ENTER**.

- 6 Press **▲** or **▼** to select "START" and press **ENTER**.

- Set the time when the recording is started.
- To switch over the selection item (hour or minute), press **←** or **→**, then press **ENTER**.
- Press **▲** or **▼** to adjust the time.
- After setting the time, press **ENTER**.



- 7 Press **▲** or **▼** to select "END" and press **ENTER**.  
Set the stopping time in the same manner for setting the starting time of timer recording.

- 8 Press **▲** or **▼** to select "CH" and press **ENTER**.  
• Press **▲** or **▼** to select the channel to be recorded and press **ENTER**.

- 9 Press **▲** or **▼** to select "REC TO" and press **ENTER**.  
Select the media (DVD or VCR) to be recorded from the list and press **ENTER**.

## Timer recording



### NOTES:

- Recording starts a few seconds before the preset starting time.
- You cannot use the timer recording for the both DVD and VCR at the same time.
- You can playback the DVD during the VCR timer recording, and you can playback the VCR during the DVD timer recording.
- If the clock symbol (⌚) blinks when the timer recording ended, the TV program has not been completely



- 11 Select "OK" and press **ENTER**. The timer program is determined and the TIMER REC SET screen appears again.
- 12 When you enter the other program for the timer recording, repeat the steps 3 to 11.
- 13 Press **SETUP**. The TIMER REC SET screen disappears and the TV returns to the normal mode.

- 14 Press **TIMER REC**. The timer indicator "⌚" will appear on the display and the unit stands by for recording.

- If the program is DVD recording only, the unit will change to VCR mode automatically. (The DVD mode cannot be selected.)
- If the program is VCR recording only, the unit will change to DVD mode automatically. (The VCR mode cannot be selected.)
- If the programs are DVD and VCR recording, the unit will turn off. If you want to use the unit, press **TIMER REC** again to deactivate the timer.
- If the clock symbol (⌚) blinks in the display in spite of the pressing of **TIMER REC**, the cassette may not have been loaded yet. (see page 42)
- If the cassette is ejected in spite of the pressing of **TIMER REC**, the erase prevention tab of the cassette may have been removed. (see page 42)

### Checking or changing the timer recording

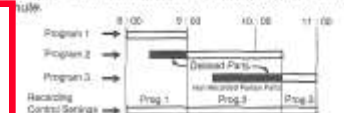
When you want to check the selected timer recording, follow the steps 1 and 2 of "Setting timer recording" and display the TIMER REC SET screen. To change the timer recording, select the program to be changed and press **ENTER**. The changing method is the same as that for the recording a program for the first time.

### Cancelling the timer recording

Display the TIMER REC SET screen. Select the program you want to cancel and press **CANCEL**, then the selected program will be erased from the timer recording list.

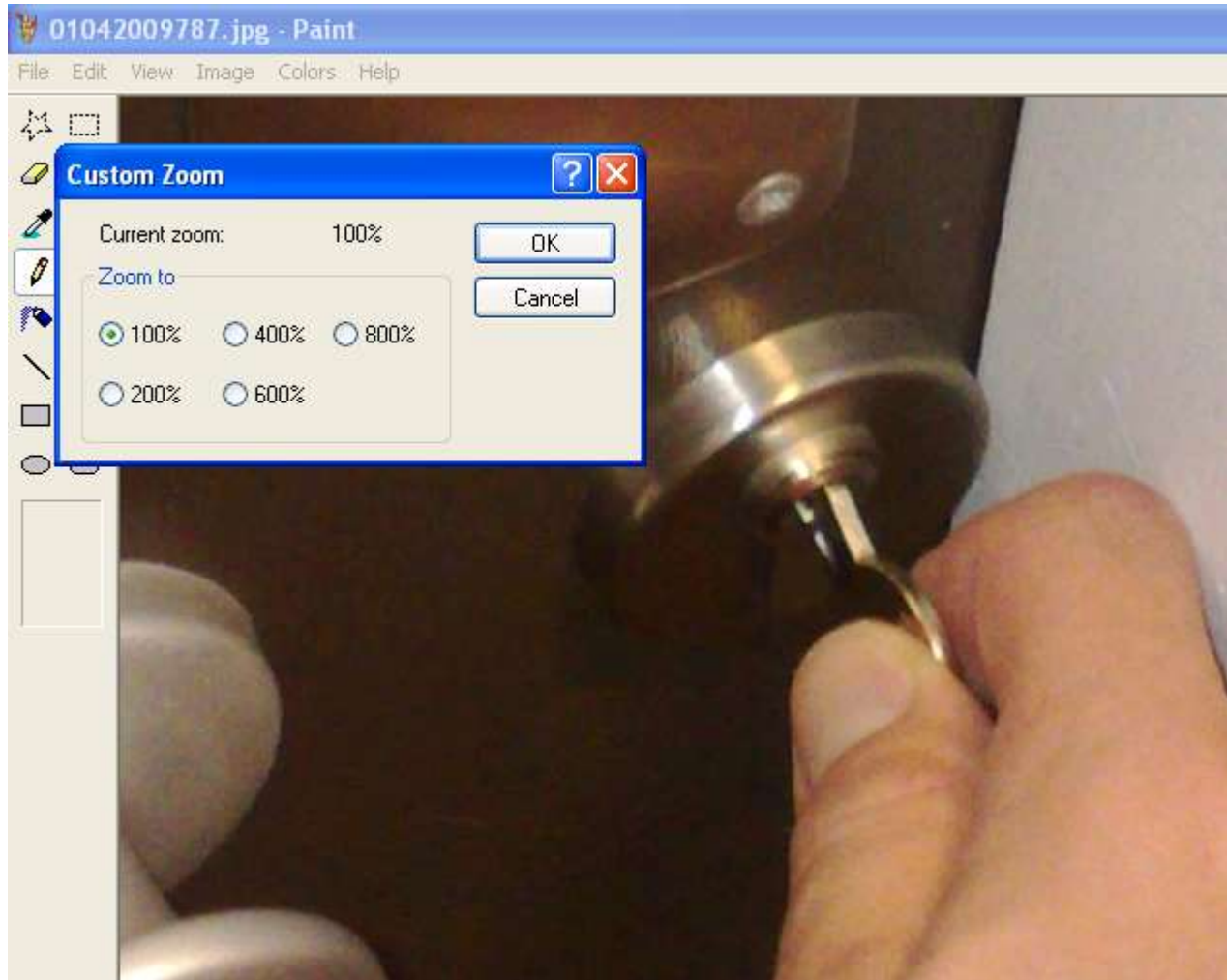
### In case timer programs-overlap

Do not overlap timer programs as portions of the conflicting programs will be lost. The first recording time has priority over the next recording time as shown in the diagram below. In this case, the next recording time is delayed a maximum of about 10 min.



**14** Press **TIMER REC**. The timer indicator "⌚" will appear on the display and the unit stands by for recording.

# Example: “I am not able to ...”



# Vorbemerkung: Deutsch and English

- Viele Materialien sind nur in englischer Sprache verfügbar
  - ...oder in besserer Qualität/Aktualität
- Wissenschaftliches Arbeiten ist international
  - Die Wissenschaftssprache ist englisch
  - Austausch von Materialien zwischen Lehre und Forschung in deutscher Sprache ist schwierig
  - Viele Begriffe sind in englischer Sprache geprägt und schwer zu übersetzen
- Konsequenz:
  - Lehrmaterialien in *englischer* Sprache
  - Vortrag in *deutscher* Sprache

# Paul Holleis from DOCOMO Euro-Labs

- Diploma Informatics, University of Passau
- PhD in Computer Science, Media Informatics Group, LMU Munich

## Mission

- Research on Smart Services & Advanced mobile Network Technologies
- Collaboration with European Universities and Industry
- Standardization

## Research Fields

### Smart & Secure Services

- Life support & community services based on context information and reasoning
- Building the „Internet of Things“ with NFC
- Secure software and data usage control

### Wireless Access

- Wireless access technologies for increased efficiency in spectrum usage, e.g., SU/MU-MIMO, Interference management

### Network Platform

- Future transport network enhanced with overlays & virtualization
- Service delivery platform cooperating with 3rd services
- Network security

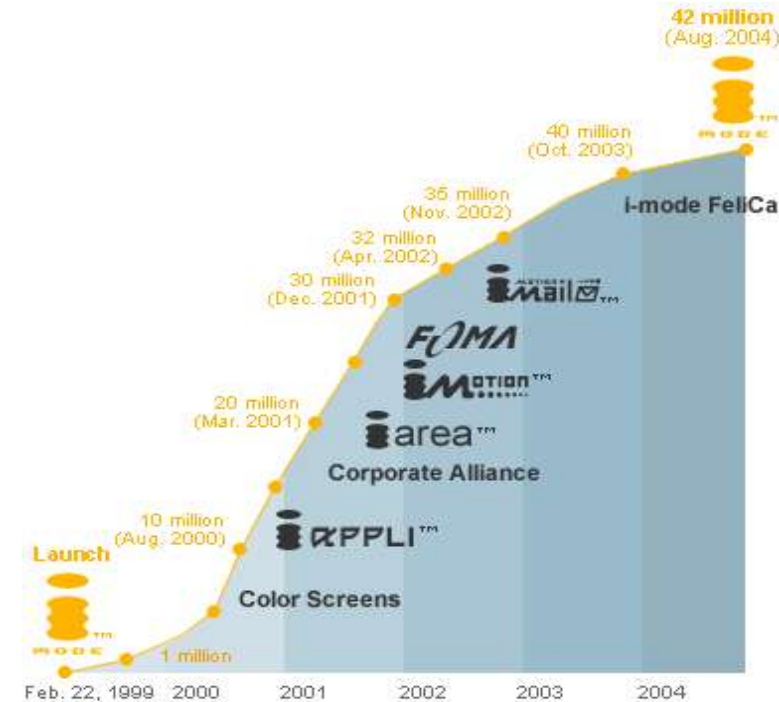


## Further information

[www.docomolab-euro.com](http://www.docomolab-euro.com)

# Who's NTT DoCoMo?

- Major mobile operator
- Japan's premier mobile operator
  - 50+ million subscriber
  - 40+ million i-mode users
  - 30+ million FeliCa users
- Leadership in mobile data
  - i-mode success story
  - Commercial 3G network (FOMA) since 2002
  - **R&D innovations** in networks, terminals, services



i-mode services



Wristomo



FingerWhisper



# Organisatorisches

- Die Lehrveranstaltung (3V+2Ü) ist eine Mischung aus:
  - Vorlesung (voraussichtlich 12 Termine)
  - Übungen zur Durchführung von Experimenten (ca. 7 Aufgabenblätter)
  - Diskussions- und Unterstützungs-Übungen
- Einteilung für die Übungen in 4er-Gruppen (*per Los!*)
- Für Leistungsnachweis:
  - Erfolgreiche Bearbeitung der Aufgabenblätter (als Gruppe)
  - Teilnahme an einer zusätzlichen Benutzerstudie (verschiedene Angebote)
    - » Aus Projekt-, Diplom- und Forschungsarbeiten
  - Lesen und schriftliches Zusammenfassen von wiss. Arbeiten
  - Abgabe einer Arbeitsmappe am Ende
- Keine Klausur / keine abschließende mündliche Prüfung

# Website

- <http://www.medien.informatik.uni-muenchen.de/mmi>
- Content
  - General Information / news
  - Lecture Slides
  - Exercises
  - Literature
  - Links
- *Remark:* There is an online video podcast of the lecture given by Prof. Hussmann in WS 06/07:  
<http://videoonline.edu.lmu.de/wintersemester-2006-2007/04/>



# 1 Introduction and History

1.1 Motivation

1.2 Terms and concepts

1.3 Overview of the course

1.4 A brief history of HCI

# Why is Usability Important?

- Improving usability can
  - increase productivity of users
  - reduce costs (support, efficiency)
  - increase sales/revenue
    - » E.g. web shop: In the web, the competitor is just one click away!
  - enhance customer loyalty
  - win new customers
- Several case studies show the benefit of usability
- Usability studies can trigger new ideas
- Usability is often considered as sign of quality

# Interaction Design and Product Design

- Product design determines the appearance of the product
- Interaction design determines the usability of the product
- Both are closely coupled



# Sophisticated Design does not entail Usability



CS Building in Saarbrücken



DFKI in Saarbrücken

(Photos A. Butz)

# Usability applies to a wide range of systems



(German Rail IC-Train)



(CS Building, Lancaster University)



- Signs and explanations for things that are usually obvious are an indicator for a potential problem.
- Not having (necessary) explanations is also not a solution

# Usability applies to a wide range of systems

## *CSE HTML Validator v3.05*

Warning Checkbox Options

Show warnings       Show comment warnings       Show missing attribute warnings

Tag Name Program Options

Enable programs

Flag 1    2    3    4    5    6    7    8    9    10

Flag 11    12    13    14    15    16    17    18    19    20

## *CSE HTML Validator v4.0*

Program Flags

<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input checked="" type="checkbox"/> 5	<input checked="" type="checkbox"/> 6	<input checked="" type="checkbox"/> 7	<input checked="" type="checkbox"/> 8	<input checked="" type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input checked="" type="checkbox"/> 11	<input checked="" type="checkbox"/> 12
<input checked="" type="checkbox"/> 13	<input checked="" type="checkbox"/> 14	<input checked="" type="checkbox"/> 15	<input checked="" type="checkbox"/> 16	<input checked="" type="checkbox"/> 17	<input checked="" type="checkbox"/> 18	<input checked="" type="checkbox"/> 19	<input checked="" type="checkbox"/> 20	<input checked="" type="checkbox"/> 21	<input checked="" type="checkbox"/> 22	<input checked="" type="checkbox"/> 23	<input checked="" type="checkbox"/> 24
<input checked="" type="checkbox"/> 25	<input checked="" type="checkbox"/> 26	<input checked="" type="checkbox"/> 27	<input checked="" type="checkbox"/> 28	<input checked="" type="checkbox"/> 29	<input checked="" type="checkbox"/> 30	<input checked="" type="checkbox"/> 31	<input checked="" type="checkbox"/> 32	<input checked="" type="checkbox"/> 33	<input checked="" type="checkbox"/> 34	<input checked="" type="checkbox"/> 35	<input checked="" type="checkbox"/> 36
<input checked="" type="checkbox"/> 37	<input checked="" type="checkbox"/> 38	<input checked="" type="checkbox"/> 39	<input checked="" type="checkbox"/> 40	<input checked="" type="checkbox"/> 41	<input checked="" type="checkbox"/> 42	<input checked="" type="checkbox"/> 43	<input checked="" type="checkbox"/> 44	<input checked="" type="checkbox"/> 45	<input checked="" type="checkbox"/> 46	<input checked="" type="checkbox"/> 47	<input checked="" type="checkbox"/> 48
<input checked="" type="checkbox"/> 49	<input checked="" type="checkbox"/> 50	<input checked="" type="checkbox"/> 51	<input checked="" type="checkbox"/> 52	<input checked="" type="checkbox"/> 53	<input checked="" type="checkbox"/> 54	<input checked="" type="checkbox"/> 55	<input checked="" type="checkbox"/> 56	<input checked="" type="checkbox"/> 57	<input checked="" type="checkbox"/> 58	<input checked="" type="checkbox"/> 59	<input checked="" type="checkbox"/> 60

<http://homepage.mac.com/bradster/iarchitect/clarity.htm>

# There are many jobs that require an understanding of usability

- **Interaction designers:** people involved in the design of all the interactive aspects of a product
- **Usability engineers:** people who focus on evaluating products, using usability methods and principles
- **Web designers:** people who develop and create the visual design of websites, such as layouts
- **Information architects:** people who come up with ideas of how to plan and structure interactive products
- **User experience designers:** people who do all the above but who may also carry out field studies to inform the design of products

# Example: Currency Converter

- Design a user interface for the following scenario:

*Scenario 1: Mary needs a currency converter tool.*

*Scenario 2: Mary works at XY-import-export GmbH in Munich. On her laptop, she frequently checks prices for goods in the USA and in Japan. For calculating her budget she needs to convert these into Euro. Sometimes when she writes offers, she converts her company's sales prices (which are in Euro) into US\$ or Yen.*

- Task: draw a sketch of a user interface for an application that supports Mary in her work.
- Think about how you would integrate such an application with her current computer system and software infrastructure



# 1 Introduction and History

1.1 Motivation

1.2 Terms and concepts

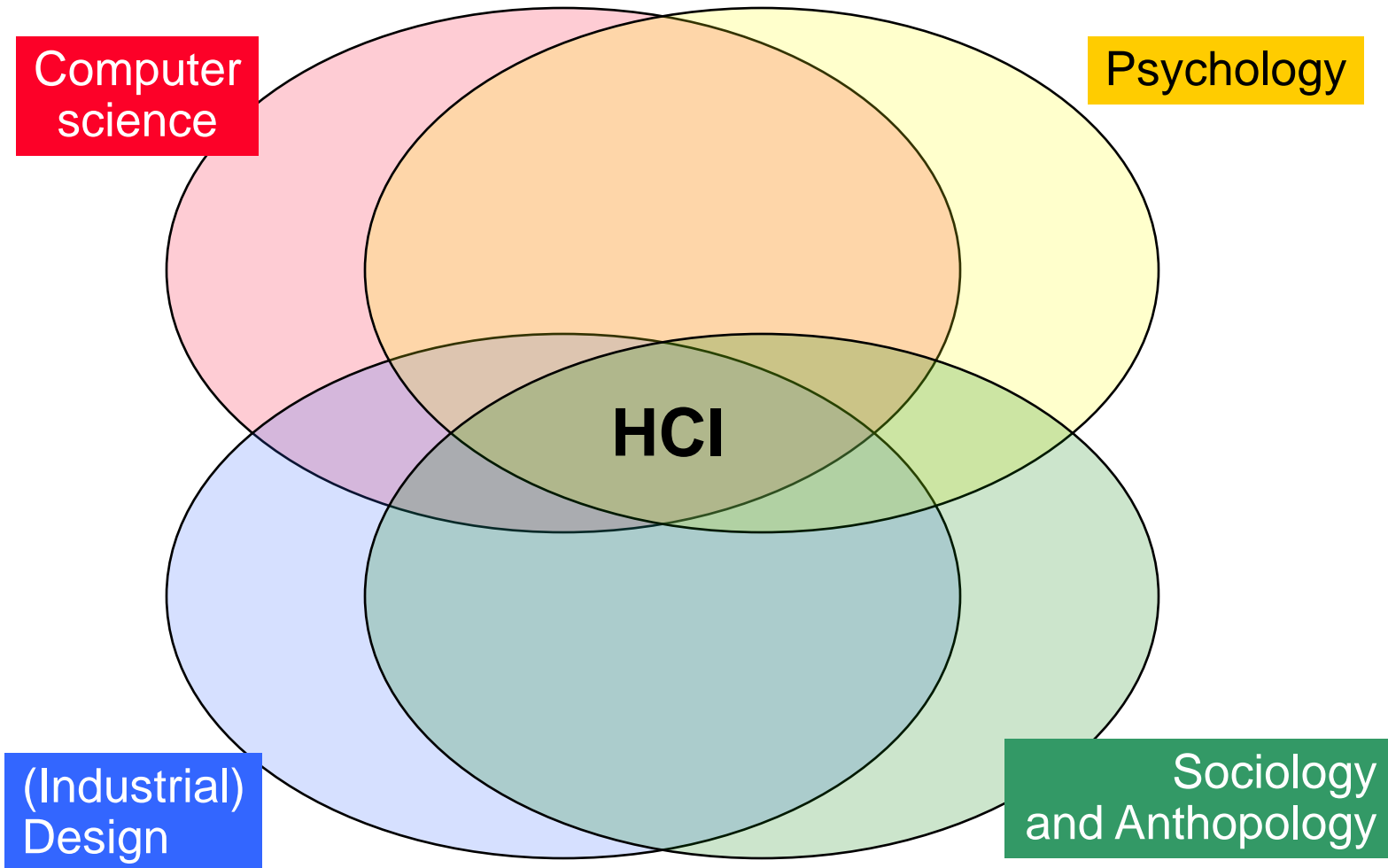
1.3 Overview of the course

1.4 A brief history of HCI

# What is the right title for the lecture?

- *Mensch-Maschine-Interaktion (MMI)* / Human-Machine Interaction (**HMI**)
  - “Man-Machine Interaction” politically incorrect
  - Study of the ways how humans use machines
- *Mensch-Computer-Interaktion (MCI)* / Human-Computer Interaction (**HCI**)
  - More special, main focus of this lecture
  - *“Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them”*  
(working definition in the ACM SIGCHI Curricula for HCI)
- *Interaktionsdesign* / Interaction Design
  - More general than HMI
  - *“designing interactive products to support people in their everyday and working live”* (Sharp, Rogers, and Preece, 2002)
  - “interaction design is related to software engineering in the same way as architecture is related to civil engineering” (Winograd, 1997)
- *Benutzerfreundlichkeit* / Usability
  - The overall goal of interaction design

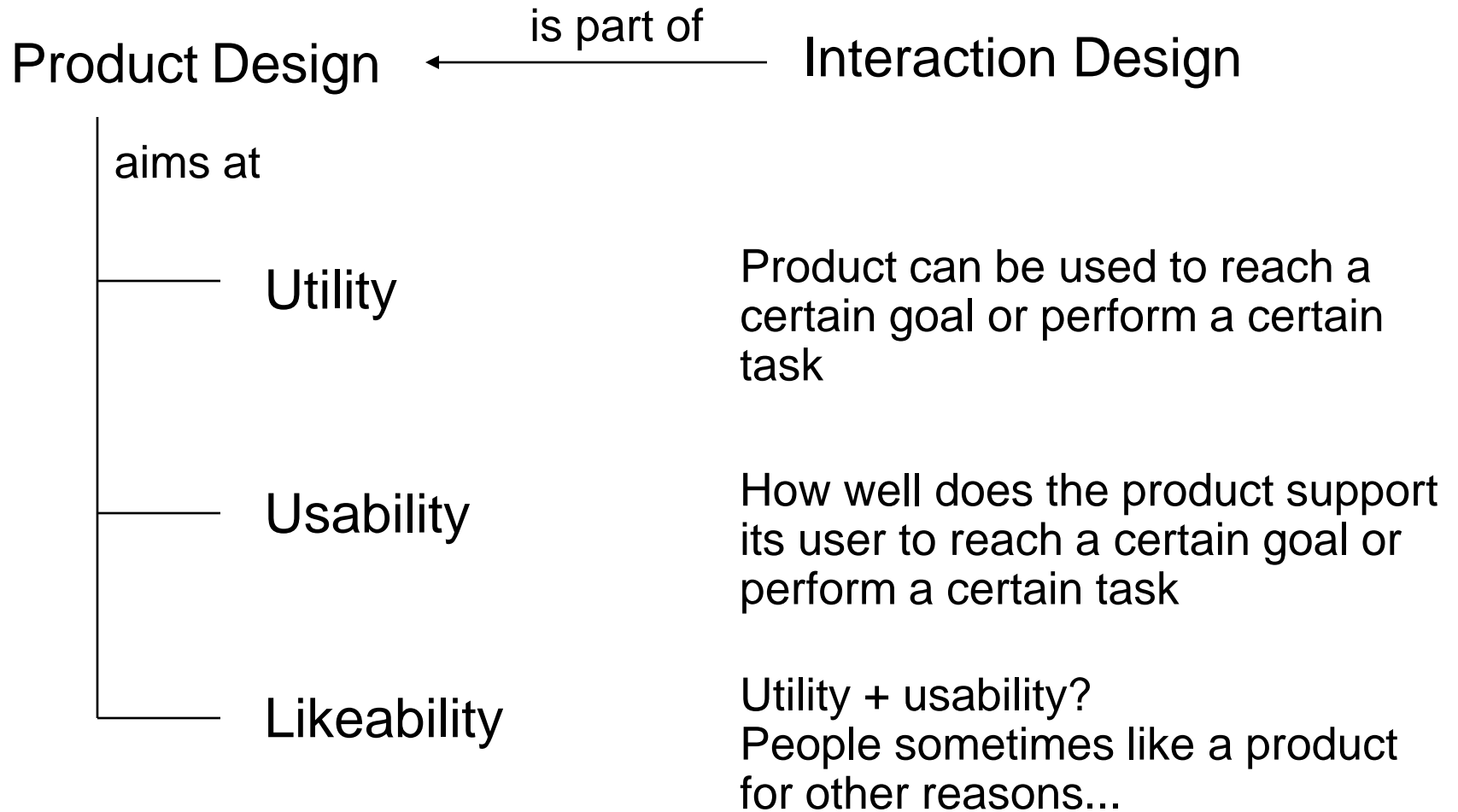
# HCI as an interdisciplinary field



# Elements of HCI

- Joint performance of tasks by humans and machines
- Structure of communication between human and machine
- Human capabilities to use machines  
(including the learnability of interfaces)
- Algorithms and programming of the interface itself
- Engineering concerns that arise in designing and building interfaces
- Process of specification, design, and implementation of interfaces
- Design trade-offs

# Aspects of Product Design



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# Use and Context

U1 Social Organization and Work



U3 Human-Machine Fit and Adaptation

U2 Application Areas

## Human

H1 Human Information Processing

H2 Language, Communication and Interaction

H3 Ergonomics

## Computer

C2 Dialogue Techniques

C4 Computer Graphics



C3 Dialogue Genre

C5 Dialogue Architecture



C1 Input and Output Devices



D3 Evaluation Techniques

D4 Example Systems and Case Studies

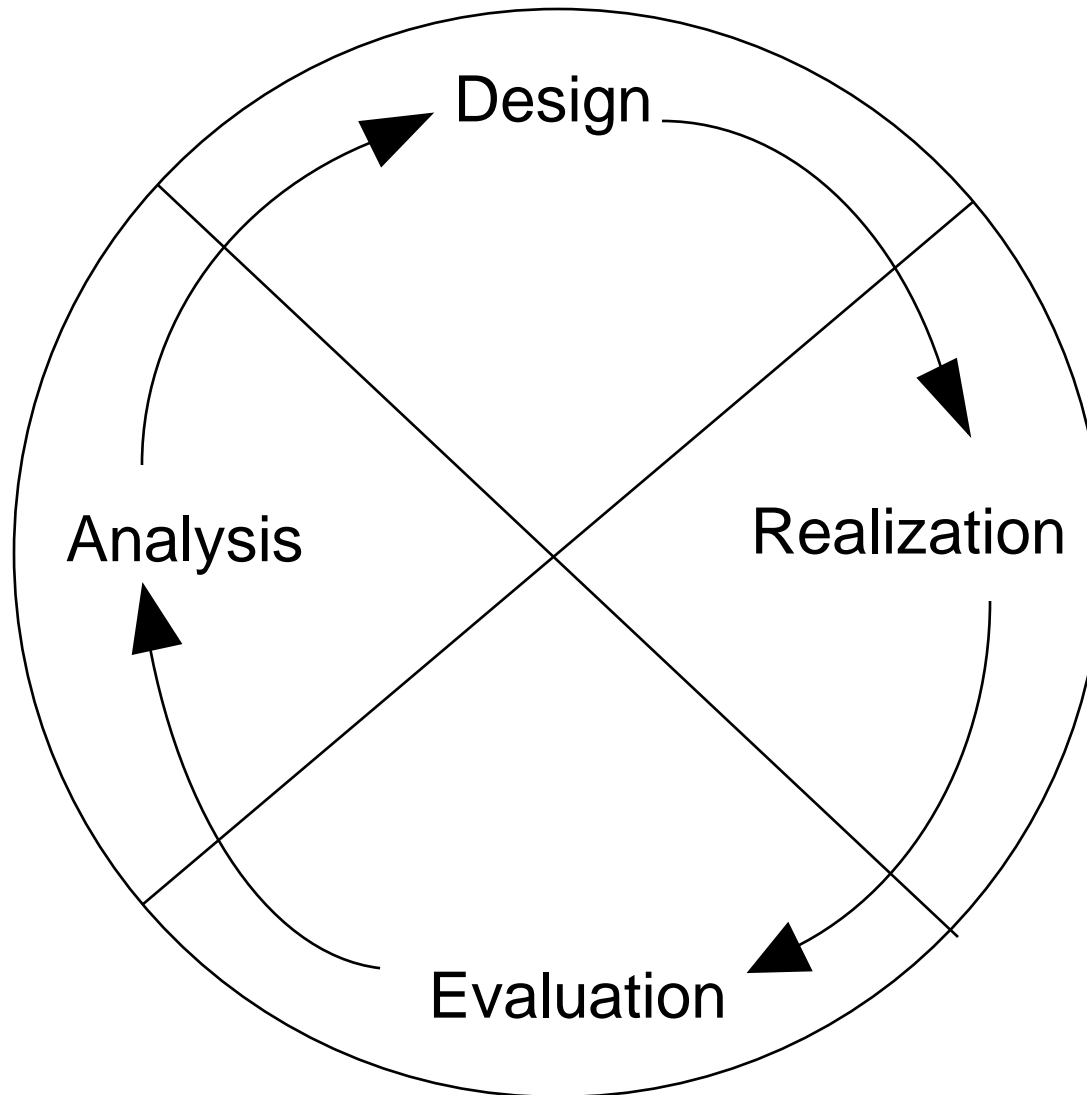
D2 Implementation Techniques and Tools

D1 Design Approaches

## Development Process

from ACM SIGCHI Curricula for HCI

# The Development Process





# (Preliminary) Outline (1/2)

## 1. Introduction, History, and Basic HCI Principles

Motivation, terms and concepts, course overview, history

→ Users, Golden Rules, Psychology of Everyday Action, GOMS

→ Basics of user study design (evaluation technique)

## 2. Capabilities of Humans and Machines

Human senses, cognitive abilities, memory

Hardware technologies for interaction; natural and intuitive interaction

→ GOMS, Keystroke-Level Model; advanced interface technologies

## 3. User-Centred Development Process

User-centred development, iterative development, prototyping

→ Paper prototyping, video prototyping, Wizard of Oz technique

## 4. Analyzing the Requirements

Focus groups, ethnographic observation

Task analysis, scenarios, use cases, conceptual models

# (Preliminary) Outline (2/2)

## 5. Designing Interactive Systems

Paradigms, styles and principles of interaction

Activity-based and object-oriented design

Describing and specifying interactive systems, design patterns

→ Creativity techniques

## 6. Implementing Interactive Systems

Constraints, mapping, implementation technologies for interactive systems

→ Standards and guidelines

## 7. Evaluation

Analytic and empirical evaluation, user studies, heuristic evaluation

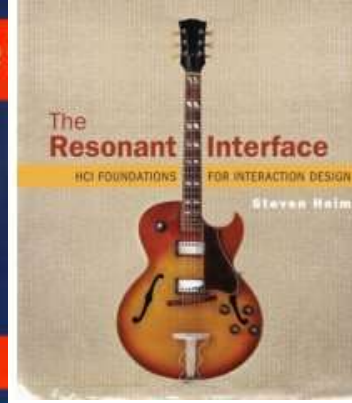
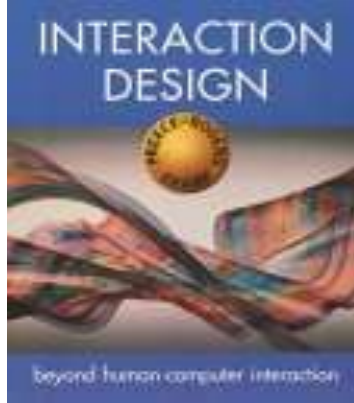
→ Statistics for evaluation

## 8. Outlook

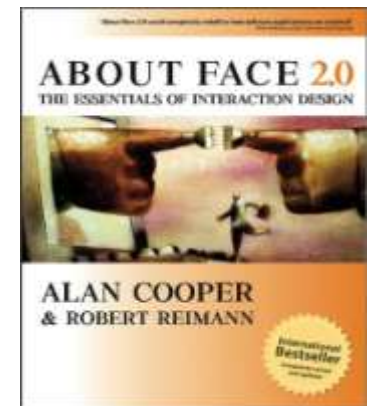
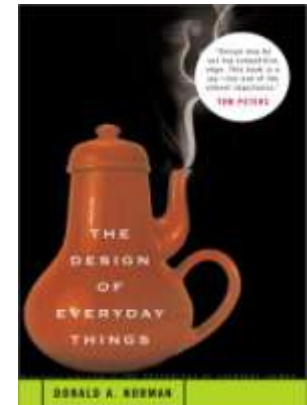
Usability in industrial practice

→ Outlook to follow-up lecture MMI2 (Web usability, mobile usability)

# Book Selection



- Jennifer Preece, Yvonne Rogers, Helen Sharp (2002). Interaction Design. ISBN 0471492787
- Alan Dix, Janet Finlay, Gregory Abowd and Russell Beale. (2003) Human Computer, Interaction (third edition), Prentice Hall, ISBN 0130461091
- Steven Heim (2007). The Resonant Interface: HCI Foundations for Interaction Design. Addison-Wesley; ISBN 978-0321375964
- Markus Dahm (2005). Grundlagen der Mensch-Computer-Interaktion. Pearson Studium; ISBN 3827371759
- Ben Shneiderman. (2004) Designing the User Interface, 4th Ed., Addison Wesley; ISBN 978-0321197863
- Donald A. Norman. (1990) The Design of Everyday Things; ISBN 0465067107
- Alan Cooper, Robert M. Reimann. (2007) About Face 3.0: The Essentials of Interaction Design; ISBN 978-0470084113



# 1 Introduction and History

1.1 Motivation

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# Evolution of HCI ‘interfaces’

- **50s:** Interface at the hardware level for engineers (switch panels)
- **60-70s:** interface at the programming level (COBOL, FORTRAN)
- **70-90s:** Interface at the terminal level (command languages)
- **80s:** Interface at the interaction dialogue level (GUIs, multimedia)
- **90s:** Interface at the work setting (networked systems, groupware)
- **2000s:** Interface becomes pervasive (‘allgegenwärtig’)
  - RF tags, Bluetooth technology, mobile devices, blogging, user generated content, consumer electronics, interactive screens, embedded technology, sensor networks
- **2010s:** ???

# Student Project

<http://www.hcilab.org/projects/historybook/>

editorial ::  
home ::  
links ::

## HUMAN COMPUTER INTERACTION

*a brief history*

Intro

the first mouse::1963

Xerox Altos 3-button-mouse::197

the first commercial mouse::1981

**Lisas mouse::1983 ←**

Macintosh with mouse::1984

rubberball::1985

trackball::1989

radio mouse::1991

3D mouse::1992

scrollwheel::1996

USB mouse::1997

optical mouse::1999

ID mouse::2001

optical radiomouse::2001

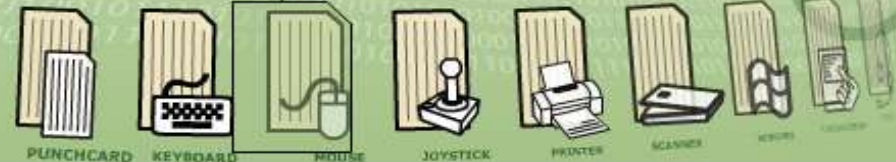
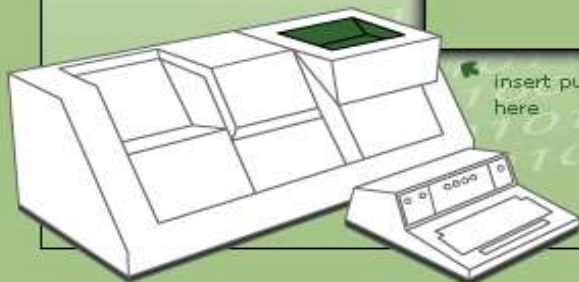
### 1983 Apples Lisa erscheint mit Maus

In january 1983 Apple releases "Lisa" the first mouseoperated personal computer. This highly praised computer indeed was no sucess as well. Again because of its high price with 10.000,-\$ no "normal people" could afford it.

By the way apples mouse was produced by Logitech with only one key, and it still macs get along with only one key on their latest mice.



Insert punchcard here



# VisiCalc - Widespread use of an Interactive Application



VisiCalc Screen, early Alpha 1/4/79

SCREENSHOT OF VISICALC 1.0

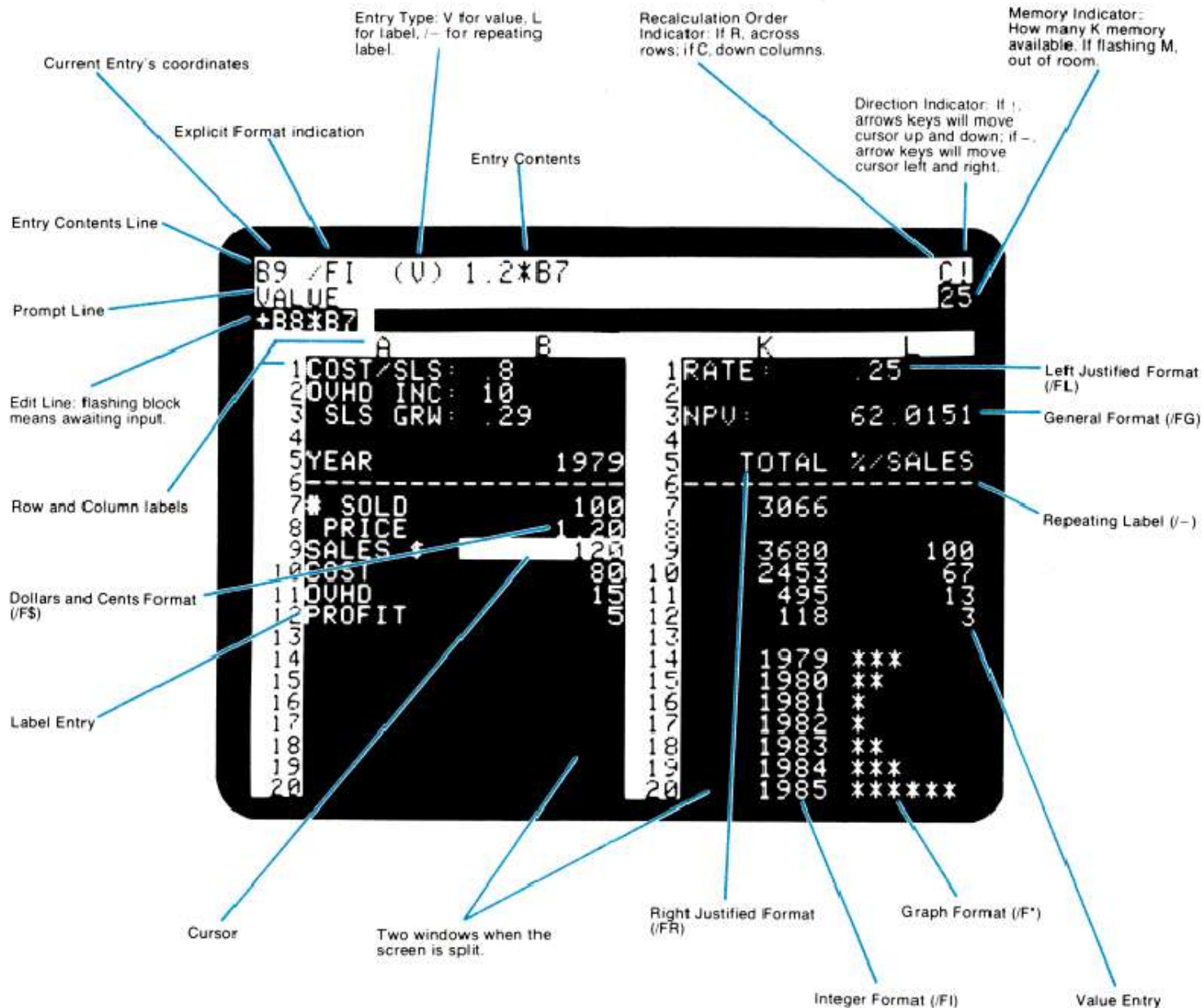
MONTH	NOV	DEC	TOTAL
SALARY	2500.00	2500.00	30000.00
OTHER			
<b>INCOME</b>	<b>2500.00</b>	<b>2500.00</b>	<b>30000.00</b>
FOOD	400.00	400.00	4800.00
RENT	350.00	350.00	4200.00
HEAT	110.00	120.00	1575.00
REC.	100.00	100.00	1200.00
TAXES	1000.00	1000.00	12000.00
ENTERTAIN	100.00	100.00	1200.00
MISC	100.00	100.00	1200.00
CAR	300.00	300.00	3600.00
<b>EXPENSES</b>	<b>2460.00</b>	<b>2470.00</b>	<b>29775.00</b>
REMAINDER	40.00	30.00	1225.00
SAVINGS	30.00	30.00	3600.00

First version of VisiCalc screenshot

- Instantly calculating electronic spreadsheet
  - D. Bricklin/J. Frankston 1979
  - For Apple II computers
- Significant value to non-technical users
  - Usability was key...
- Early killer app for PCs
  - Motivated IBM to enter the PC market

<http://www.danbricklin.com/visicalc.htm>

# A VISICALC™ Screen:

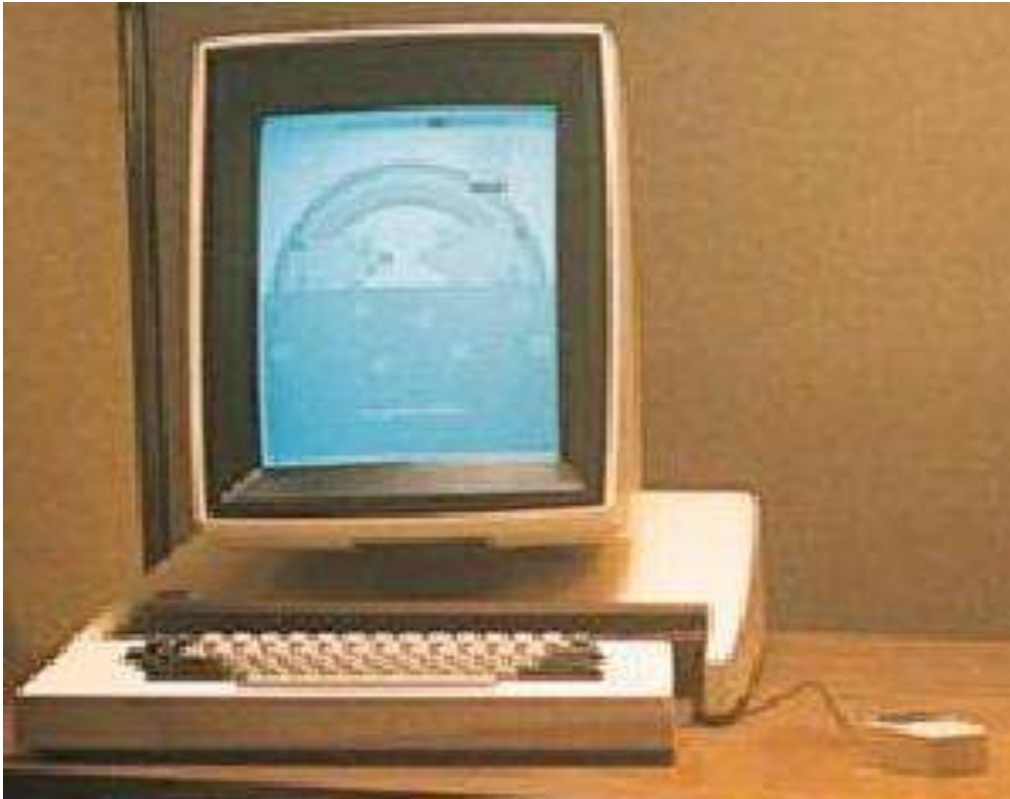




# Changing Interaction Paradigms

- Replacement of command-language
- Direct manipulation of the objects of interest
- Continuous visibility of objects and actions of interest
- Graphical metaphors (desktop, trash can)
- Windows, icons, menus and pointers
- Rapid, reversible, incremental actions
- Origins of direct manipulation and graphical user interfaces
  - Ivan Sutherland's Sketchpad, 1963, object manipulation with a light pen (grabbing, moving, resizing)
  - Douglas C. Engelbart, 1968, Mouse, NLS
  - XEROX ALTO (50 units at Universities in 1978)
  - XEROX Star (1981)
  - Apple Macintosh (1984)

# XEROX ALTO



Photos from

<http://members.fortunecity.com/pcmuseum/alto.html>

<b>Start</b>	<b>Ready:</b> Select file names with the mouse Red-Copy, Yel-Copy/Rename, Blue-Delete Click Start' to execute file name commands	<b>Quit</b>
		<b>Clear</b>
		<b>Type</b>

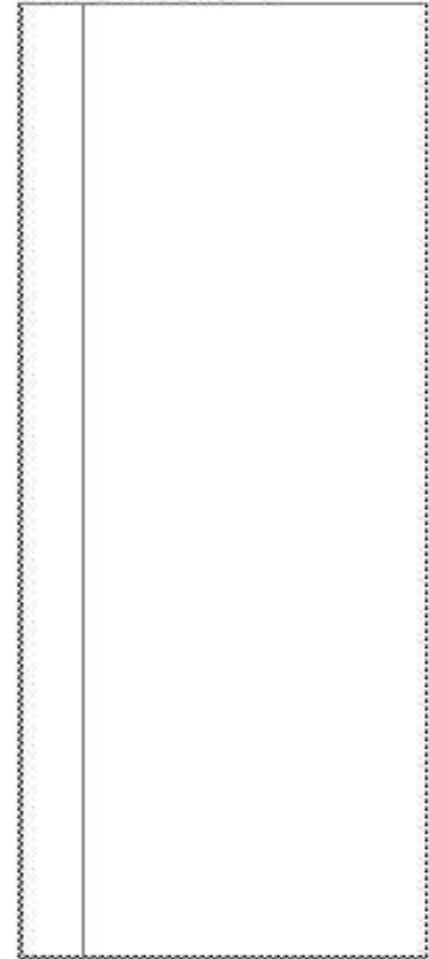
Pages: 832 **Log**  
Files listed: 60  
Files selected: 0 Delete: 0  
Copy/Rename: 0 Copy: 0

DP0: <SysDir.> \*.\*

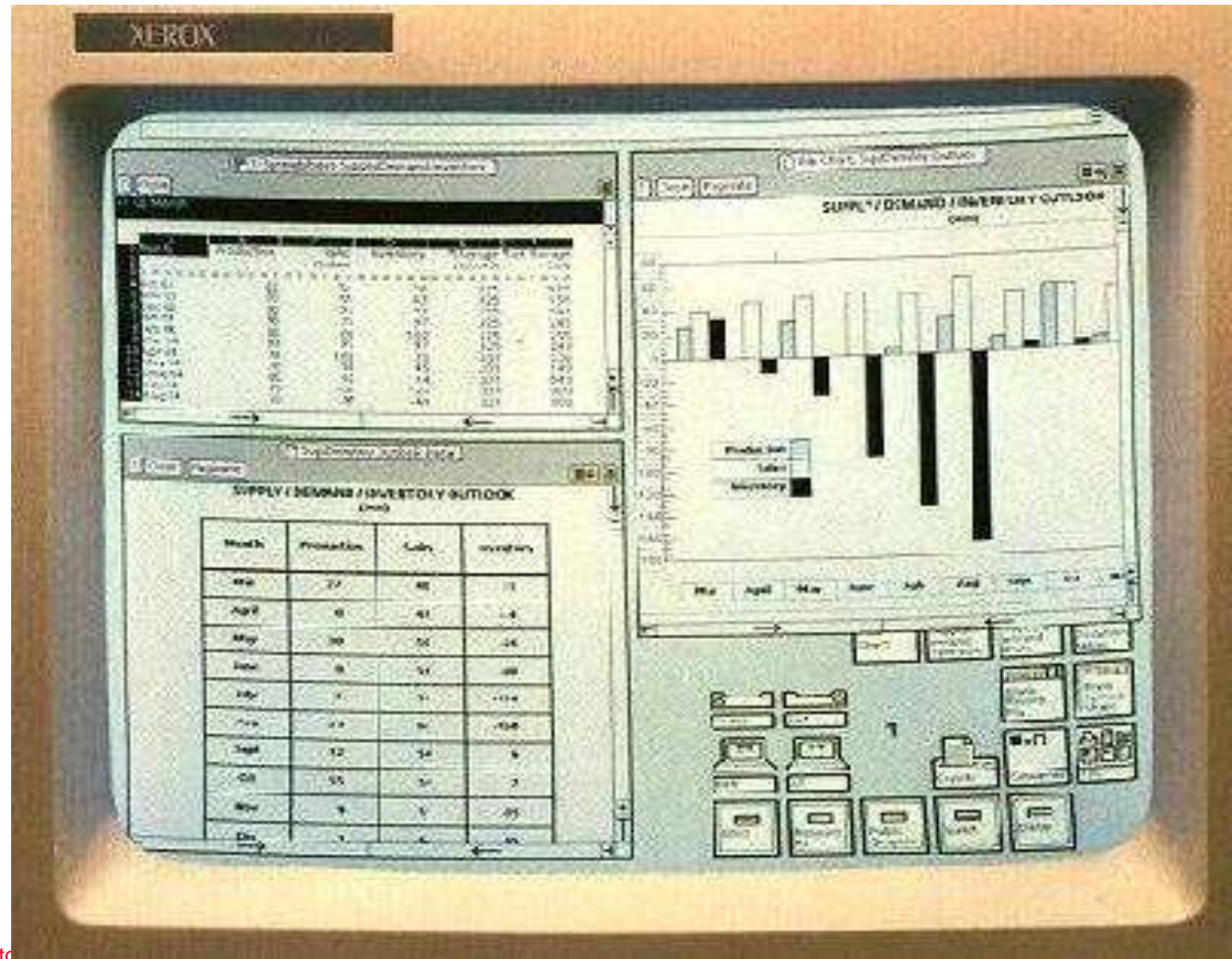
```
-- BEGINNING --  
1012-AstroRoids.Boot.  
Anonymous.1.  
BottleShip.er.  
BottleShip.RUN.  
BlockJock.RUN.  
BuildKal.cm.  
CalcSources.dm.  
Calculator.RUN.  
Chess.log.  
Chess.run.  
Com.Cm.  
CompileKal.cm.  
CRTTEST.RUN.  
DMT.boot.  
E8sBuild.run.  
empress.run.  
Executive.Run.  
Fly.run.  
galaxian.boot.  
Garbage.S.  
Go9.run.  
GoFont.AL.  
Invaders.Run.  
junk.  
junk.press.  
Kal.bopl.  
Kal.cm.  
KalA.cm.  
KalMc.mu.  
Kinetic4.RUN.  
LoadKal.cm.  
MasterMind.RUN.  
maze.run.  
Meta.Typescript.  
Missile.run.  
NEPTUNE.RUN.  
othello.run.  
Pinball-easy.run.  
POLYGONS.RUN.
```

Pages: 0 **Log**  
Files listed: 0  
Files selected: 0 Delete: 0  
Copy/Rename: 0 Copy: 0

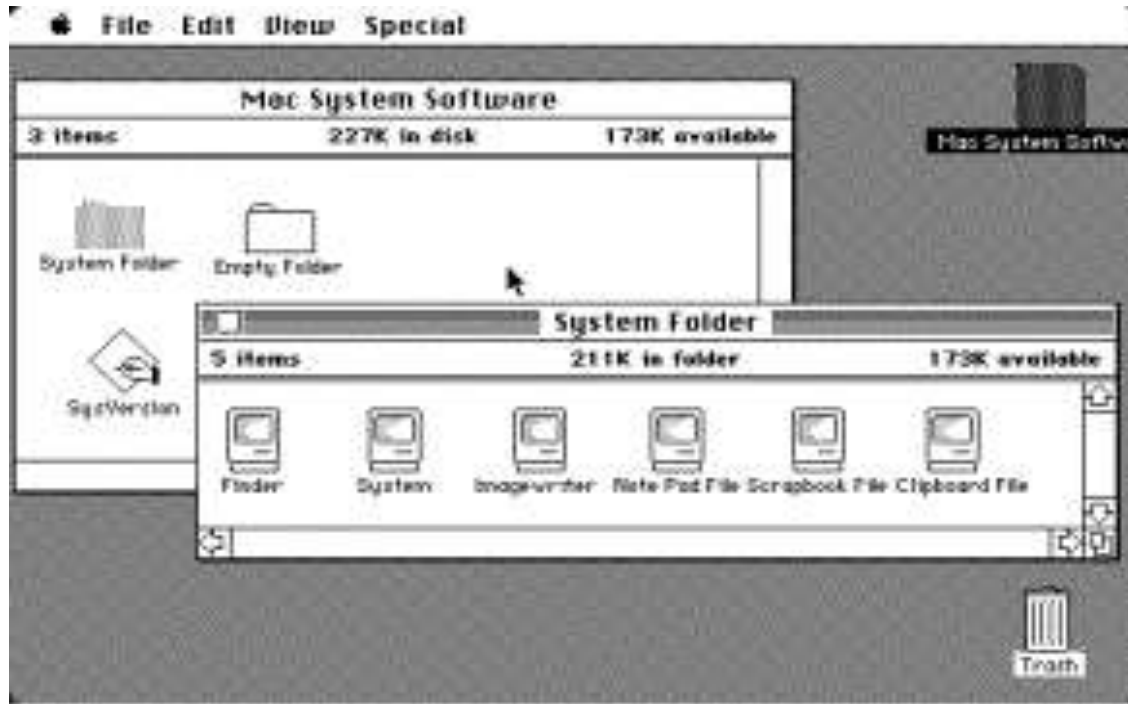
No Disk: <SysDir.> \*.\*



# XEROX Star



# Apple Macintosh



1984 – commercially successful GUI



# More GUIs



Amiga 1985



NextStep 1989



Win 3.11 1992

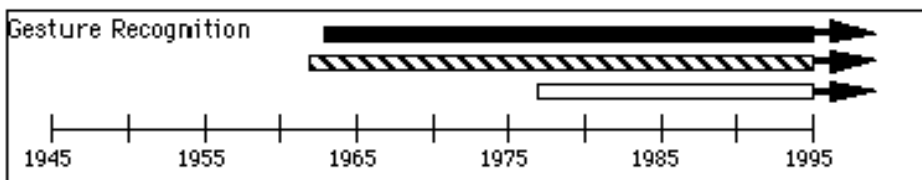
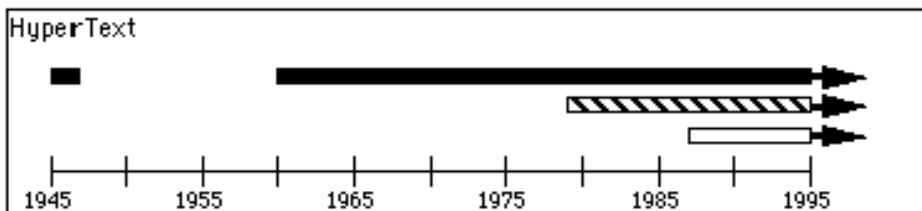
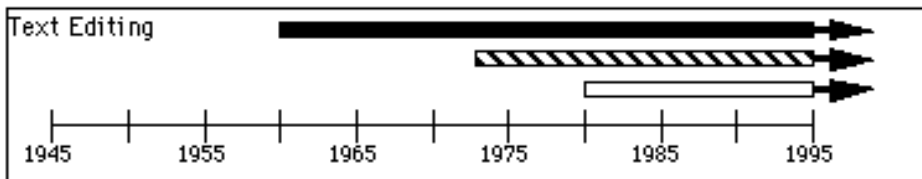
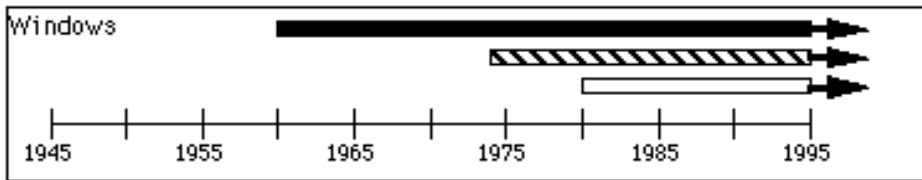
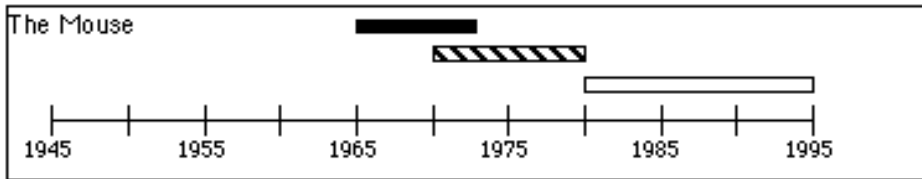
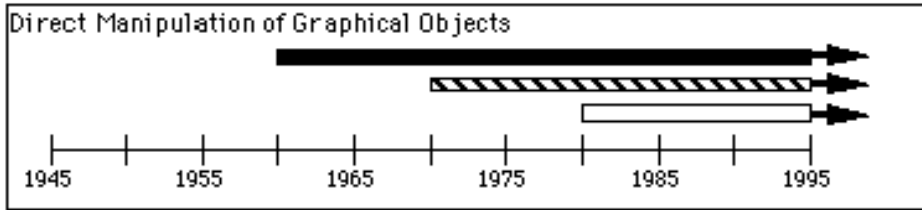


OS/2 1992



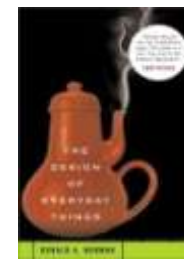
From B. Myers  
 "Brief History of HCI"

# Research and Products



- Early machines used batch processing (e.g. punch card machines)
- Terminals with command line interfaces
- Graphical user interfaces with pointing device
- Multimodal user interfaces

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