User Interface Design

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Course Overview

Introduction to HCI

Interaction Design Basics

Usability Principles

User Centered Design

Prototyping

Evaluation Techniques

Marking Schema

- Grades distribution: Total 100 Grade
  - Final exam: 50
  - Year Work: 50
    - 15 Midterm
    - 20 Project and Practical
    - 10 Year work
    - 5 Quiz

Human Computer Interaction

- **Human:** the person that's using the system

- **Computer:** the machine or the network of machines that run the system

- **Interaction:** the interface that represents the system for the user

Human Computer Interaction

Human Computer Interaction

is the **study**, **planning**, and **design** of how **people** and **computers work together** so that a person's **needs** are satisfied in the most effective way.

Human Computer Interaction

- HCI designers must consider a variety of factors:
  - What people **want** and **expect**
  - What physical **limitations** and **abilities** people possess
  - How their **perceptual** and information processing systems work
  - What people find **enjoyable** and **attractive**

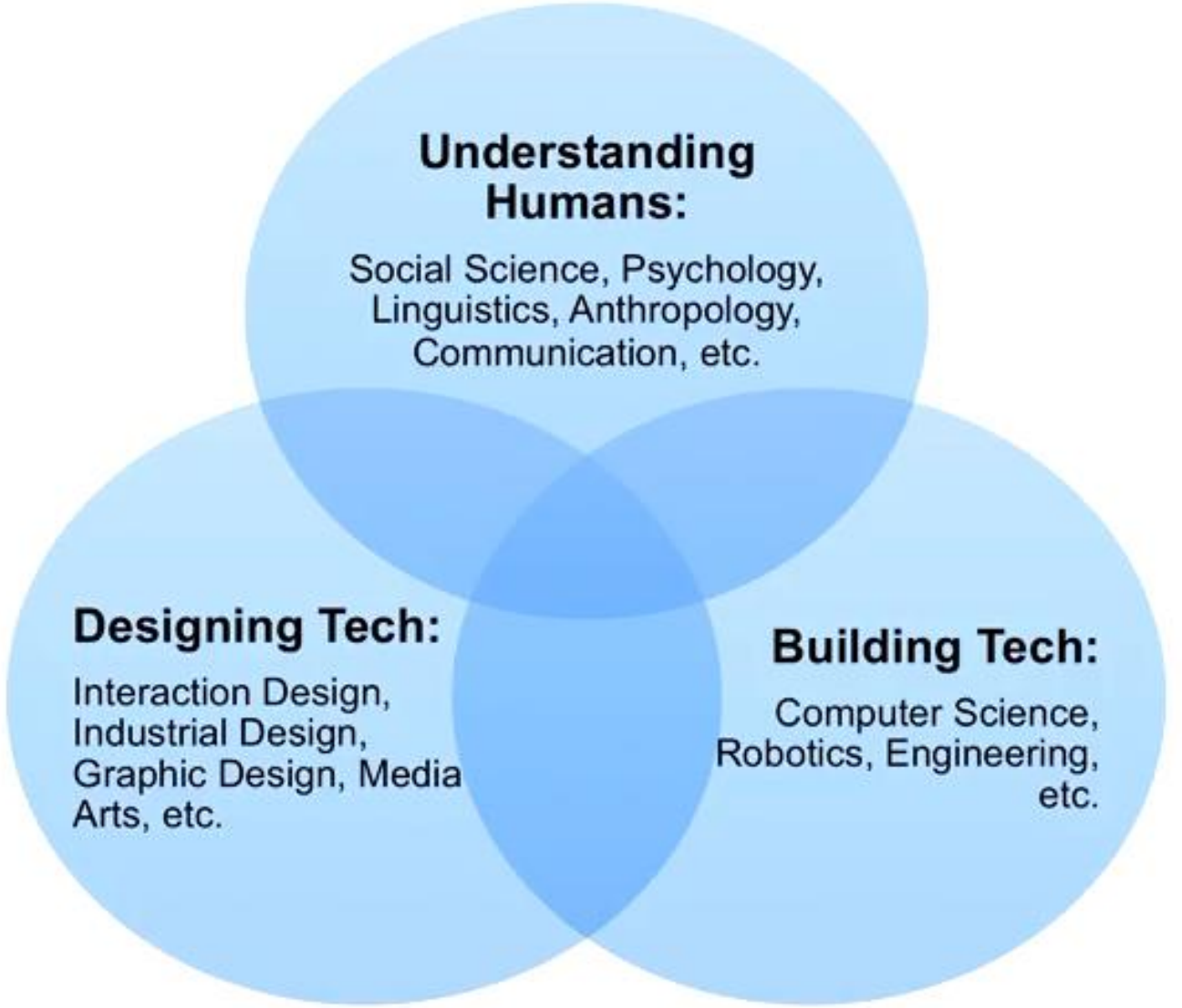
- Technical **characteristics** and **limitations** of the computer **hardware** and **software** must also be considered.

User Interface vs. Human Computer Interaction

- ***User interface design*** is a subset of a field of study called ***Human-Computer Interaction***(HCI).

- Human Computer Interaction is the **study**, **planning**, and **design** of how **people** and **computers work together** so that a person's **needs** are satisfied in the most effective way.

Human Computer Interaction Relevant Disciplines



User Interface

The ***user interface*** is the **part** of a **computer** and its **software** that people can see, hear, touch, talk to, or otherwise understand or direct.

The user interface has essentially two components:

Input: is how a person ***communicates*** his or her ***needs*** or desires to the computer.

- Keyboard
- mouse
- trackball
- one's finger (for touch-sensitive screens),
- one's voice (for spoken instructions).

Output: is how the computer ***conveys the results*** of its computations and requirements to the user.

- display screen
- person's auditory capabilities: voice and sound.

Proper Interface Design

- Proper interface design will provide a ***mix of well-designed input and output mechanisms*** that satisfy the user's ***needs***, ***capabilities***, and ***limitations*** in the most effective way possible.

- The best interface is one that it ***not noticed***, one that permits the user to ***focus*** on the ***information*** and ***task*** at hand, ***not*** the ***mechanisms*** used to present the information and perform the task.

The Importance of Good Design

Why do we continue to produce systems that are inefficient and confusing or, at worst, just plain unusable?

Is it because:

1. We don't care?
2. We don't possess common sense?
3. We don't have the time?
4. We still don't know what really makes good design?

The Importance of Good Design (Cont.)

- A ***well-designed*** interface and screen is terribly important to our users.
  - It is their ***window*** to view the ***capabilities*** of the system. To many, *it is* the system, being one of the few visible components of the product we developers create.
  - It is also the ***vehicle*** through which many ***critical tasks*** are presented.
  - These tasks often have a direct impact on an organization's ***relations*** with its ***customers***, and its ***profitability.***

- A ***screen's layout*** and ***appearance*** affect a person in a variety of ways.
  - If they are ***confusing*** and ***inefficient***, people will have greater difficulty in doing their jobs and will make more mistakes.
  - ***Poor design*** may even chase some people away from a system ***permanently***. It can also lead to aggravation, frustration, and increased stress.

The Benefits of a Good Design

- Attempting to improve ***screen clarity*** and ***readability*** by making screens less crowded. Separate items, which had been combined on the same display line to conserve space, were placed on separate lines instead.
  - *The result:* screen users were about **20% more productive** with the less-crowded version.

- Reforming a series of screens following many of the same concepts to be described.
  - *The result:* screen users of the modified screens completed transactions in ***25% less time*** and with ***25% fewer errors*** than those who used the original screens.

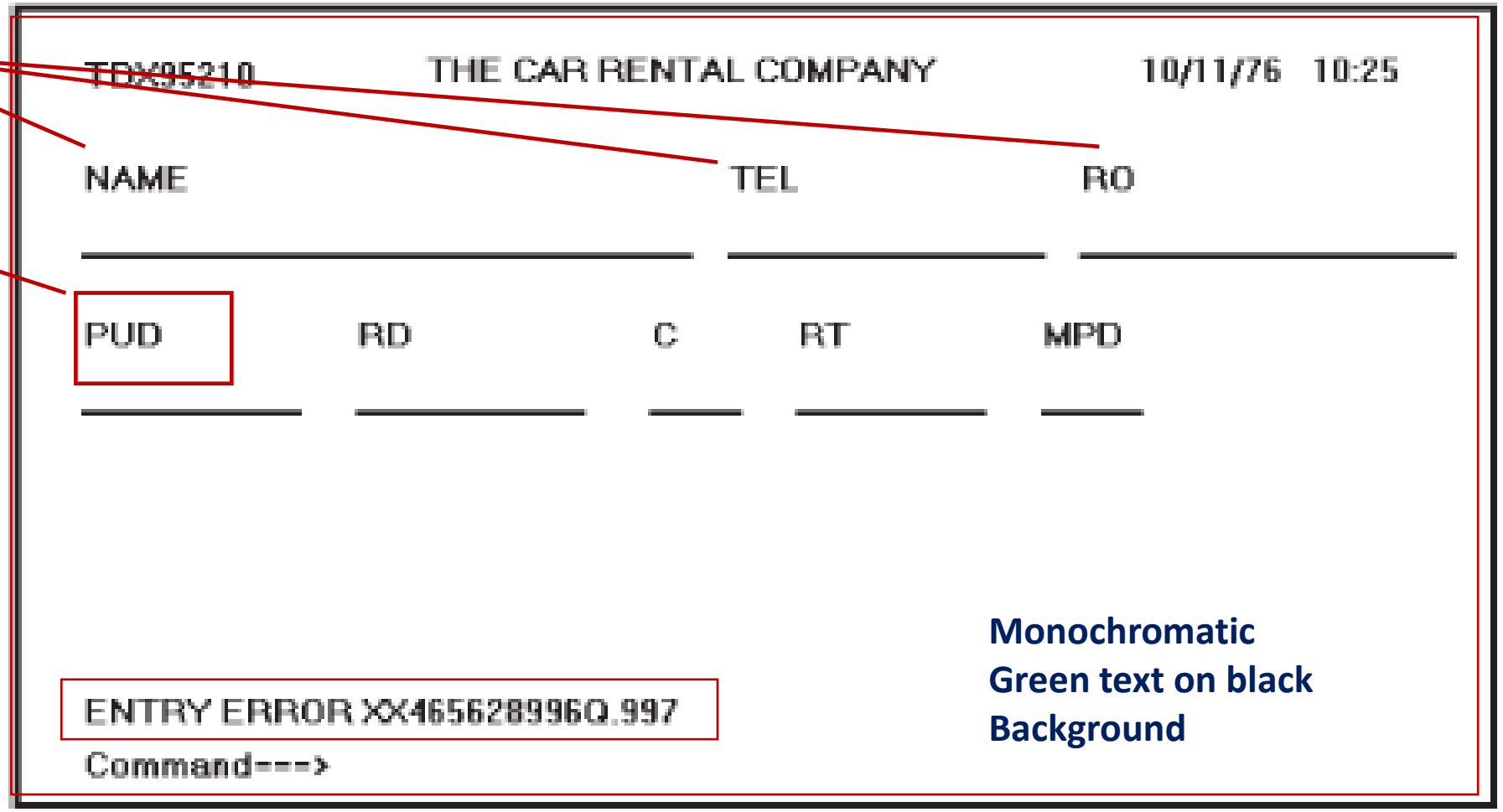
A Brief History of Screen Design

Many Fields

Vague captions

Visually cluttered

Ambiguous messages



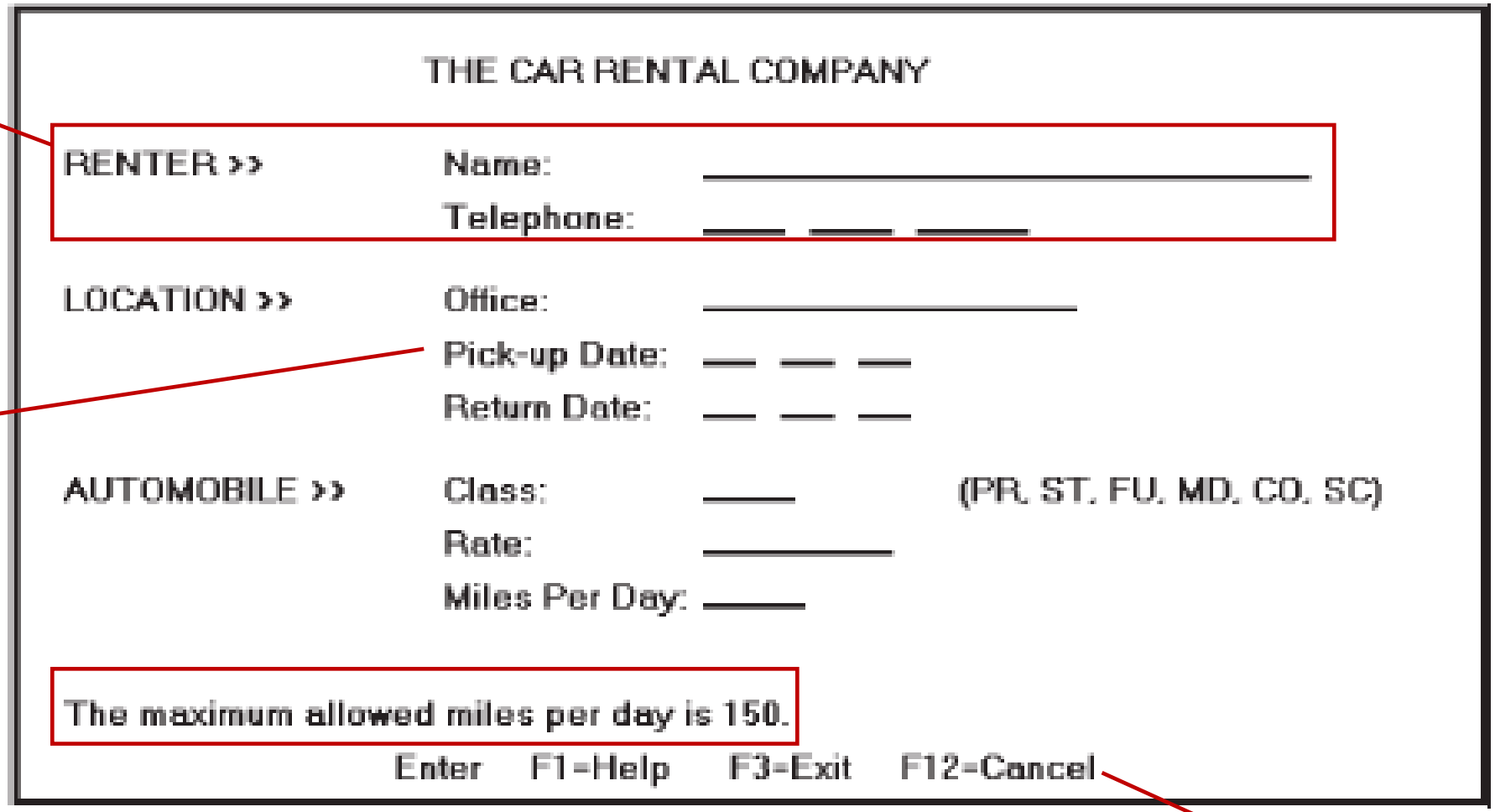
A 1970s Screen

A Brief History of Screen Design (Cont.)

Grouping and alignment elements

Clear and meaningful field captions

Clear Messages



A 1980s Screen

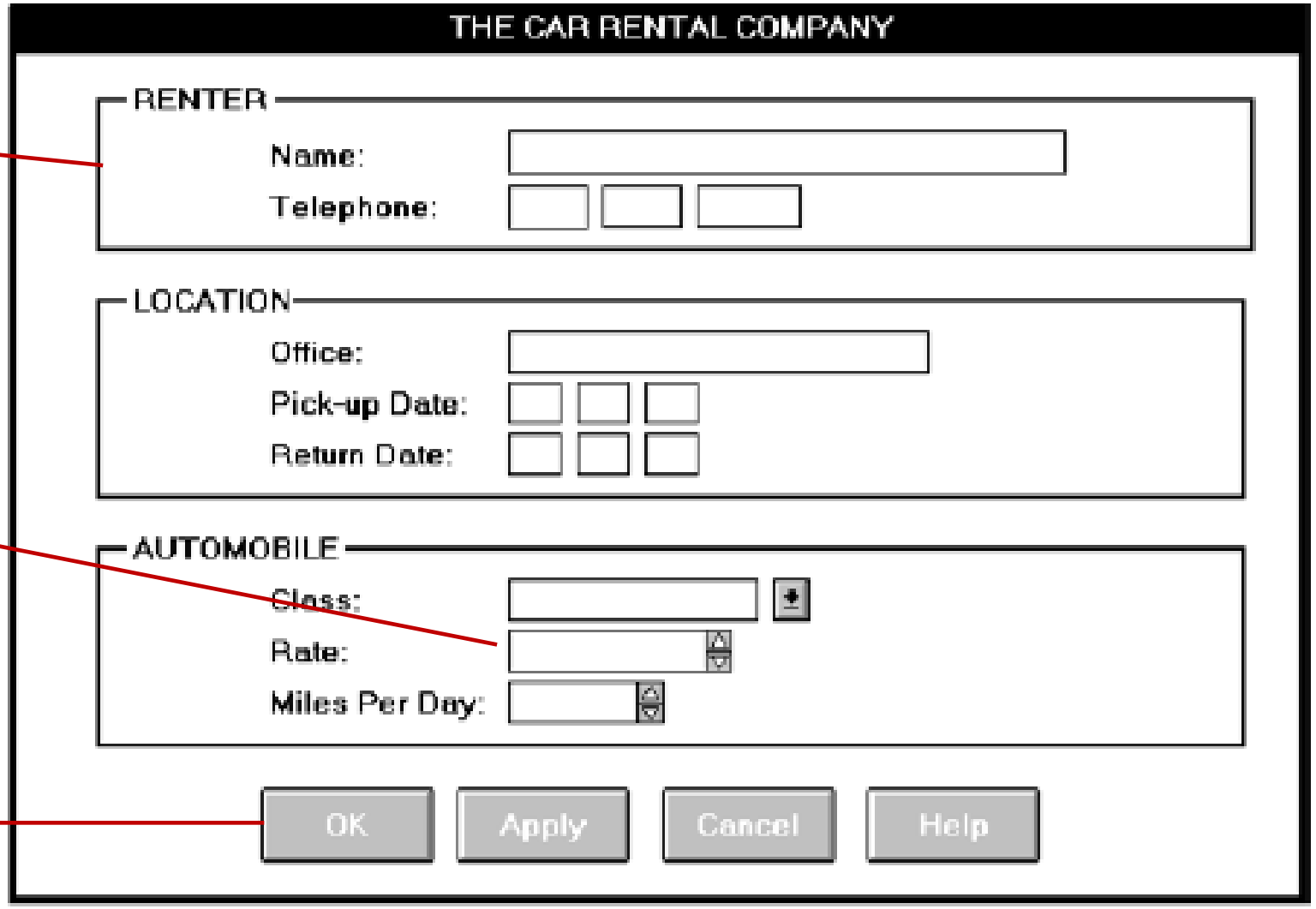
On screen commands using function Keys

A Brief History of Screen Design (Cont.)

Borders to visually enhance groupings

List boxes and Drop-down boxes

Buttons and menus for implementing commands replaced function keys

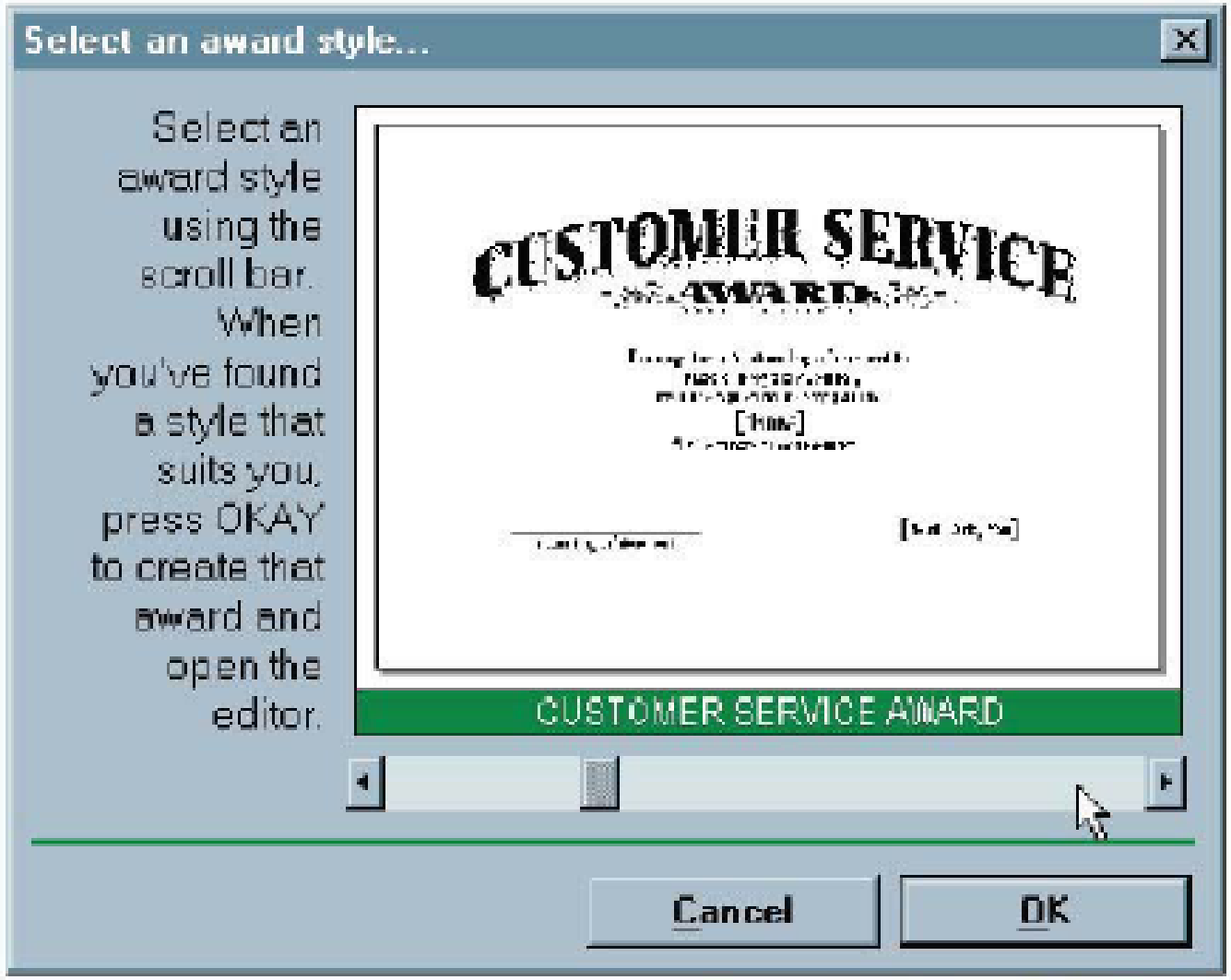


A 1990's and beyond Screen

Our Objective

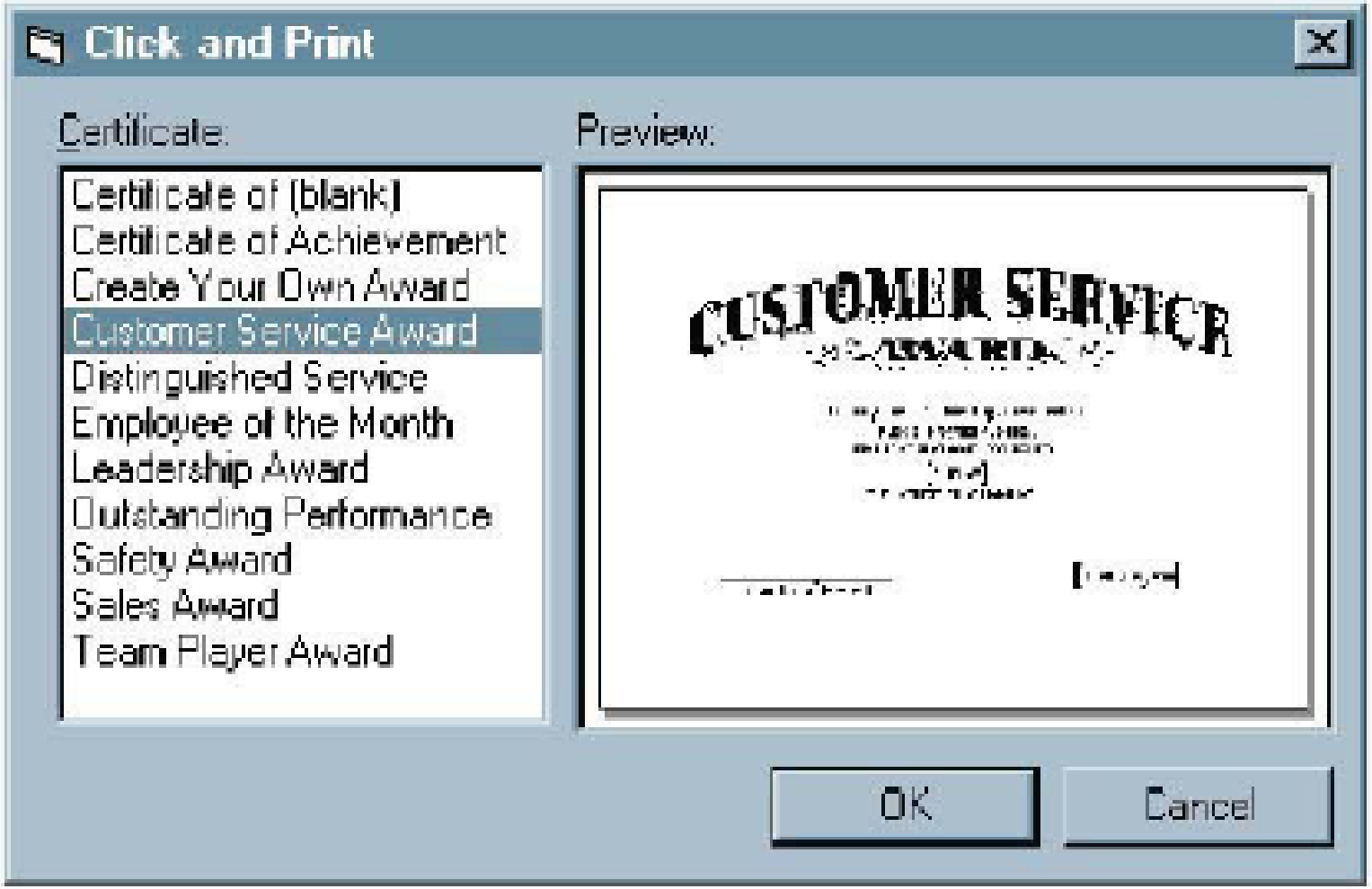
- Understand the many ***considerations*** that must be ***applied*** to the ***interface*** and ***screen design process***.
- Understand the ***rationale*** and ***rules*** for an ***effective*** interface design ***methodology***.
- Identify the ***components*** of ***graphical*** and ***Web interfaces*** and screens, including windows, menus, and controls.
- ***Design*** and organize ***graphical screens*** and Web pages to encourage the fastest and most accurate comprehension and execution of screen features.
- **Explore** the foundations of ***User Experience(UX)*** design and why it's so important for consumers and businesses.
- ***User Centered Design*** for ***Designing***, ***Prototyping*** and **Evaluating** Interfaces.

UI Hall of Shame



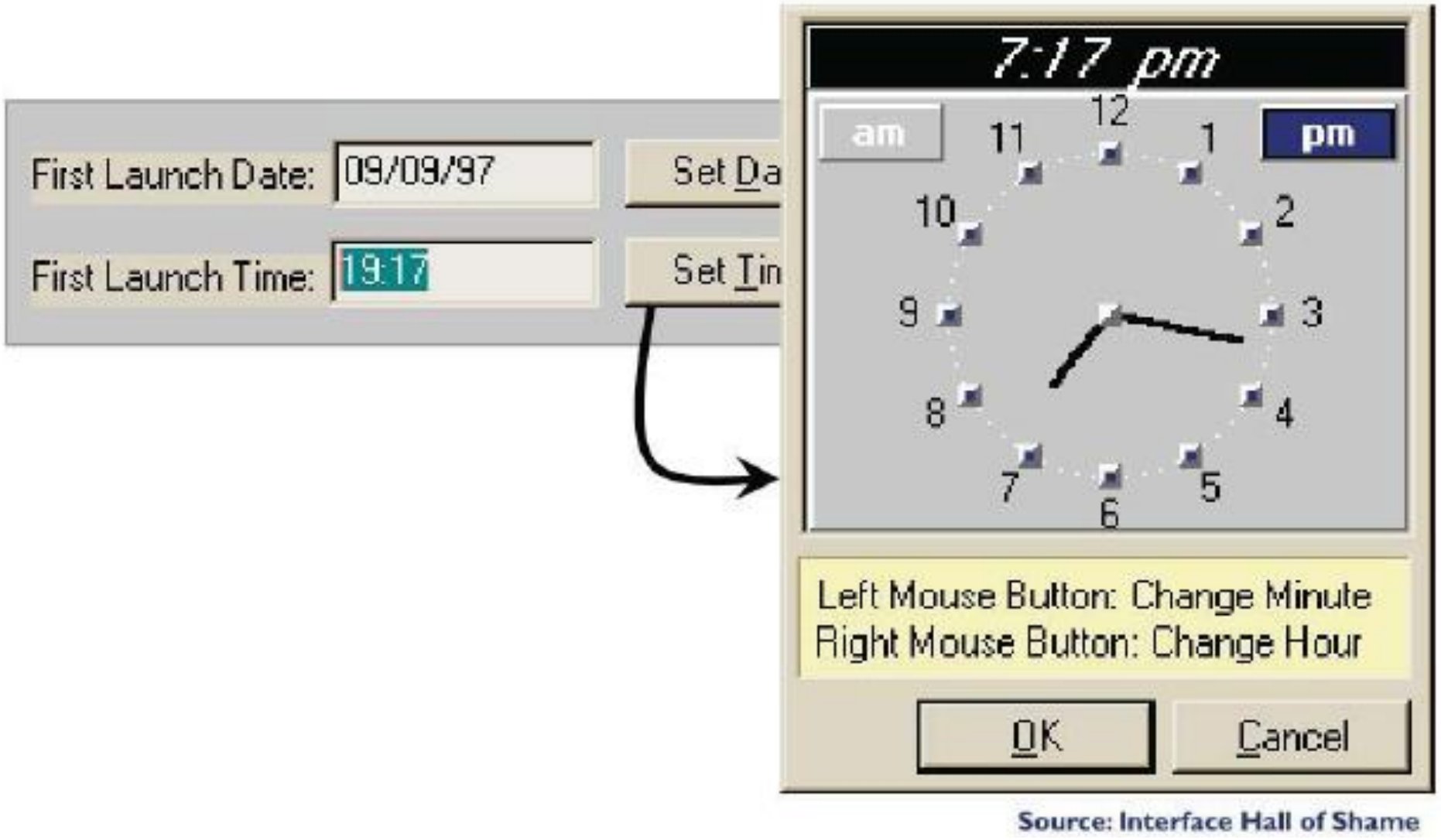
Source: Interface Hall of Shame

Redesigned



Source: Interface Hall of Shame

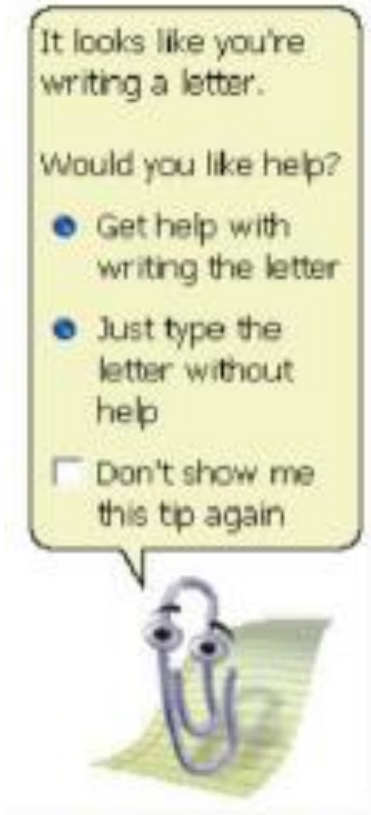
More UI Hall of Shame

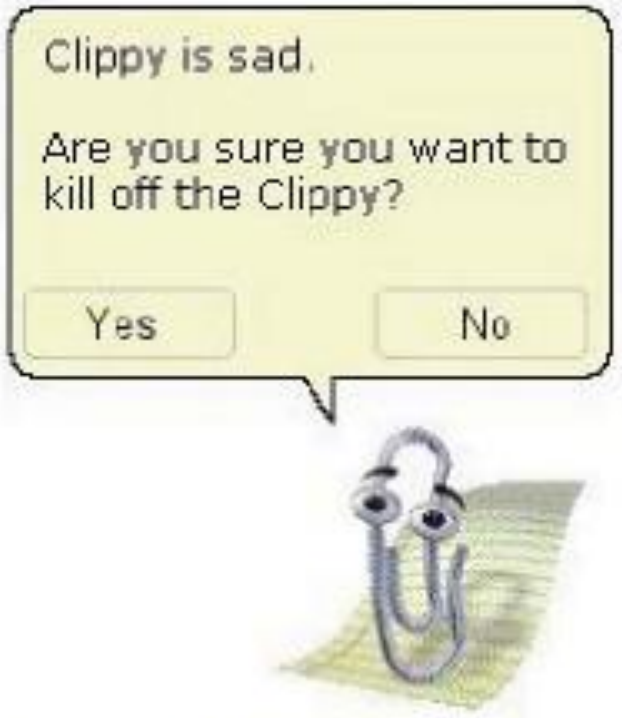


Source: Interface Hall of Shame

UI Hall of Shame

UI Hall of Shame/Fame





Importance of User Interface

- ***Usability*** strongly affects how software is ***perceived***, because the user interface is the means by which the software presents itself to the world.

- A Harris poll (reported in the Wall Street Journal 11/8/05) found that ease of use (61%), customer service (58%), and no hassle installation (57%) are the most important factors US adults consider when purchasing a new technology product.

Importance of User Interface (Cont.)

- ***Usable*** software ***sells***. Conversely, ***unusable*** software doesn't sell.

Ex: If a web site is so unusable that shoppers can't find what they want, or can't make it through the checkout process, then they will go somewhere else.

- Bad user interface design can also ***cost lives.***

- The usability problems may go ***unreported.***

Importance of User Interface (Cont.)

- In fact, ***user time*** is probably getting ***more expensive*** every year.

- Interfaces that waste user time repeatedly over a lifetime of use impose a hidden cost that companies are less and less inclined to pay.

- For some applications, like customer call centers, ***saving a few seconds per call may translate into millions of dollars saved per year.***

User Interfaces are hard to design

- You (the developer) are not ***a typical user***. You know far more about your application than any user will.

- This is how usability is different from everything else you learn about software engineering. ***Usability is about communicating with other users, who are probably not like us*** (software engineers).

- The User is always ***right***.

  Don't blame the user for what goes wrong. If users consistently make mistakes with some part of your interface, take it as a sign that your *interface* is wrong, not that the users are dumb.

Usability

- **Usability** measures ***how well*** users can ***use*** the system's functionality.

- Usability has several dimensions:

  Learnability: Is it easy to learn?

  Efficiency: Once learned, is it easy to use?

  Safety: Are errors few and recoverable?

- We can **quantify** all these measures of usability. We can say that interface X is more learnable, or more efficient than interface Y for some set of tasks and some class of users, by designing an experiment that measures the two interfaces.

Usability

- Usability dimensions vary in importance for different classes of users and applications

- Depends on the user
  - Beginner users need learnability
  - Infrequent users need memorability
  - Experts need efficiency

But no user is uniformly beginner or expert

Usability is only one attribute of a system

- Software designers have a lot to worry bout:
  - Functionality
  - Performance
  - Cost
  - Security
  - Usability
  - Size
  - Reliability
  - Standards
- Many design decisions involve **tradeoffs** among different attributes.

Sources

- User Interface Design and Implementation MIT Open Course Ware ocw.mit.edu

- The Essential Guide to User Interface Design 2nd Edition, Wilbert O. Galitz

Thank You