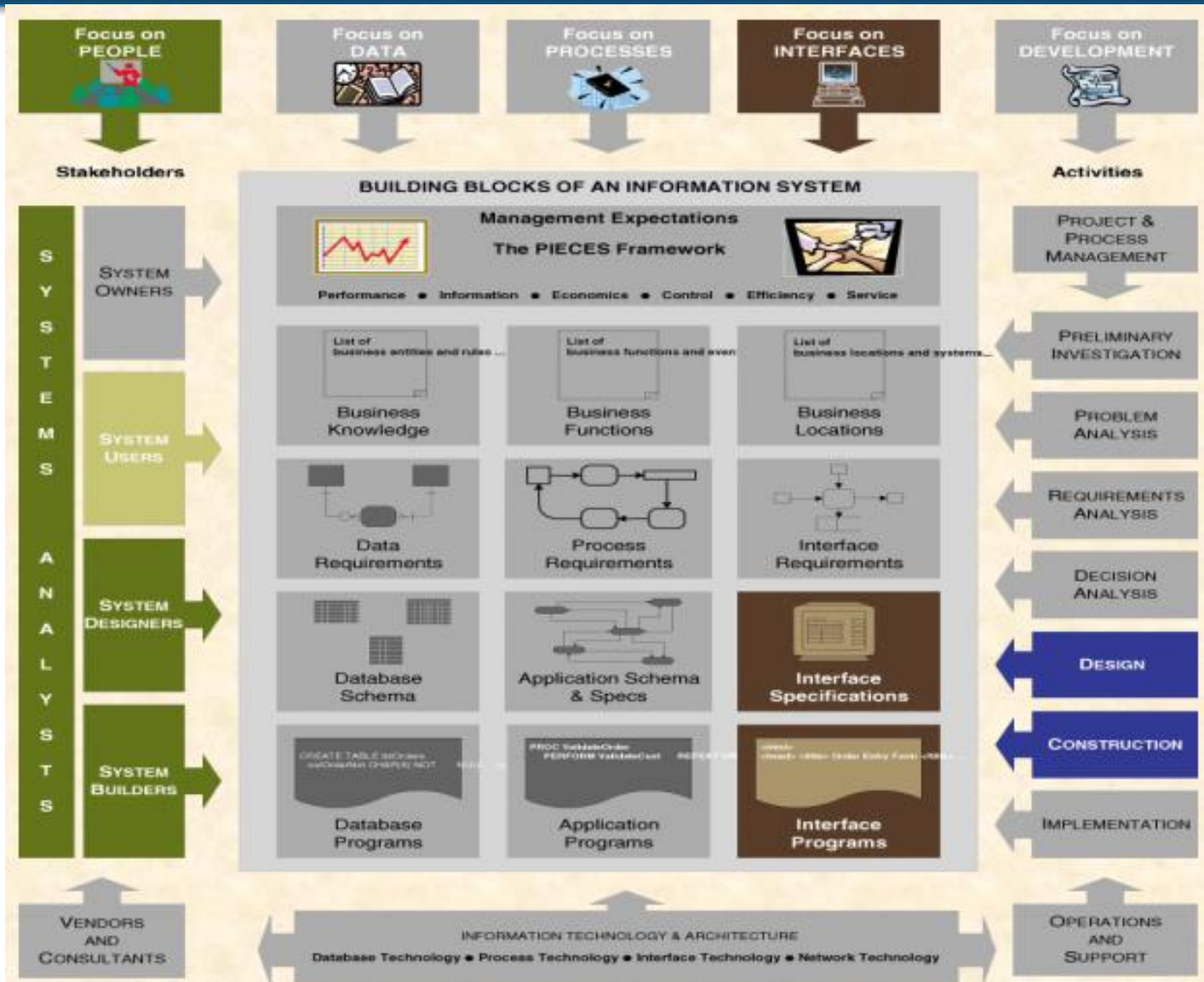**XIDIAN UNIVERSITY**

15

系统分析与设计
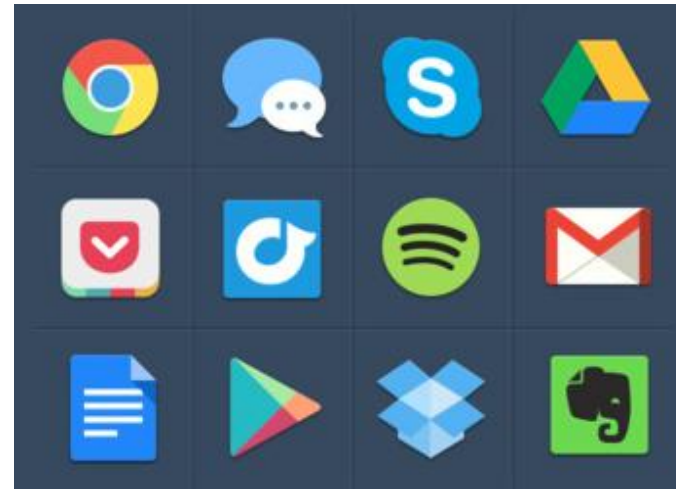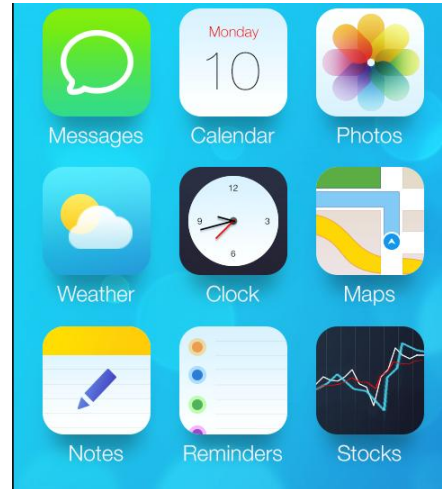## （SYSTEM ANALYSIS AND DESIGN）

User Interface Design

Content Structure

- User Interface Design Concepts and Guidelines
  - 用户的类别；人的因素；人机工程的原理。
- User Interface Technology
  - 系统对人机界面的支持.
- Graphical User Interface Styles and Considerations
  - 不同类别的典型 GUI 风格；人机界面设计所需要考虑的问题。
- How to Design and Prototype a User Interface?
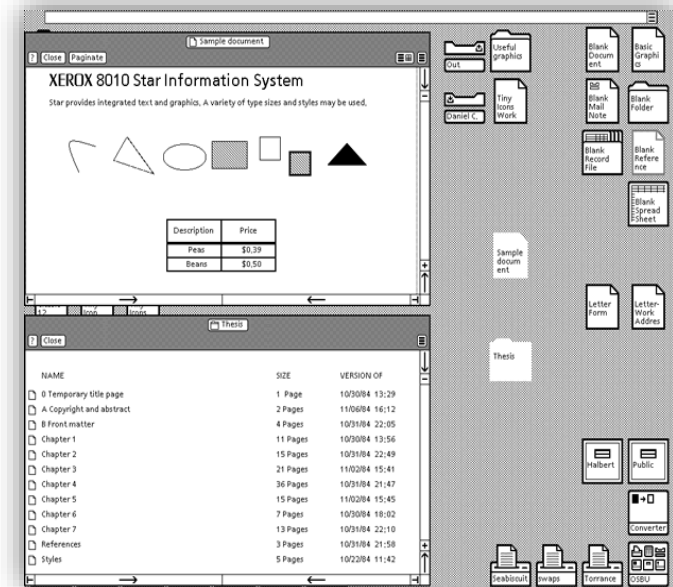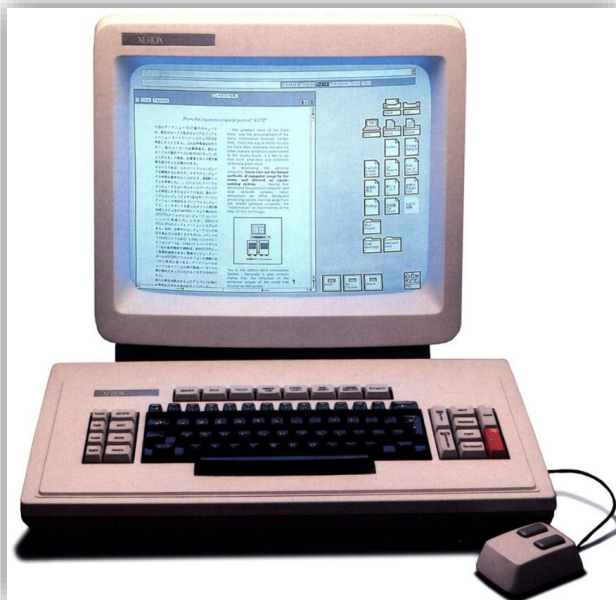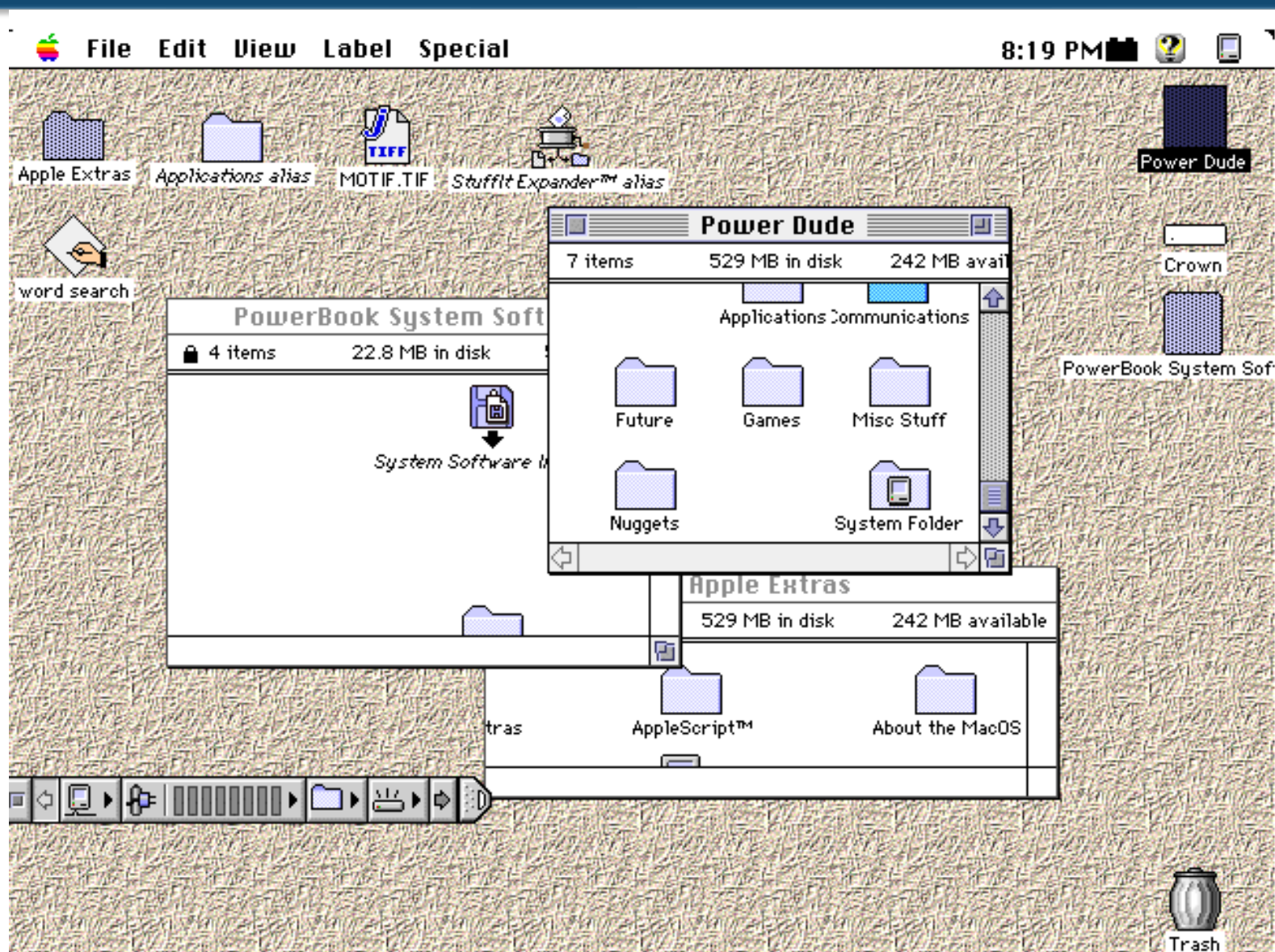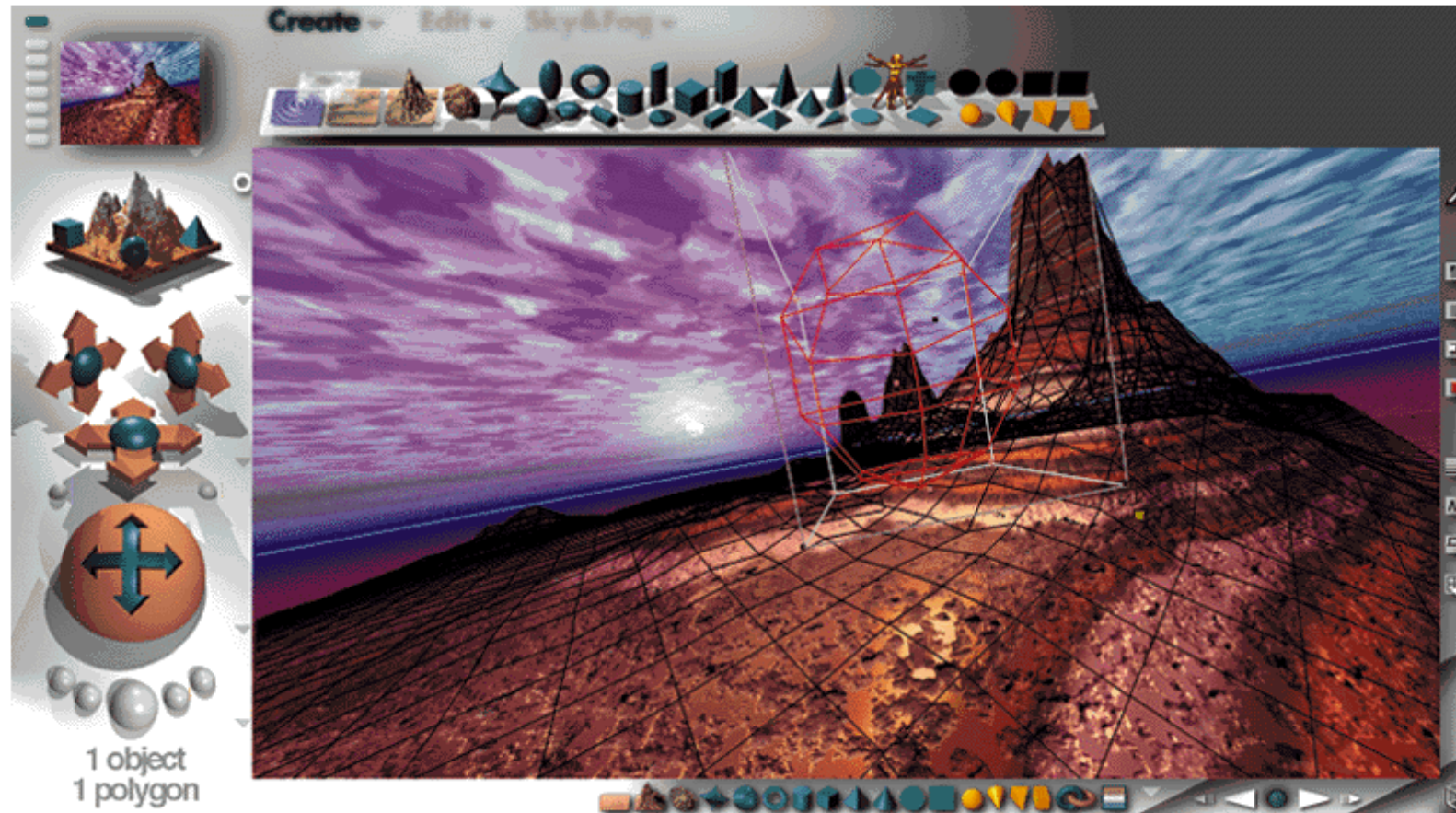 - 工具；设计过程。

Chapter Map

User Interface

Examples of GUIs

✿ Xerox's Star workstation was the first commercial implementation of the graphical user interface. The Star was introduced in 1981 and was the inspiration for the Mac and all the other GUIs that followed

Examples of GUIs

Examples of GUIs

The GUI Created a Revolution

GUIs allow the most imaginative interfaces to be created; witness this Bryce 3-D modeling program. All the symbols are working tools. For example, the ones on the left side with crosses are camera controls. The large symbol at the bottom is the camera trackball, while the other three control the x, y and z axes. On top are primitive graphic elements, including an "organic rock generator," fourth from left. *(Screen shot courtesy of MetaCreations Corporation.)*
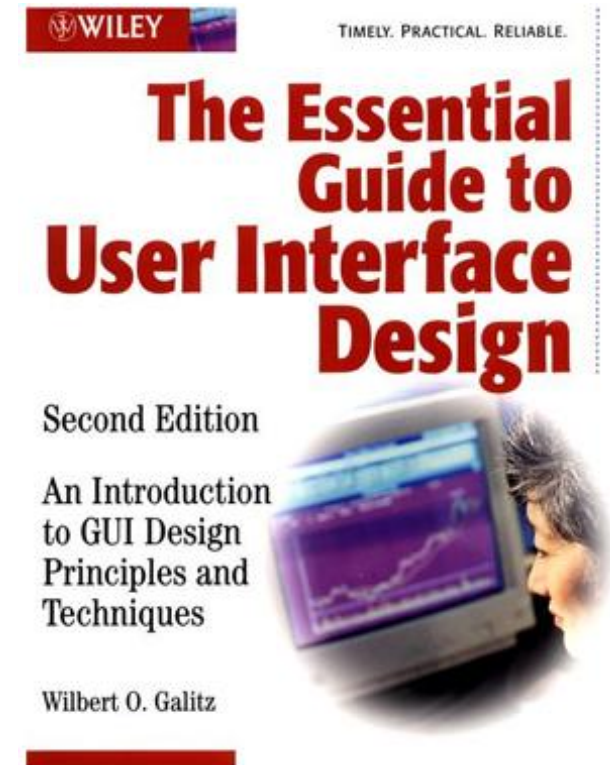
User Interface Design Concepts and Guidelines

System User Classifications

✤ An expert user is an experienced computer user who has spent considerable time using specific application programs. The use of a computer is usually considered nondiscretionary（不可任意支配的）. In the mainframe computing era, this was called a _dedicated user_（专用用户）.

✤ The novice user（初学者用户）(sometimes called a _casual user_（临时用户）) is a less experienced computer user who will generally use a computer on a less frequent, or even occasional, basis. The use of a computer may be viewed as discretionary（可任意支配的）(although this is becoming less and less true).

Interface Problems

❀ According to Wilbert O. Galitz
(a GUI expert), these problems
result in confusion, panic（恐慌），
frustration（受挫），boredom（厌倦），
misuse（误用），abandonment（放弃），
and other undesirable consequences.

- Excessive（过分的） use of computer jargon
  and acronyms
- Nonobvious or less-than-intuitive design
- Inability to distinguish between alternative
  actions ("what do I do next?")
- Inconsistent problem-solving approaches
- Design inconsistency

⊗WILEY   TIMELY. PRACTICAL. RELIABLE.

The Essential Guide to User Interface Design

Second Edition

An Introduction to GUI Design Principles and Techniques

Wilbert O. Galitz

Commandments of User Interface Design

- Understand your users and their tasks.

- Involve the user in interface design.

- Test the system on actual users.

  - Observation and listening are the key skills here.

- Practice iterative design.

  - When is the interface finished? Probably never.

Human Engineering Guidelines

- The system user should always be aware of what to do next.
  - Tell the user what the system expects right now.
  - Tell the user that data has been entered correctly.
  - Tell the user that data has not been entered correctly.
  - Explain to the user the reason for a delay in processing.
  - Tell the user that a task was completed or was not completed.
- The screen should be formatted so that the various types of information, instructions, and messages always appear in the same general display area.

Human Engineering Guidelines (continued)

⌖ Messages, instructions, or information should be displayed long enough to allow the system user to read them.

⌖ Use display attributes sparingly（不要滥用加亮、闪烁、逆显等，反而不能让用户集中视点）.

⌖ Default values for fields and answers to be entered by the user should be specified.

⌖ Anticipate（预见到）the errors users might make.

⌖ With respect to errors, a user should not be allowed to proceed without correcting an error.

⌖ If the user does something that could be catastrophic（灾难性的），the keyboard should be locked to prevent any further input, and an instruction to call the analyst or technical support should be displayed.

Guidelines for Dialogue Tone and Terminology

- Tone（语气）
  - Use simple, grammatically correct sentences.
  - Don't be funny or cute（装腔作势）！
  - Don't be condescending（故作谦卑状）.
- Terminology（术语）
  - Don't use computer jargon.
  - Avoid most abbreviations (缩写词).
  - Use simple terms.
  - Be consistent in your use of terminology.
  - Carefully phrase instructions—use appropriate action verbs.

User Interface Technology

Today's User Interfaces

❧   Most of today's user interfaces are graphical. The basic structure of the graphical user interface (GUI) is provided within either the computer operating system or the Internet browser of choice.

❧   In *client/server information systems*, the user interface client is implemented to execute within the *PC operating system*.

❧   In *Internet and intranet information systems*, the user interface is implemented to execute within the *PC's Web browser*.

Common Approaches to Showing the Display Area

❄ Paging displays a complete screen of characters at a time. The complete display area is known as a page (or screen). The page is replaced on demand by the next or previous page, much like turning the pages of a book.

❄ Scrolling moves the displayed information up or down on the screen, one line at a time. This is similar to the way movie and television credits scroll up the screen at the end of a movie.

Graphical User Interface Styles and Considerations

Styles or Strategies Used For Designing GUI

- Windows and frames
  - A window may be divided into zones called frames.
- Menu-driven interfaces
  - Menu-driven strategies require the user to select an action from a menu of alternatives.
- Instruction-driven interfaces
- Question-answer dialogue

A Classical Hierarchical Menu Dialogue
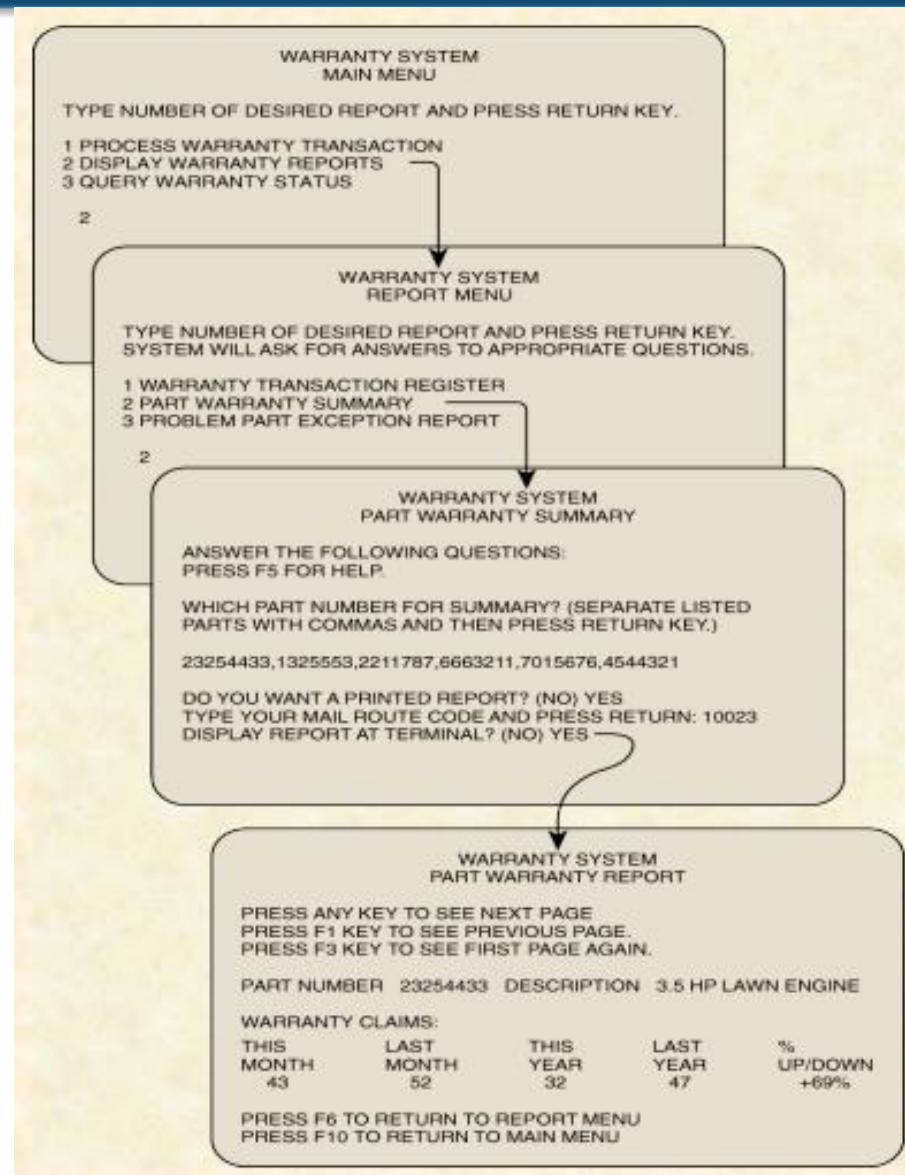
Sample Dialogue Chart
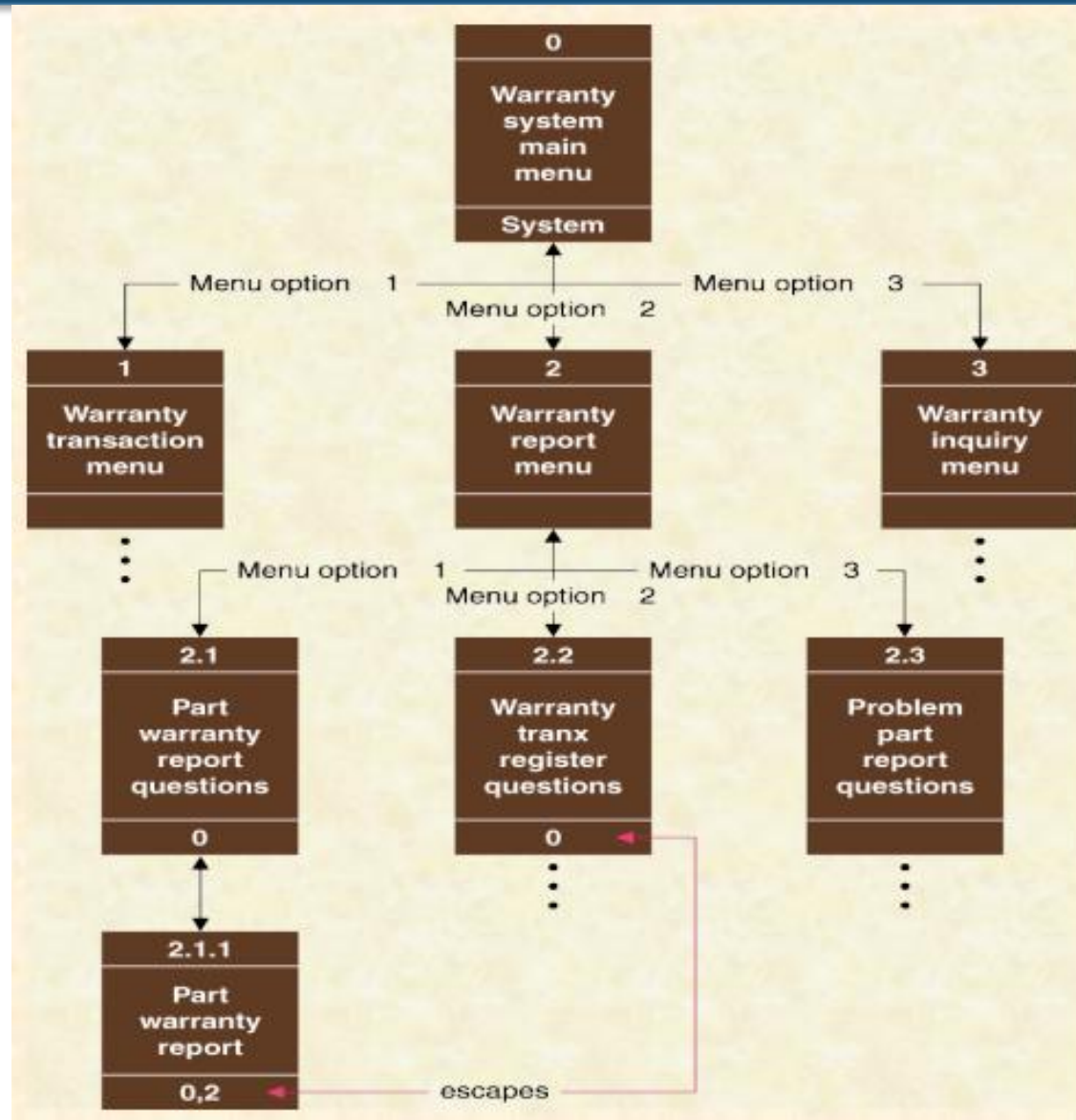
GUI Menus

- Pull down（下拉式的） and cascading（层迭式的） menus
- Tear-off（可拖动的） and pop-up（弹出式的） menus
- Toolbar and iconic（图标式的） menus
- Hypertext and hyperlink menus

Pull-Down and Cascading Menus

Dialogue Box

通常对应的菜单项带有省略号

Pop-Up Menus

供选择的、与文本有关的操作

Tool Bars

Iconic Menus

Consumer-Style Interface
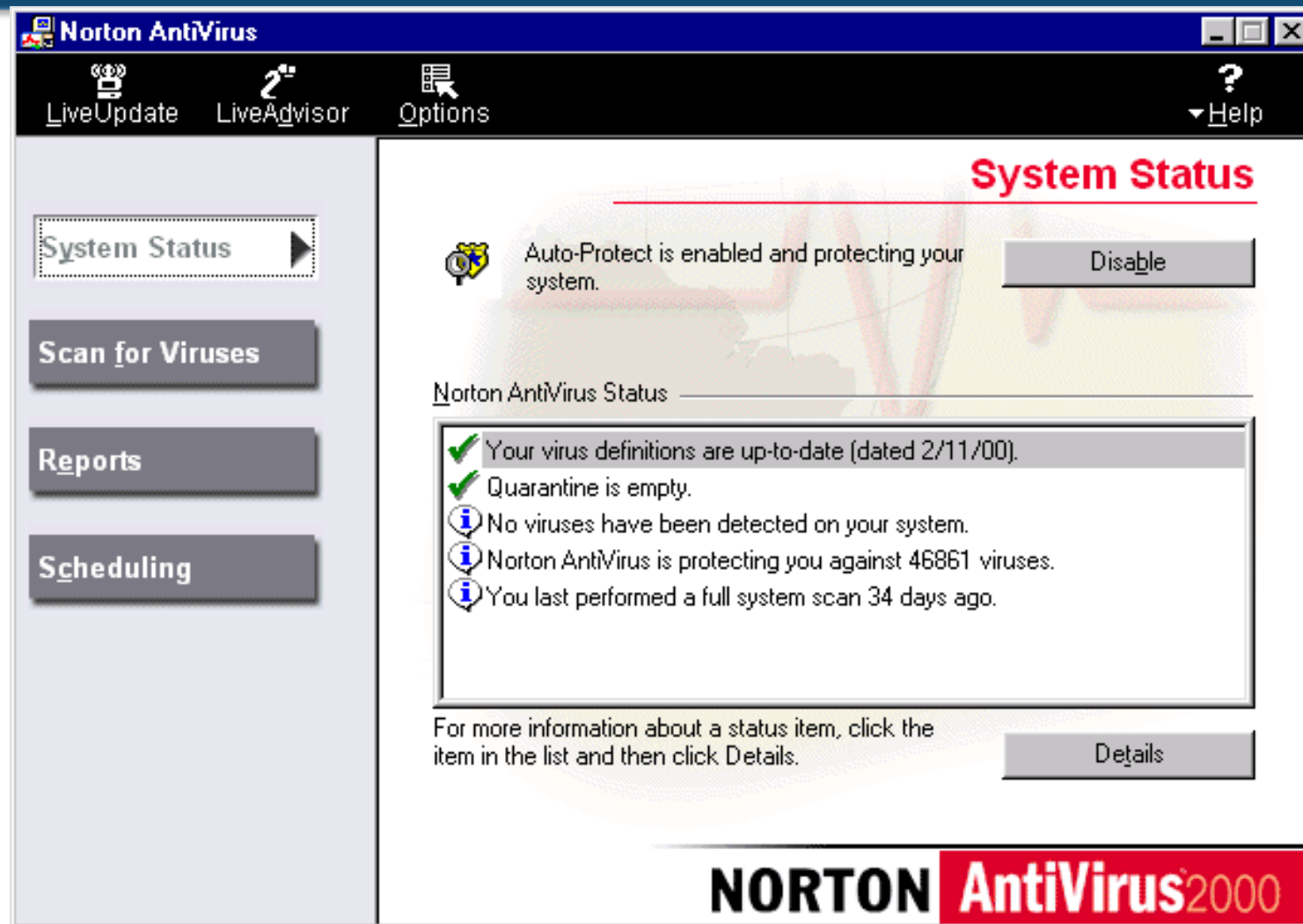
More Web-like

Hybrid Windows/Web Interface

Instruction-Driven Interface

- Most suitable for expert users.
- Three types of syntax:
  - A language-based syntax is built around a widely accepted command language that can be used by the user to invoke action (e.g., QBE, SQL).
  - A mnemonic （记忆的） syntax is built around commands defined for custom information system applications.
  - A natural language syntax allows users to enter questions and commands in their native language.

Instruction-Driven Interface
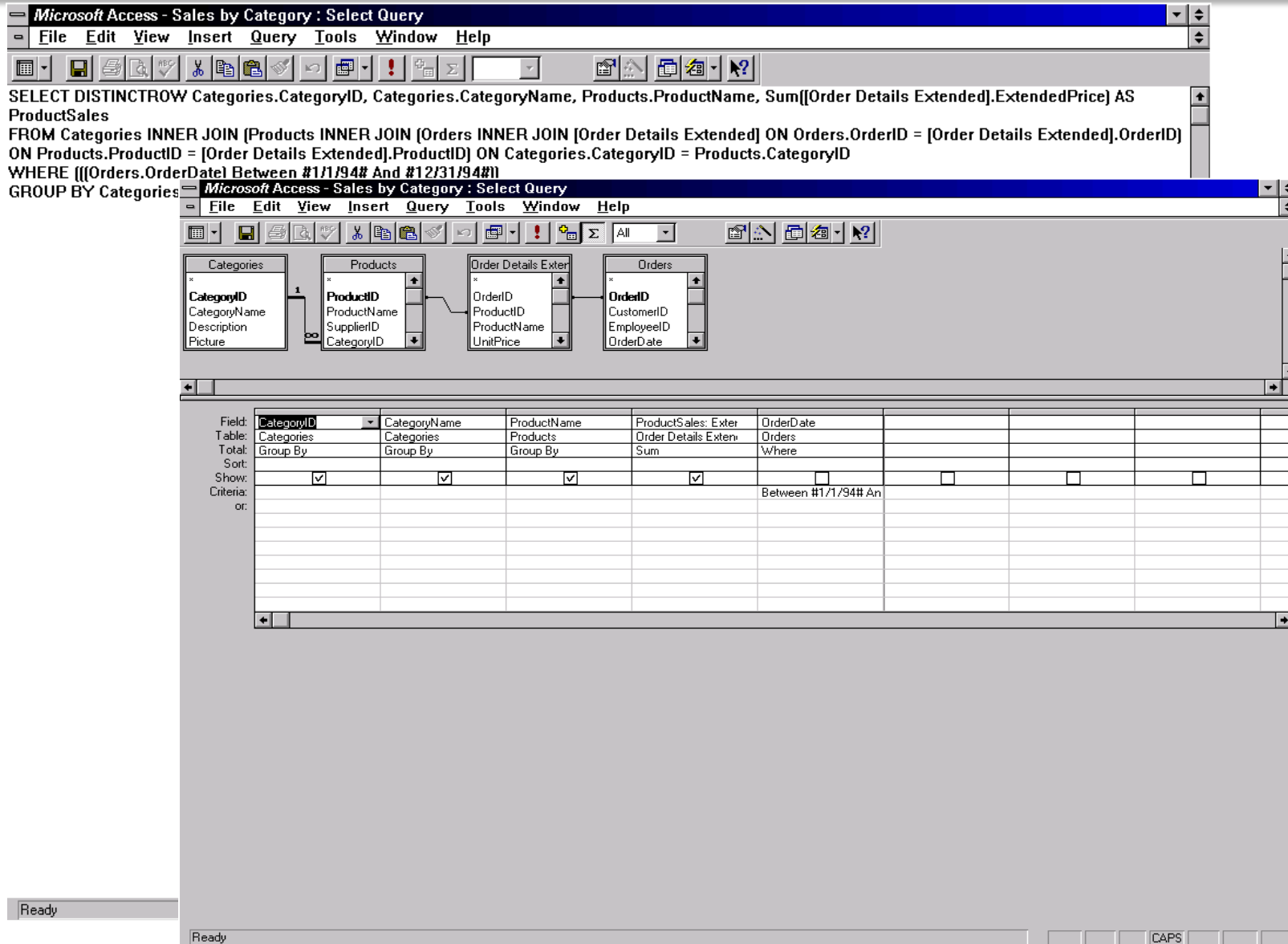
Question-Answer Dialogues

✿ A question-answer dialogue style is primarily used to supplement either menu-driven or instruction-driven dialogues.

✿ This strategy requires that you consider all possible correct answers and deal with the actions to be taken if incorrect answers are entered.

Special Considerations for User Interface Design

✿ Internal controls - Authentication and Authorization（鉴别与授权）.

✿ On-line Help.

Authentication Log-in Screen

Authentication Error Screen

Security Authorization Failure ✕

❌ Unknown User ID or incorrect password. Please try again.

OK
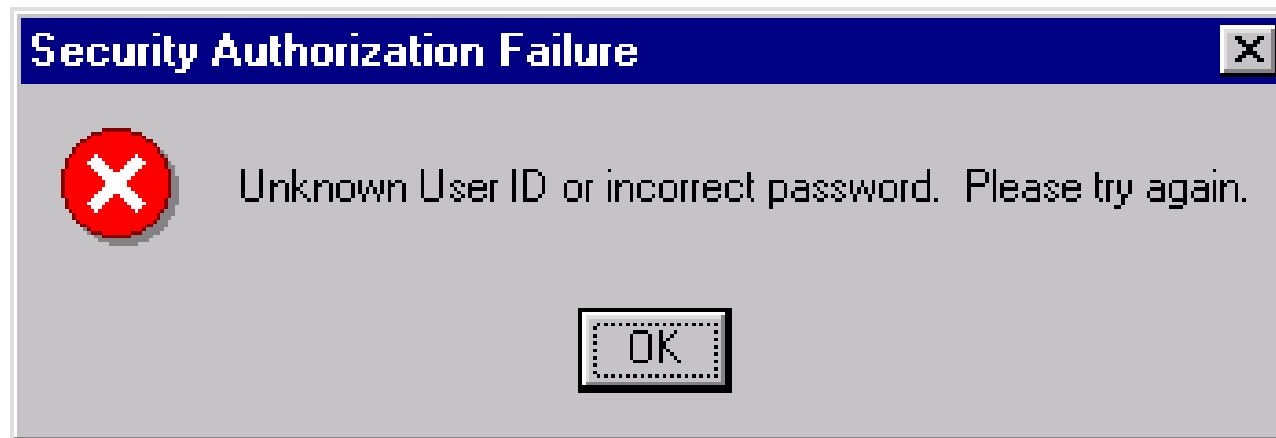
Server Security Certificate
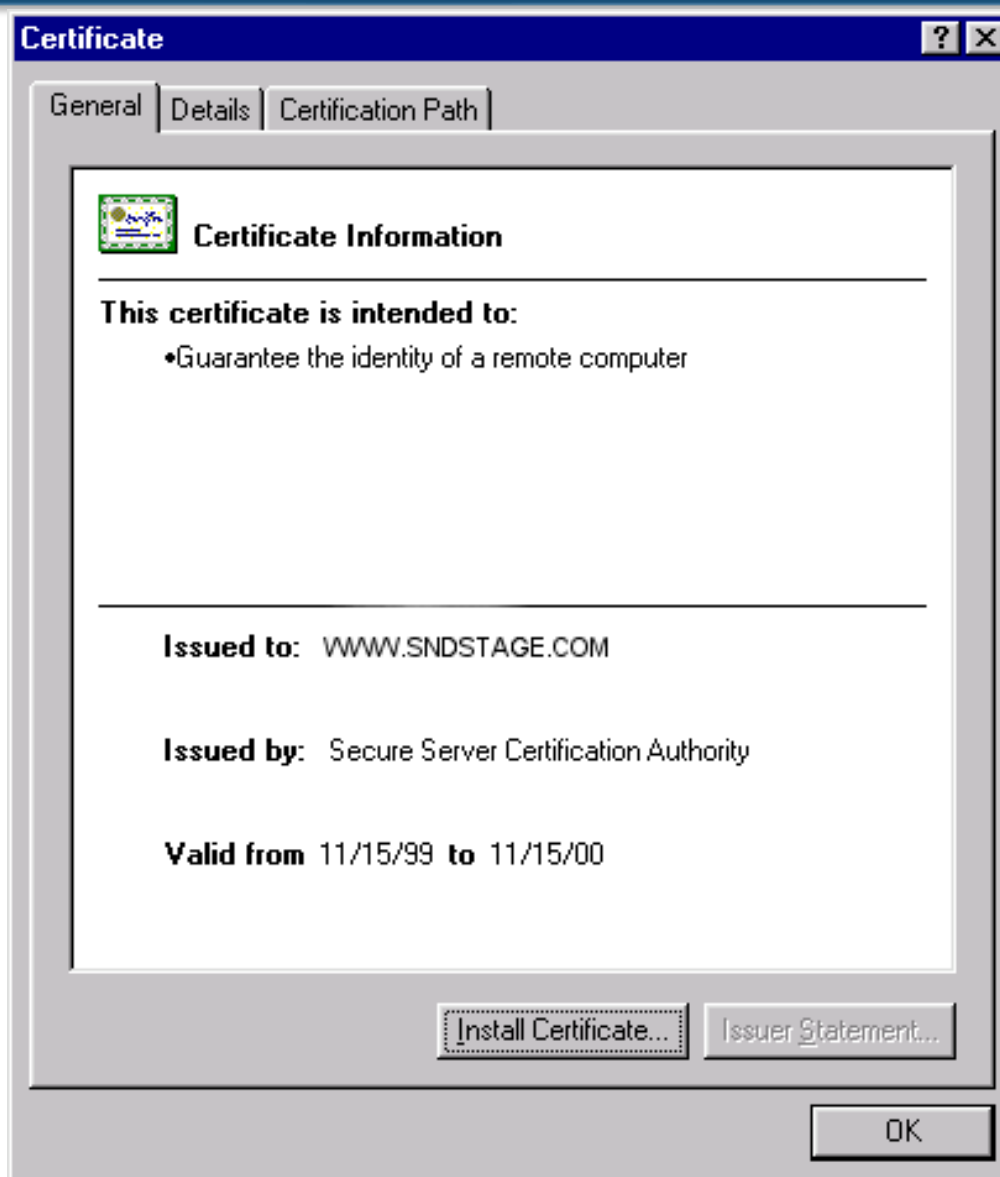
Special Considerations for User Interface Design

- Internal controls - Authentication and Authorization（鉴别与授权）.
- On-line Help.

Help Tool Tip
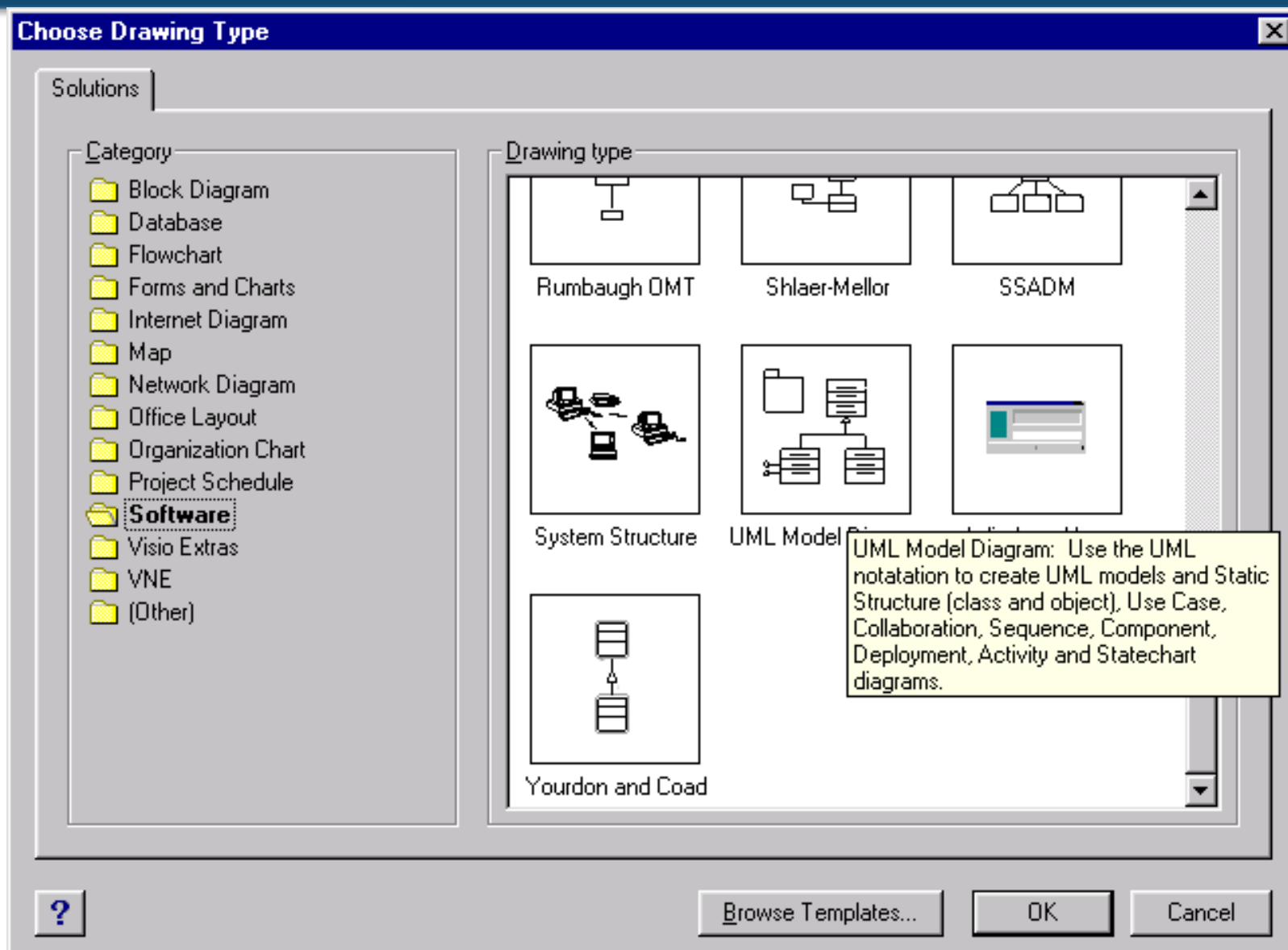
Choose Drawing Type

Solutions

Category
- Block Diagram
- Database
- Flowchart
- Forms and Charts
- Internet Diagram
- Map
- Network Diagram
- Office Layout
- Organization Chart
- Project Schedule
- **Software**
- Visio Extras
- VNE
- (Other)

Drawing type

Rumbaugh OMT   Shlaer-Mellor   SSADM

System Structure   UML Model

Yourdon and Coad

UML Model Diagram: Use the UML notatation to create UML models and Static Structure (class and object), Use Case, Collaboration, Sequence, Component, Deployment, Activity and Statechart diagrams.

?

Browse Templates...   OK   Cancel

Help Wizard

Instructions

Create New Account

Choose the type of account to create.

Banking & Cash
- Checking
- Savings
- ● Credit Card
- Money Market
- Cash

Investments
- Brokerage
- IRA or Keogh
- 401(k)
- Dividend Reinvestment Plan
- Other Investment

Home & Business
- House (with or w/o Mortgage)
- Vehicle (with or w/o Loan)
- Asset
- Liability
- Invoices / Receivables
- Bills / Payables

- If you are trying to set up a security such as a stock or bond, you should probably choose Brokerage. Click help for more information.

✕ Cancel   ? Help   ▷ Next

Additional or subsequent steps

Explanations

More detailed help

Help Wizard

Instructions

Create New Account

Choose the type of account to create.

Banking & Cash
- ○ Checking
- ○ Savings
- ◉ Credit Card
- ○ Money Market
- ○ Cash

Investments
- ○ Brokerage
- ○ IRA or Keogh
- ○ 401(k)
- ○ Dividend Reinvestment Plan
- ○ Other Investment

Home & Business
- ○ House (with or w/o Mortgage)
- ○ Vehicle (with or w/o Loan)
- ○ Asset

- ■ If you are trying to set up a security such as a stock or probably choose Brokerage. Click help for more informa

✖ Cancel   ? Help

Explanations

More detailed help

Credit Card Account Setup

| EasyStep | Summary |

Account Information

Account Name: Credit Card

Description: My New Credit Card

Balance: 3.00   as of 2/21/00

Financial Institution: Ashburn Bank

Online Information

☐ Enable Online Account Access

Optional Information

Credit Limit, if Applicable: 5,000.00

Additional Information: Info...   Tax Info: Tax...

✖ Cancel   ? Help   ◀ Back   ▷ Done

How to Design and Prototype
a User Interface?

Visual Basic Menu Construction

Menu Editor

Caption: `E&xit`

Name: ` `

Index: ` `   Shortcut: `(None)`

HelpContextID: `0`   NegotiatePosition: `0 - None`

☐ Checked   ☑ Enabled   ☑ Visible   ☐ WindowList

[←] [→] [↑] [↓]   [Next]   [Insert]   [Delete]

```
&File
····&Open
····&New
····E&xit
&Edit
&Reports
&Operations
&Maintenance
&Help
```
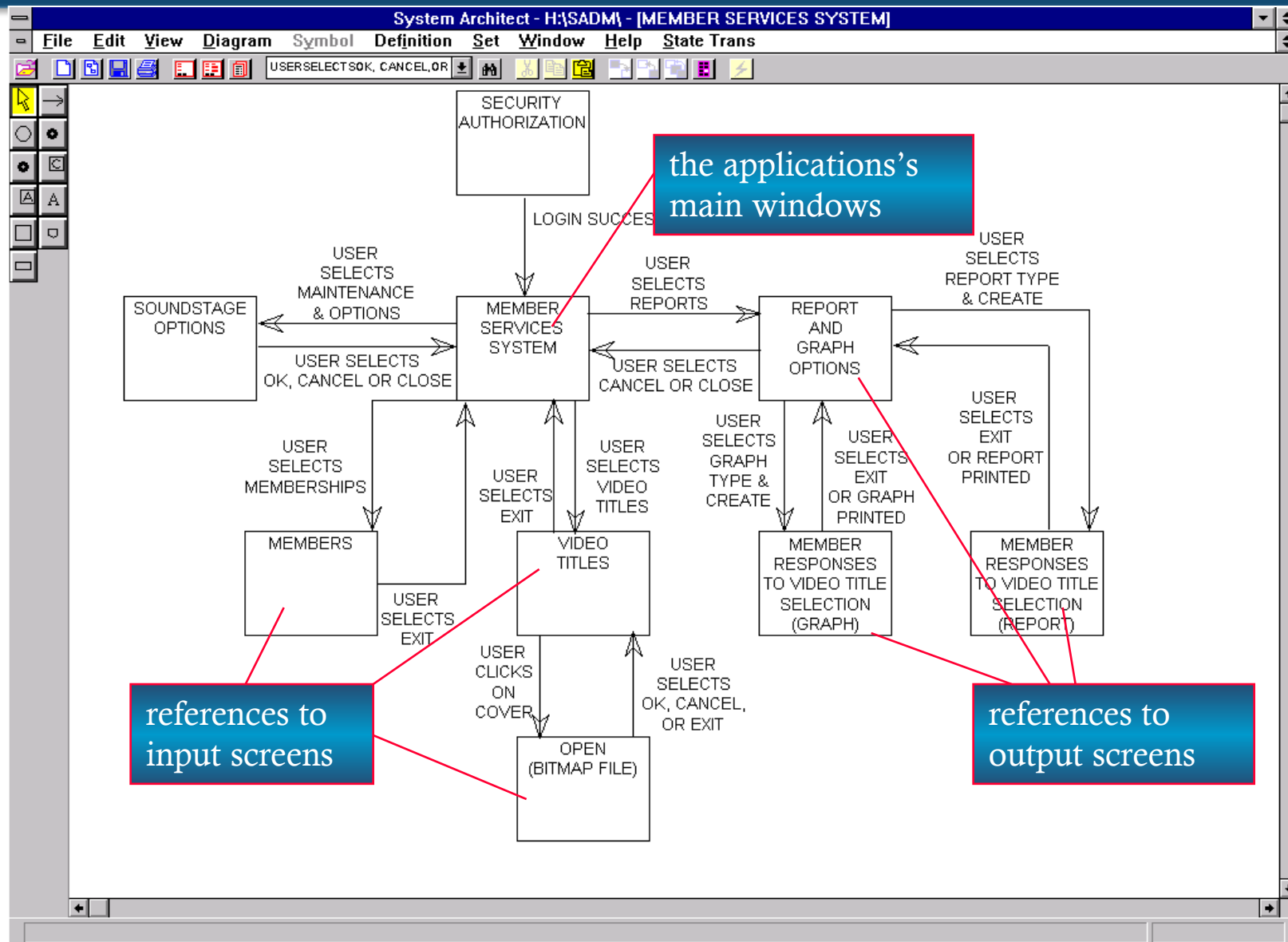
[OK] [Cancel]

```
Open
New
Exit
```

Additional User Interface Controls
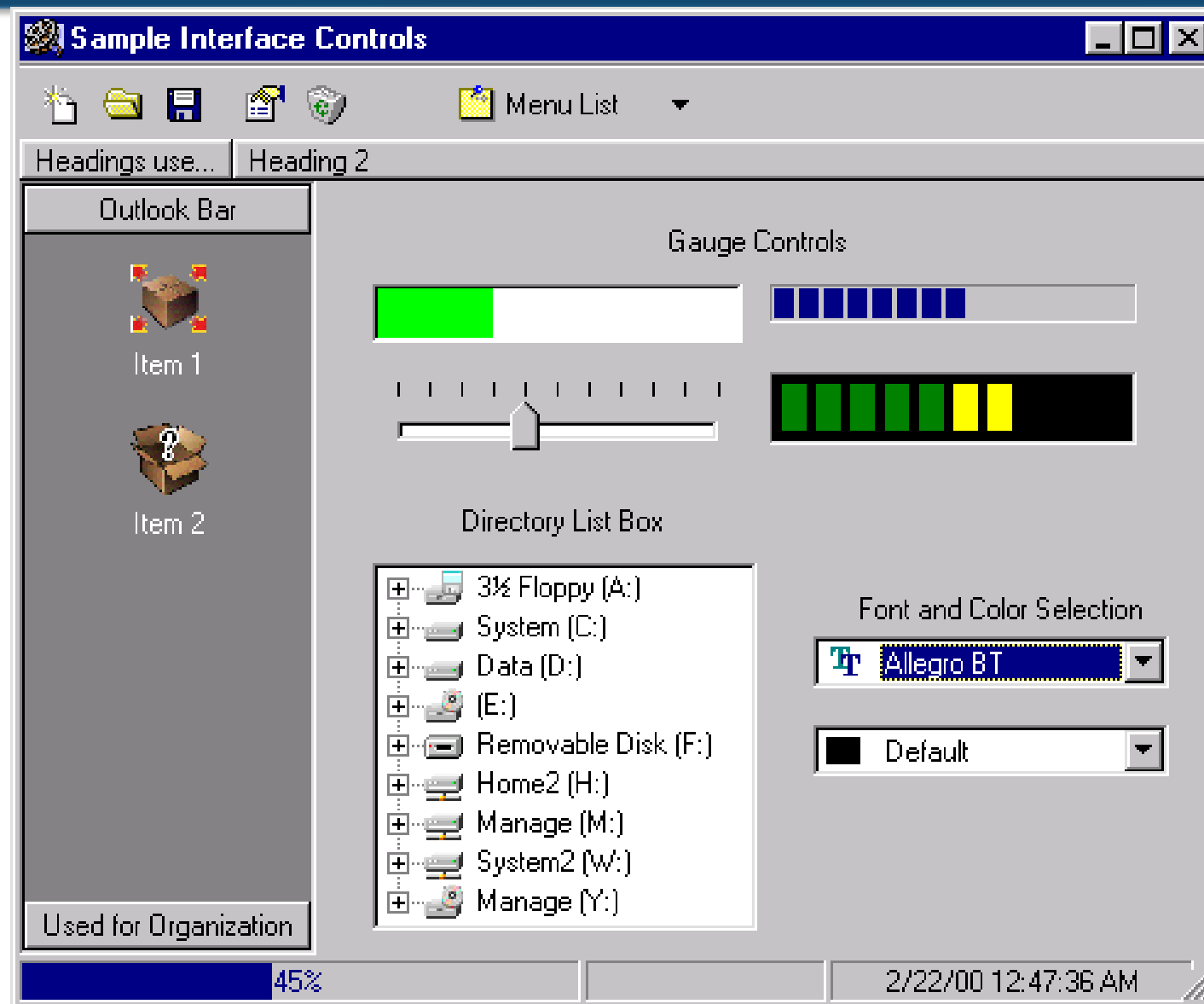
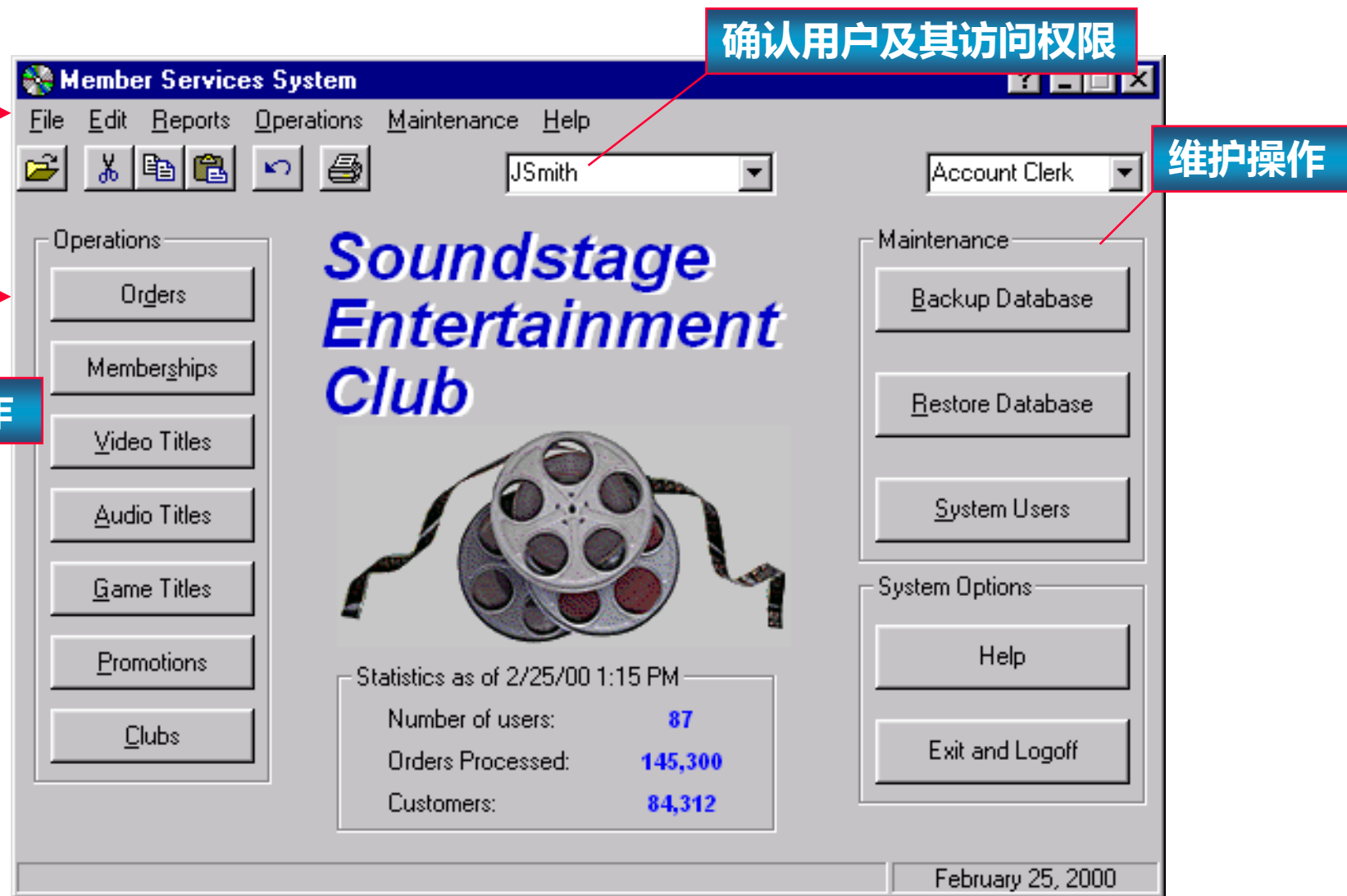# The User Interface Design Process

- 1. Chart the user interface dialogue.
- 2. Prototype the dialogue and user interface.
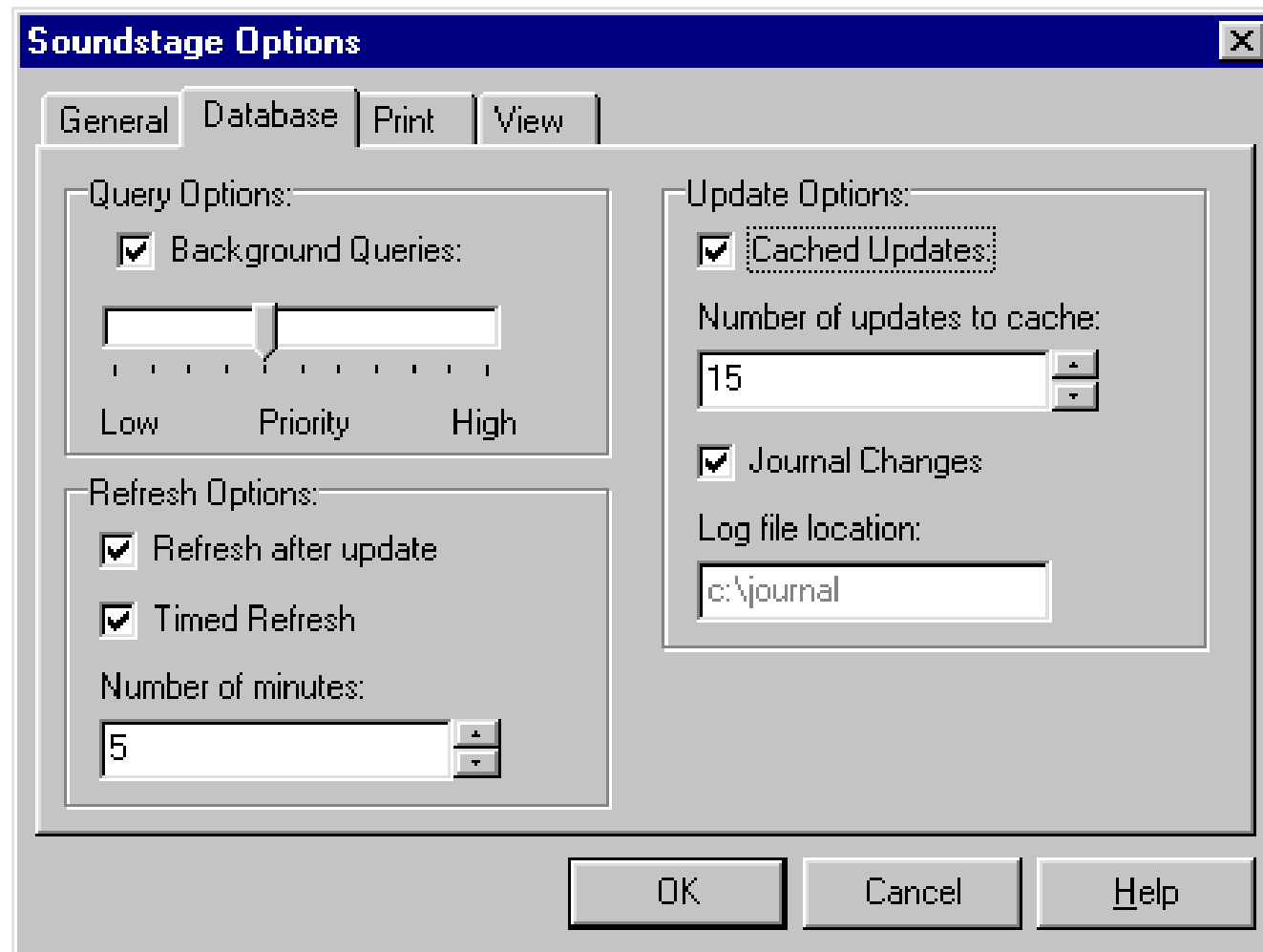- 3. Obtain user feedback.
- 4. If necessary, return to step 1 or 2.

SoundStage Partial State Transition Diagram

System Architect - H:\SADM\ - [MEMBER SERVICES SYSTEM]

File Edit View Diagram Symbol Definition Set Window Help State Trans

USER SELECT S OK, CANCEL, OR

SECURITY AUTHORIZATION

the applications's main windows

LOGIN SUCCESS

USER SELECTS MAINTENANCE & OPTIONS

USER SELECTS REPORTS

USER SELECTS REPORT TYPE & CREATE

SOUNDSTAGE OPTIONS

MEMBER SERVICES SYSTEM

REPORT AND GRAPH OPTIONS

USER SELECTS OK, CANCEL OR CLOSE

USER SELECTS CANCEL OR CLOSE

USER SELECTS MEMBERSHIPS

USER SELECTS EXIT

USER SELECTS VIDEO TITLES

USER SELECTS GRAPH TYPE & CREATE

USER SELECTS EXIT OR GRAPH PRINTED

USER SELECTS EXIT OR REPORT PRINTED

MEMBERS

VIDEO TITLES

MEMBER RESPONSES TO VIDEO TITLE SELECTION (GRAPH)

MEMBER RESPONSES TO VIDEO TITLE SELECTION (REPORT)

USER SELECTS EXIT

USER CLICKS ON COVER

USER SELECTS OK, CANCEL, OR EXIT

references to input screens

references to output screens

OPEN (BITMAP FILE)

SoundStage Main Menu

确认用户及其访问权限

维护操作

业务操作

SoundStage Options and Preferences Screen

SoundStage Report Customization Dialogue

Report and Graph Options

Reports | Graphs

Report Type:

Pre-defined Reports:

Member Selection Summary ▾

☐ Custom Report

Custom Report Name:

[   ] Design

Header Options:

☑ Current Date   ☐ User Name
☑ Current Time   ☑ Report Name
☐ Page Numbers   ☐ Number of Records

Entertainment Categories:

☐ Audio
☑ Game
☑ Video
☐ All

Summary Information:

☑ Show Summations
☑ Show Maximums
☐ Show Minimums

Cancel | Create

要点与引申

- 据统计，软件系统中70%左右的代码与人机交互有关。

- 用户界面的设计强烈地受到平台（如 Windows 和 Web browser）的影响。

- 同一个产品系列、同一个组织的信息系统，通常有统一的用户界面风格。

- 请大家从人机工程中学习更多的用户界面设计知识与技能。