Systems Analysis and Design

5th Edition

Chapter 9. User Interface Design

Alan Dennis, Barbara Haley Wixom, and Roberta Roth

Chapter 9 Outline

- Principles of user interface design.
- User interface design process.
- Navigation design.
- Input design.
- Output design.

INTRODUCTION

- **Interface design** is the process of defining how the system will interact with external entities.
- In this chapter, we focus on the design of ***user interfaces*** – how the system will interact with the users.
- The design of system interfaces defines how the systems exchange information with other systems.

(cont'd)

- The user interface includes three fundamental parts:

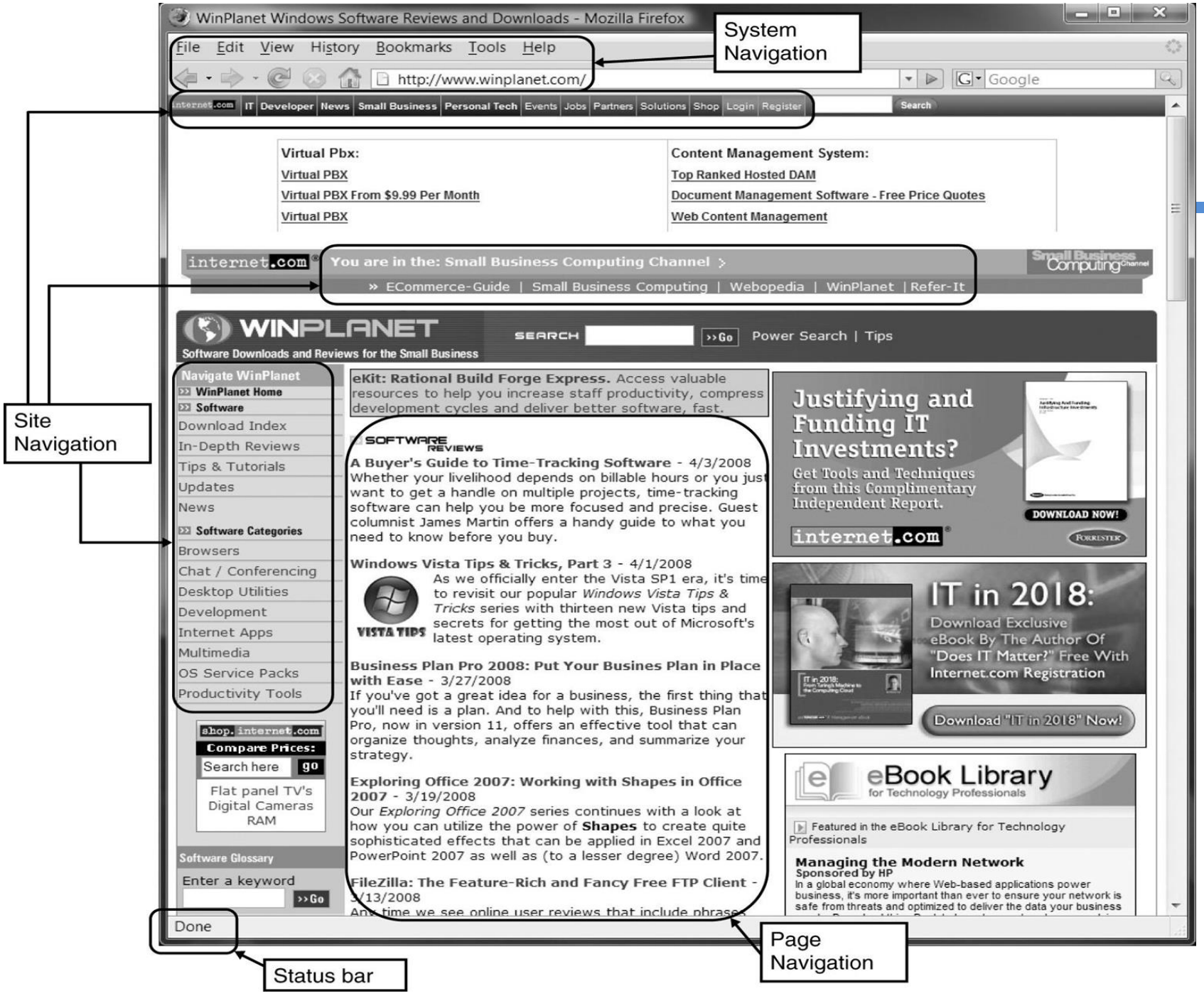
- The ***Navigation mechanism*** - the way in which the user tells the system what to do.
- The ***input mechanism*** – the way in which the system captures information.
- The **output mechanism** - the way in which the system provides information to the user or to other systems.

- **Graphical user interfaces (GUI)** use windows, menus, icons, etc., and are the most common type of user interfaces.

PRINCIPLES FOR USER INTERFACE DESIGN

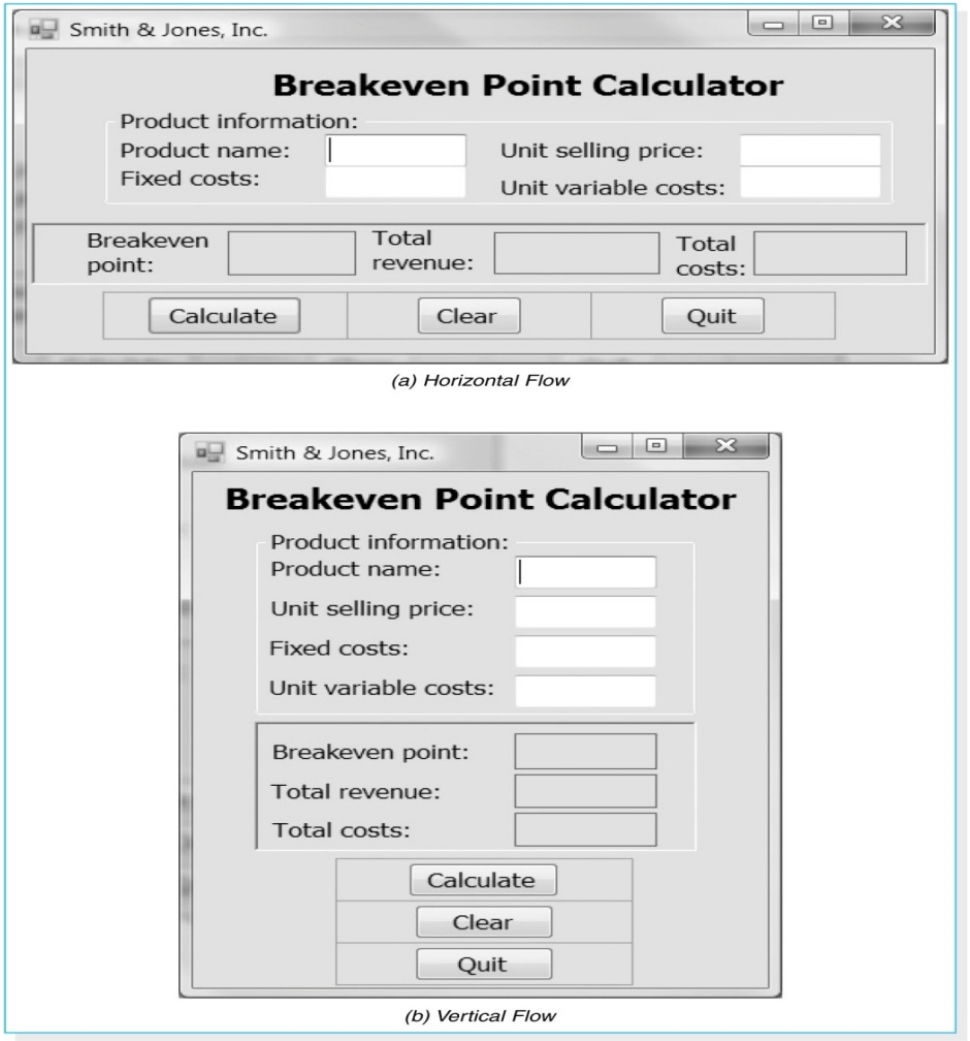
- User interface design is an art.
- The goal is to make the interface pleasing to the eye and simple to use, while minimizing the user's effort.

Principle	Description
Layout	The interface should be a series of areas on the screen that are used consistently for different purposes—for example, a top area for commands and navigation, a middle area for information to be input or output, and a bottom area for status information.
Content awareness	Users should always be aware of where they are in the system and what information is being displayed.
Aesthetics	Interfaces should be functional and inviting to users through careful use of white space, colors, and fonts. There is often a trade-off between including enough white space to make the interface look pleasing and losing so much space that important information does not fit on the screen.
User experience	Although ease of use and ease of learning often lead to similar design decisions, there is sometimes a trade-off between the two. Novice users or infrequent users of software will prefer ease of learning, whereas frequent users will prefer ease of use.
Consistency	Consistency in interface design enables users to predict what will happen before they perform a function. It is one of the most important elements in ease of learning, ease of use, and aesthetics.
Minimize user effort	The interface should be simple to use. Most designers plan on having no more than three mouse clicks from the starting menu until users perform work.

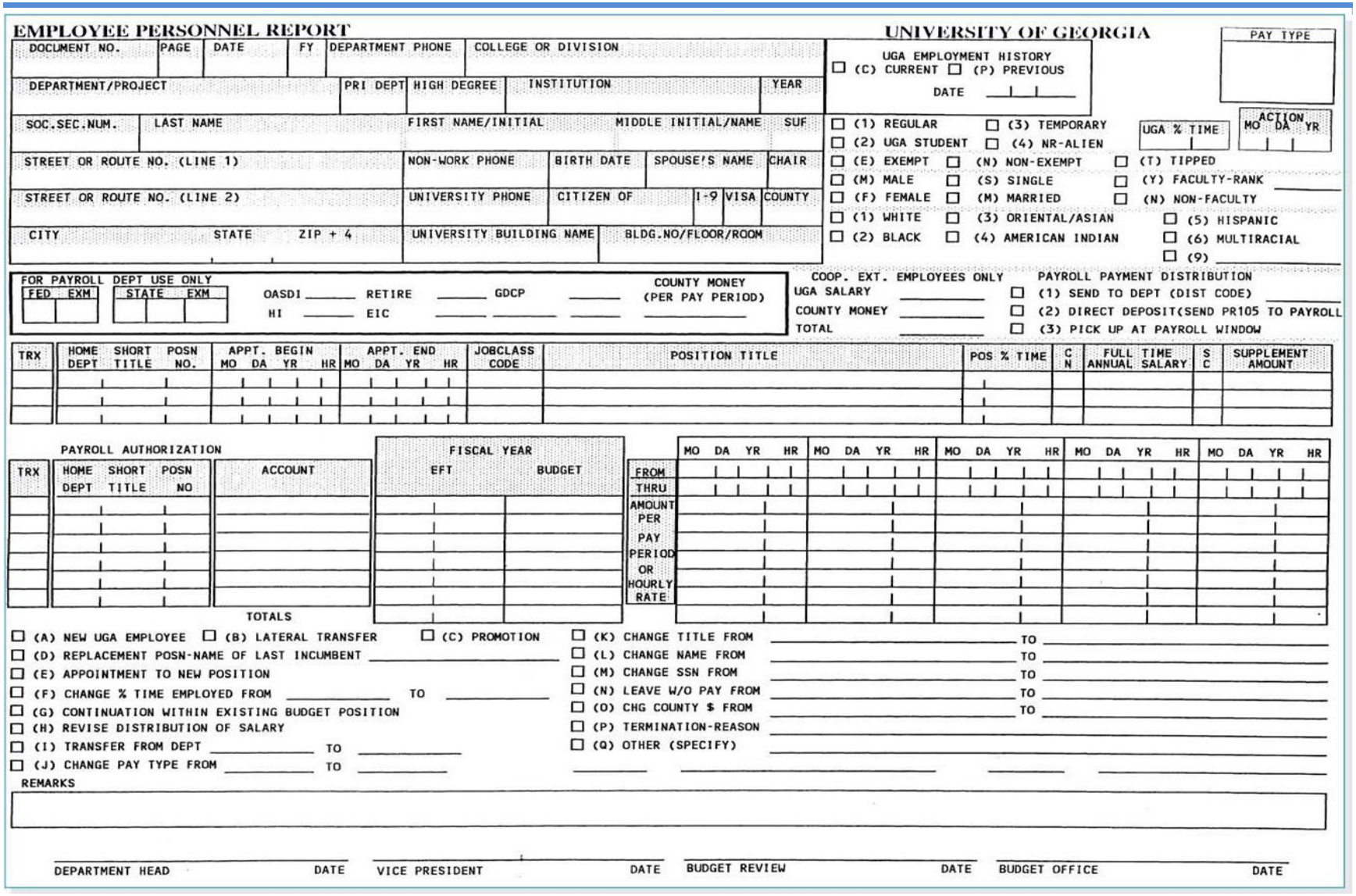

WinPlanet Windows Software Reviews and Downloads - Mozilla Firefox
System Navigation
File Edit View History Bookmarks Tools Help
http://www.winplanet.com/
Google
internet.com IT Developer News Small Business Personal Tech Events Jobs Partners Solutions Shop Login Register
Search
Virtual Pbx:
Virtual PBX
Virtual PBX From $9.99 Per Month
Virtual PBX
Content Management System:
Top Ranked Hosted DAM
Document Management Software - Free Price Quotes
Web Content Management
internet.com
You are in the: Small Business Computing Channel
» ECommerce-Guide | Small Business Computing | Webopedia | WinPlanet | Refer-It
Small Business Computing
WINPLANET
Software Downloads and Reviews for the Small Business
SEARCH
>>Go
Power Search | Tips
Site Navigation
Navigate WinPlanet
WinPlanet Home
Software
Download Index
In-Depth Reviews
Tips & Tutorials
Updates
News
Software Categories
Browsers
Chat / Conferencing
Desktop Utilities
Development
Internet Apps
Multimedia
OS Service Packs
Productivity Tools
shop.internet.com
Compare Prices:
Search here
go
Flat panel TV's
Digital Cameras
RAM
Software Glossary
Enter a keyword
>>Go
eKit: Rational Build Forge Express. Access valuable resources to help you increase staff productivity, compress development cycles and deliver better software, fast.
SOFTWARE REVIEWS
A Buyer's Guide to Time-Tracking Software - 4/3/2008
Whether your livelihood depends on billable hours or you just want to get a handle on multiple projects, time-tracking software can help you be more focused and precise. Guest columnist James Martin offers a handy guide to what you need to know before you buy.
Windows Vista Tips & Tricks, Part 3 - 4/1/2008
VISTA TIPS
As we officially enter the Vista SP1 era, it's time to revisit our popular Windows Vista Tips & Tricks series with thirteen new Vista tips and secrets for getting the most out of Microsoft's latest operating system.
Business Plan Pro 2008: Put Your Busines Plan in Place with Ease - 3/27/2008
If you've got a great idea for a business, the first thing that you'll need is a plan. And to help with this, Business Plan Pro, now in version 11, offers an effective tool that can organize thoughts, analyze finances, and summarize your strategy.
Exploring Office 2007: Working with Shapes in Office 2007 - 3/19/2008
Our Exploring Office 2007 series continues with a look at how you can utilize the power of Shapes to create quite sophisticated effects that can be applied in Excel 2007 and PowerPoint 2007 as well as (to a lesser degree) Word 2007.
FileZilla: The Feature-Rich and Fancy Free FTP Client - 3/13/2008
Justifying and Funding IT Investments?
Get Tools and Techniques from this Complimentary Independent Report.
DOWNLOAD NOW!
internet.com
FORRESTER
IT in 2018:
Download Exclusive eBook By The Author Of "Does IT Matter?" Free With Internet.com Registration
Download "IT in 2018" Now!
eBook Library
for Technology Professionals
Featured in the eBook Library for Technology Professionals
Managing the Modern Network
Sponsored by HP
In a global economy where Web-based applications power business, it's more important than ever to ensure your network is safe from threats and optimized to deliver the data your business
Done
Status bar
Page Navigation

Consistency

The flow between sections should also be consistent.



An example of form with high *density*



EMPLOYEE PERSONNEL REPORT

UNIVERSITY OF GEORGIA

DOCUMENT NO. | PAGE | DATE | FY | DEPARTMENT PHONE | COLLEGE OR DIVISION

DEPARTMENT/PROJECT | PRI DEPT | HIGH DEGREE | INSTITUTION | YEAR

SOC.SEC.NUM. | LAST NAME | FIRST NAME/INITIAL | MIDDLE INITIAL/NAME | SUF

STREET OR ROUTE NO. (LINE 1) | NON-WORK PHONE | BIRTH DATE | SPOUSE'S NAME | CHAIR

STREET OR ROUTE NO. (LINE 2) | UNIVERSITY PHONE | CITIZEN OF | I-9 | VISA | COUNTY

CITY | STATE | ZIP + 4 | UNIVERSITY BUILDING NAME | BLDG.NO/FLOOR/ROOM

UGA EMPLOYMENT HISTORY
☐ (C) CURRENT ☐ (P) PREVIOUS
DATE ___/___

PAY TYPE

UGA % TIME

ACTION MO DA YR

☐ (1) REGULAR ☐ (3) TEMPORARY
☐ (2) UGA STUDENT ☐ (4) NR-ALIEN
☐ (E) EXEMPT ☐ (N) NON-EXEMPT ☐ (T) TIPPED
☐ (M) MALE ☐ (S) SINGLE ☐ (Y) FACULTY-RANK ____
☐ (F) FEMALE ☐ (M) MARRIED ☐ (N) NON-FACULTY
☐ (1) WHITE ☐ (3) ORIENTAL/ASIAN ☐ (5) HISPANIC
☐ (2) BLACK ☐ (4) AMERICAN INDIAN ☐ (6) MULTIRACIAL
☐ (9) ____

FOR PAYROLL DEPT USE ONLY
FED EXM | STATE EXM

OASDI ____ RETIRE ____ GDCP ____ COUNTY MONEY (PER PAY PERIOD)
HI ____ EIC ____ ____ ____

COOP. EXT. EMPLOYEES ONLY
UGA SALARY ____
COUNTY MONEY ____
TOTAL ____

PAYROLL PAYMENT DISTRIBUTION
☐ (1) SEND TO DEPT (DIST CODE) ____
☐ (2) DIRECT DEPOSIT(SEND PR105 TO PAYROLL
☐ (3) PICK UP AT PAYROLL WINDOW

TRX	HOME DEPT	SHORT TITLE	POSN NO.	APPT. BEGIN MO DA YR HR	APPT. END MO DA YR HR	JOBCLASS CODE	POSITION TITLE	POS % TIME	C N	FULL TIME ANNUAL SALARY	S C	SUPPLEMENT AMOUNT

PAYROLL AUTHORIZATION

TRX	HOME DEPT	SHORT TITLE	POSN NO	ACCOUNT	FISCAL YEAR EFT	FISCAL YEAR BUDGET
				TOTALS		

	MO DA YR HR	MO DA YR HR	MO DA YR HR	MO DA YR HR	MO DA YR HR
FROM					
THRU					
AMOUNT PER PAY PERIOD OR HOURLY RATE					

☐ (A) NEW UGA EMPLOYEE ☐ (B) LATERAL TRANSFER ☐ (C) PROMOTION
☐ (D) REPLACEMENT POSN-NAME OF LAST INCUMBENT ____
☐ (E) APPOINTMENT TO NEW POSITION
☐ (F) CHANGE % TIME EMPLOYED FROM ____ TO ____
☐ (G) CONTINUATION WITHIN EXISTING BUDGET POSITION
☐ (H) REVISE DISTRIBUTION OF SALARY
☐ (I) TRANSFER FROM DEPT ____ TO ____
☐ (J) CHANGE PAY TYPE FROM ____ TO ____

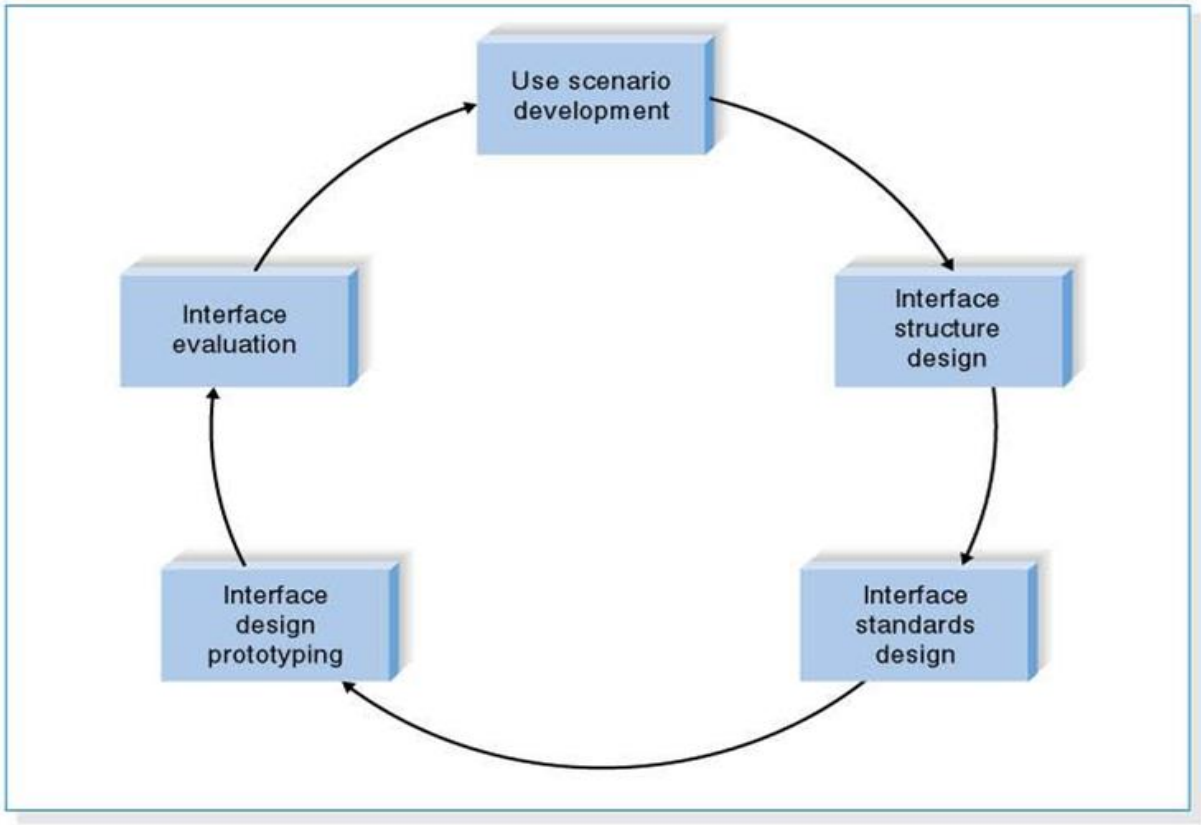
☐ (K) CHANGE TITLE FROM ____ TO ____
☐ (L) CHANGE NAME FROM ____ TO ____
☐ (M) CHANGE SSN FROM ____ TO ____
☐ (N) LEAVE W/O PAY FROM ____ TO ____
☐ (O) CHG COUNTY $ FROM ____ TO ____
☐ (P) TERMINATION-REASON ____
☐ (Q) OTHER (SPECIFY) ____

REMARKS

DEPARTMENT HEAD ____ DATE ____ VICE PRESIDENT ____ DATE ____ BUDGET REVIEW ____ DATE ____ BUDGET OFFICE ____ DATE ____

USER INTERFACE DESIGN PROCESS

- **User interface design** is a five-step process that is iterative.



Use Scenario Development

- A ***use scenario*** is an outline of steps that users perform to accomplish some part of their work.
- Use scenarios are presented in a simple narrative description that is tied to the DFD.

(cont'd)

Use Scenario: The Browsing Shopper
User is not sure what they want to buy and will browse through several tunes.

1. User may search for a specific artist or browse through a music category (1.2).
2. User will likely read the basic information for several tunes, as well as the marketing material for some. He or she will likely listen to music samples and browse related tunes (1.3).
3. User will put the tune in the shopping cart (1.3) and will continue browsing (1.2).
4. Eventually, the user will want to purchase the download, but will probably want to look through the shopping cart, possibly discarding some tunes first (1.3).

Use Scenario: The Hurry-up Shopper
User knows exactly what he or she wants and wants it quickly.

1. User will search for a specific artist or tune (1.2).
2. User will look at the price and enough other information to confirm that the tune is the desired tune (1.3).
3. User will want to buy the download (process 2) or move on to other Web sites.

The numbers in parentheses refer to process numbers in the DFD.

Interface Standards Design

- The interface standards are the basic design elements that are common across the individual screens, forms, and reports within the system.

- The ***interface template*** defines the general appearance of all screens and the paper-based forms and reports.

(cont'd)

- The template specifies the names that the interface will use for the major ***interface objects***, the fundamental building blocks of the system.
- The template gives names to the most commonly used *interface actions*.
- The interface objects and actions, and also their status, may be represented by ***interface icons***.

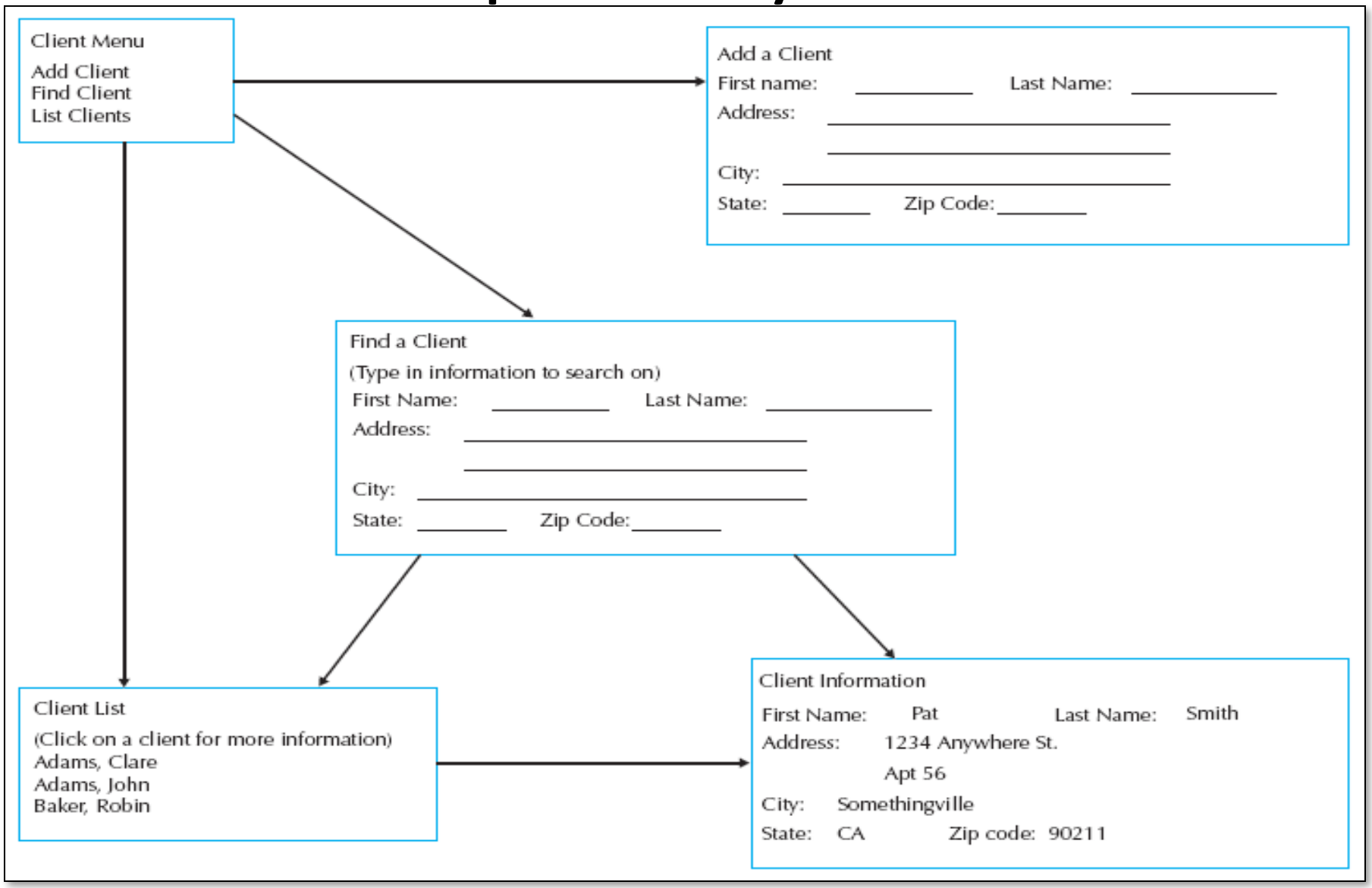
Interface Design Prototyping

- An interface design prototype is a mock-up or a simulation of a computer screen, form, or report.
- Common approaches to interface design prototyping:
  - **Storyboards**
  - HTML prototypes
  - Language prototypes.

(cont'd)

- The ***storyboard*** shows hand-drawn pictures of screens.
- An ***HTML prototype*** is built with the use of Web pages created in HTML
- A ***language prototype*** is an interface design prototype built in the actual language or by the actual that will be used to build the system.

Sample Storyboard



Interface Evaluation

- The objective of interface evaluation is to understand how to improve the interface design.
- There are four common approaches to interface evaluation.

1. ***Heuristic evaluation -*** Compare the interface to a checklist of design principles.
2. ***Walk-through evaluation -*** It is a meeting conducted with the users to walk through the interface.
3. ***Interactive evaluation -*** Users try out the interface.
4. ***Formal usability testing -*** It is a formal testing process to understand how usable the interface is.

NAVIGATION DESIGN

- **Basic Principles**

- Analysts usually must assume that users have not read the manual, have not attended training, and do not have external help readily at hand.

- All controls should be clear and understandable and placed in an intuitive location on the screen.

(cont'd)

- **Prevent Mistakes** - The first of principle of designing navigation control is to prevent users from making mistakes.
  - Labeling commands appropriately and limiting choices.
  - Confirming with the user that the actions are difficult or impossible to undo.
- **Simplify Recovery from Mistakes** – making "undo" buttons whenever possible.
- **Use Consistent Grammar Order** – Windows application uses an *object-action* grammar order.

Window Navigation Diagram

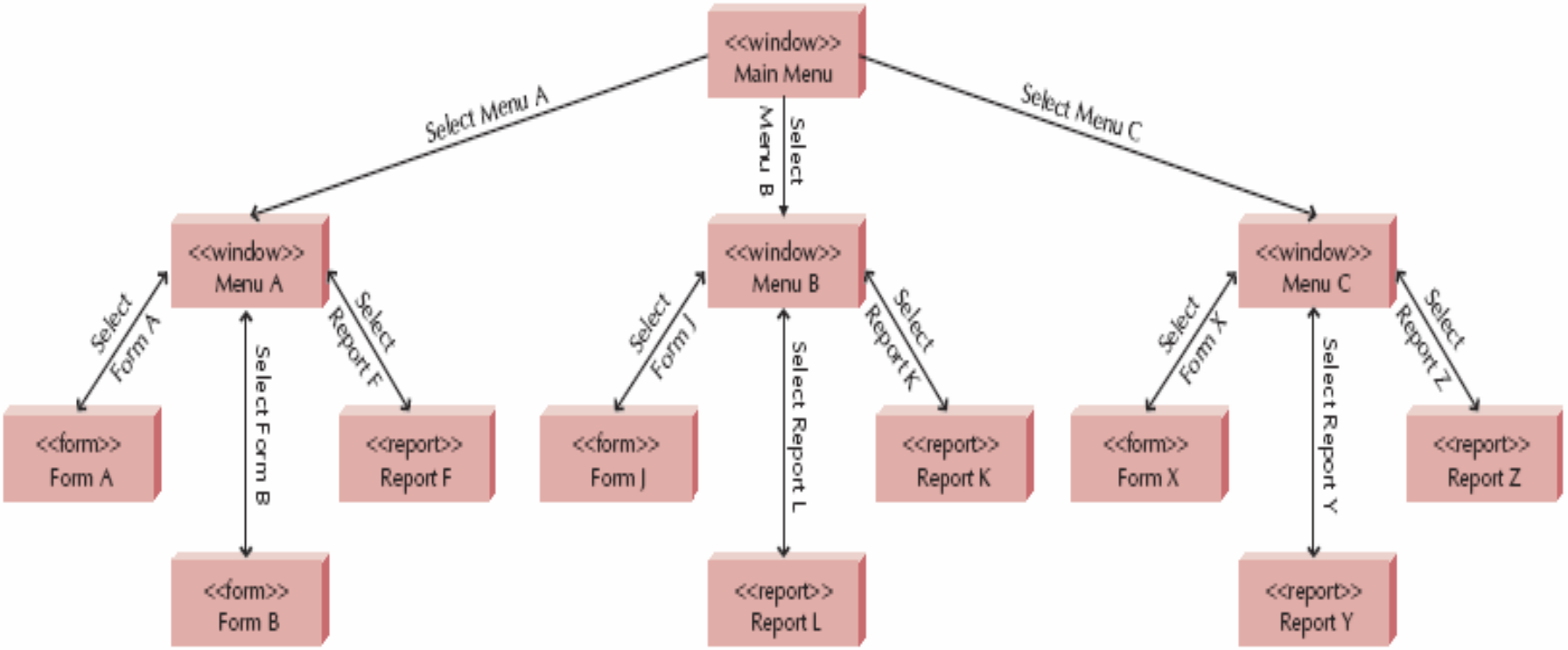
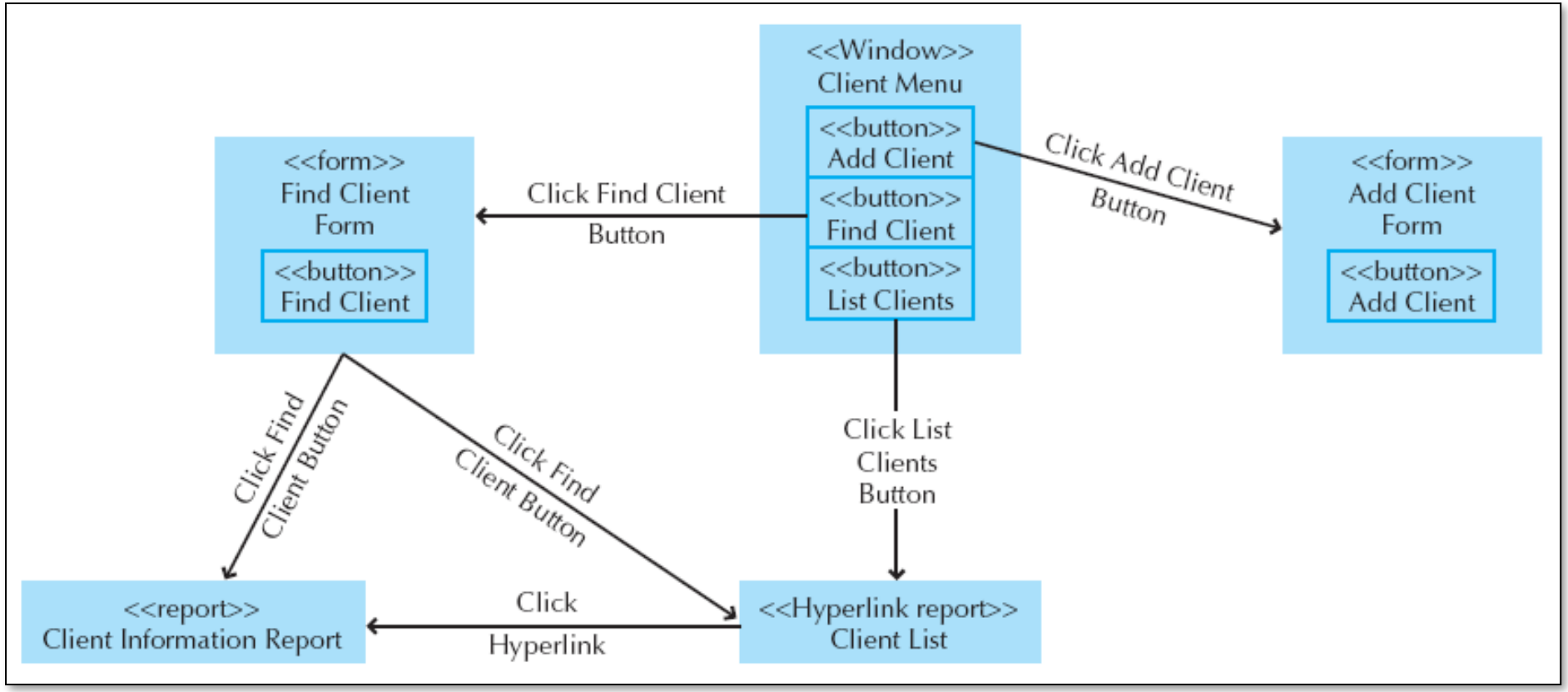


FIGURE 12-7 An Example Window Navigation Diagram

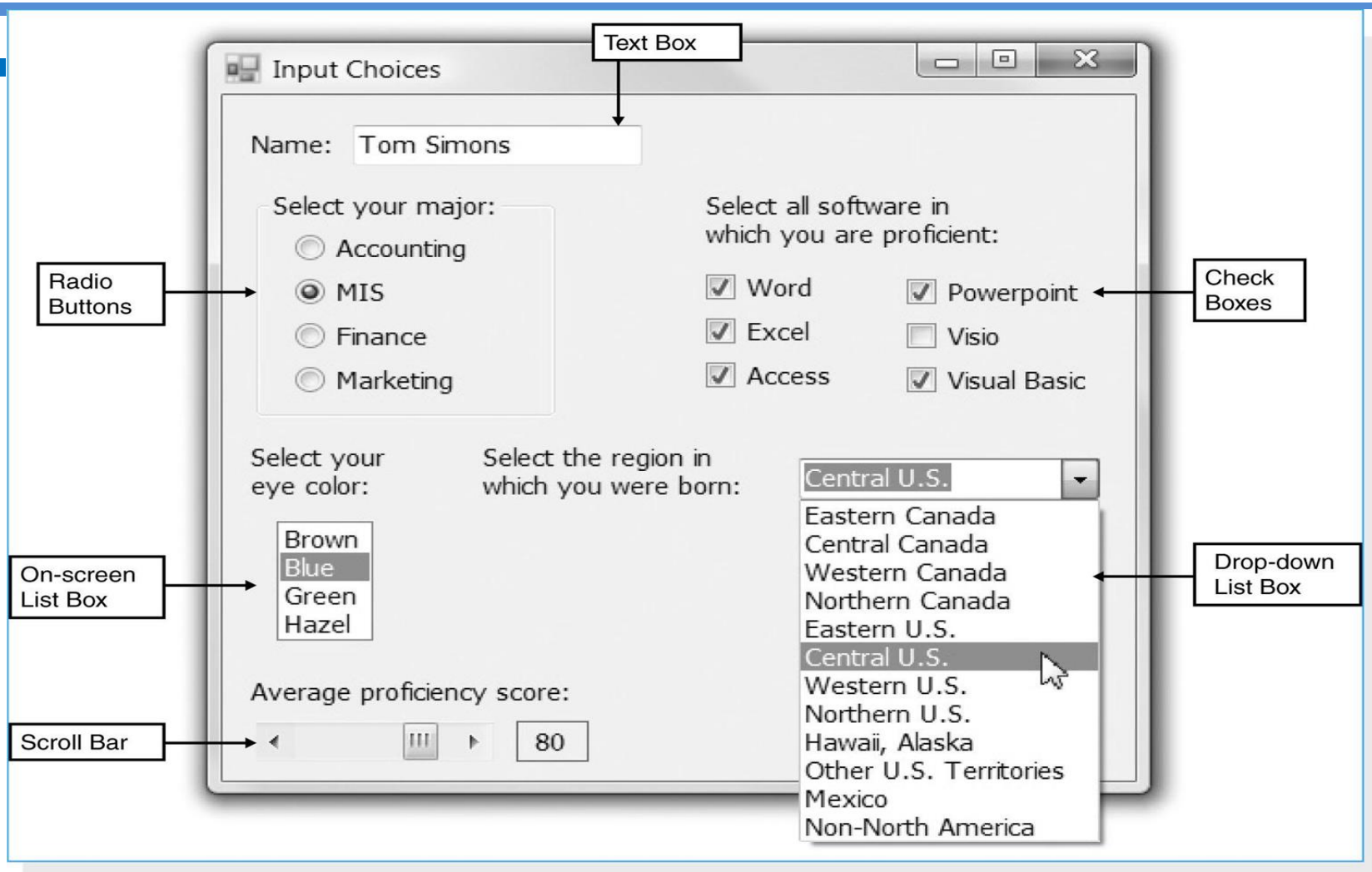
Sample WND


<<Window>>
Client Menu
<<button>>
Add Client
<<button>>
Find Client
<<button>>
List Clients
<<form>>
Find Client
Form
<<button>>
Find Client
<<form>>
Add Client
Form
<<button>>
Add Client
Click Find Client
Button
Click Add Client
Button
Click Find
Client Button
Click Find
Client Button
Click List
Clients
Button
<<report>>
Client Information Report
Click
Hyperlink
<<Hyperlink report>>
Client List

INPUT DESIGN

- Input mechanisms facilitate the entry of data into the computer system.
- Input design means designing the screen used to enter information and forms on which the users write and type information.
- The goal of input design is to capture accurate information for the system simply and easily.

Types of Inputs



Minimize Keystrokes

- Keystrokes cost time and money.
- The system should never ask for information that can be obtained in another way (e.g., by retrieving it from a database).
- The system should not require a user to type information that can be selected from a list.
- The frequent values should be used as the ***default value*** for the data.

OUTPUT DESIGN

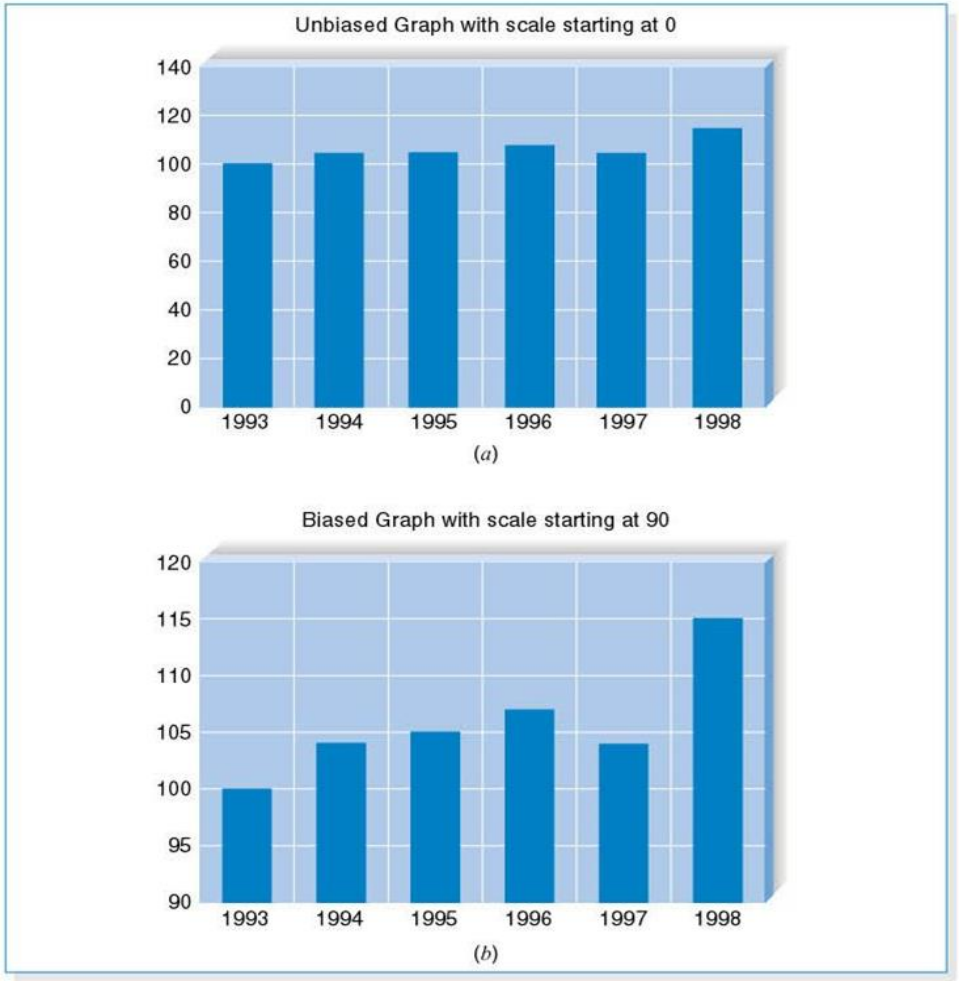
- Outputs are the reports that the system produces, whether on the screen, on paper, or in other media, such as the Web.
- Outputs are the most visible part of any system.

Basic Principles

- The goal of the output mechanism is to present information to users so that they can accurately understand it with the least effort.
- **Understand report usage** – the first principle in designing reports is to understand how they are used.
- **Manage information load** – the goal of a well-designed report is to provide all needed information without information overload.
- **Minimize bias** – no analyst sets out to design a biased report.

(cont'd)

- Example of bias: Bias in graphs.



SUMMARY

- User interface design principles

- Layout, content awareness, aesthetics, user experience, consistency, minimize user effort.

- The user interface design process

- Use scenario development, interface structure design, interface standards design, interface design prototyping, and interface evaluation.

(cont'd)

- Navigation design
  - The fundamental goal of navigation design is to make the system as simple to use as possible.
- Input design
  - The goal of input design is to simply and easily capture accurate information for the system.
- Output design
  - The goal of the output design is to present information to users so that they can accurately understand it with the least effort.