Designing the Human Interface

Copyright 2004 Prentice-Hall, Inc.

Learning Objectives

- Explain the process of designing forms and reports and the deliverables for their creation
- Discuss general guidelines for formatting text, tables and lists
- Learn how to effectively format text, tables and lists
- Explain the process of designing interfaces and dialogues and the deliverables for their creation

Learning Objectives

- Discuss the general guidelines for interface design including:
  - Layout and design
  - Structuring data entry fields
  - Providing feedback
  - System help

Learning Objectives

- Discuss the design of human-computer dialogues and the use of dialogue diagramming
- Explain interface design guidelines unique to the design of Internet-based electronic commerce systems

Designing Forms and Reports

System inputs and outputs are produced at the end of the analysis phase

- Precise appearance was not defined during this phase

  Forms and reports are integrally related to DFD and E-R diagrams

Designing Forms and Reports: Key Concepts

Form

- A business document that contains some predefined data and may include some areas where additional data are to be filled in
- An instance of a form is typically based on one database record

Report

- A business document that contains only predefined data
- A passive document for reading or viewing data
- Typically contains data from many database records or transactions

The Process of Designing Forms and Reports

- User-focused activity
- Follows a prototyping approach
- Requirements determination
  - Who will use the form or report?
  - What is the purpose of the form or report?
  - When is the report needed or used?
  - Where does the form or report need to be delivered and used?
  - How many people need to use or view the form or report?

The Process of Designing Forms and Reports

Prototyping

- Initial prototype is designed from requirements
- Users review prototype design and either accept the design or request changes
- If changes are requested, the construction-evaluation-request cycle is repeated until the design is accepted

Deliverables and Outcomes

Design specifications are major deliverable and contain three sections

1. Narrative
2. Screen Design
3. Testing and usability assessment

General Formatting Guidelines for Forms and Reports

Highlighting

- Use sparingly to draw user to or away from certain information
- Blinking and audible tones should only be used to highlight critical information requiring user's immediate attention
- Methods should be consistently selected and used based upon level of importance of emphasized information

Table 8.3 Methods of Highlighting

Blinking and audible tones
Color differences
Intensity differences
Size differences
Font differences
Reverse video
Boxing
Underlining
All capital letters
Offsetting the position of nonstandard information

Figure 8.6 A Form in Which Several Types of Highlighting Are Used

General Formatting Guidelines for Forms and Reports

Displaying Text

- Display text in mixed upper- and lowercase and use conventional punctuation
- Use double spacing if space permits. If not, place a blank line between paragraphs
- Left-justify text and leave a ragged right margin
- Do not hyphenate words between lines
- Use abbreviations and acronyms only when they are widely understood by users and are significantly shorter than the full text

General Formatting Guidelines for Forms and Reports

- Displaying tables and lists
  - Labels
    - All columns and rows should have meaningful labels
    - Labels should be separated from other information by using highlighting
    - Redisplay labels when the data extend beyond a single screen or page

General Formatting Guidelines for Forms and Reports

- Displaying tables and lists (continued)
  - Formatting columns, rows and text
    - Sort in a meaningful order
    - Place a blank line between every 5 rows in long columns
    - Similar information displayed in multiple columns should be sorted vertically
    - Columns should have at least two spaces between them
    - Allow white space on printed reports for user to write notes
    - Use a single typeface, except for emphasis
    - Use same family of typefaces within and across displays and reports
    - Avoid overly fancy fonts

General Formatting Guidelines for Forms and Reports

- Displaying tables and lists (continued)
  - Formatting numeric, textual and alphanumeric data
    - Right-justify numeric data and align columns by decimal points or other delimiter
    - Left-justify textual data. Use short line length, usually 30 to 40 characters per line
    - Break long sequences of alphanumeric data into small groups of three to four characters each

Figure 8.8a Contrasting Two Pine Valley Furniture Forms — A Poorly Designed Form

No column labels

Single column for all types of data

Pine Valley Furniture

CUSTOMER INFORMATION

CUSTOMER NO:	1273	
NAME:	CONTEMPORARY DESIGNS	
ADDRESS:	123 OAK ST.	
CITY-STATE-ZIP:	AUSTIN, TX 28384	
YTD-PURCHASE:	47,285.00	
CREDIT LIMIT:	10,000.00	
YTD-PAYMENTS:	42,656.65	
DISCOUNT %:	5.0	
PURCHASE:	21-JAN-03	22,000.00
PAYMENT:	21-JAN-03	13,000.00
PURCHASE:	02-MAR-03	16,000.00
PAYMENT:	02-MAR-03	15,500.00
PAYMENT:	23-MAY-03	5,000.00
PURCHASE:	12-JUL-03	9,285.00
PAYMENT:	12-JUL-03	3785.00
PAYMENT:	21-SEP-03	5,371.65
STATUS:	ACTIVE	

Numeric data are left-justified

A

Figure 8.8b Contrasting Two Pine Valley Furniture Forms — An Improved Design Form

Clear and separate column labels for each data type

Pine Valley Furniture

Page: 2 of 2

Today: 11-OCT-03

Pine Valley Furniture

Detail Customer Account Information

Customer Number: 1273

Name: Contemporary Designs

DATE	PURCHASE	PAYMENT	CURRENT BALANCE
01-Jan-03			0.00
21-Jan-03	(22,000.00)		(22,000.00)
21-Jan-03		13,000.00	(9,000.00)
02-Mar-03	(16,000.00)		(25,000.00)
02-Mar-03		15,500.00	(9,500.00)
23-May-03		5,000.00	(4,500.00)
12-Jul-03	(9,285.00)		(13,785.00)
12-Jul-03		3,785.00	(10,000.00)
21-Jul-03		5,371.65	(4,628.35)
YTD-SUMMARY	**(47,285.00)**	**42,656.65**	**(4,628.35)**

Help | Prior Screen | Exit

Numeric data are right-justified

B

Figure 8.9 Tabular Report Illustrating Good Report Design Guidelines

Place meaningful labels on all columns and rows

Alphabetic text is left-justified

Use a meaningful title

Box the table data to improve the appearance of the table

Pine Valley Furniture

Salesperson Annual Summary Report, 2002

January 10, 2003 Page 1 of 2

Region	Salesperson	SSN	*Quarterly Actual Sales* First	Second	Third	Fourth
Northwest & Mountain						
	Baker	999-99-9999	195,000	146,000	133,000	120,000
	Hawthorne	999-99-9999	220,000	175,000	213,000	198,000
	Hodges	999-99-9999	110,000	95,000	170,000	120,000
Midwest & Mid-Atlantic						
	Franklin	999-99-9999	110,000	120,000	170,000	90,000
	Stephenson[1]	999-99-9999	75,000	66,000	80,000	80,000
	Swenson	999-99-9999	110,000	98,000	100,000	90,000
New England						
	Brightman	999-99-9999	250,000	280,000	260,000	330,000
	Kennedy	999-99-9999	310,000	190,000	270,000	280,000

1. Sales reflect May 1, 2002 – December 31, 2002.

Superscript characters can be used to alert reader of more detailed information

Sort columns in some meaningful order (names are sorted alphabetically within region)

Long sequence of alphanumeric data is grouped into smaller segments

Right-justify all numeric data

Try to fit table onto a single page to help in making comparisons

Designing Interfaces and Dialogues

Focus on how information is provided to and captured from users
Dialogues are analogous to a conversation between two people
A good human-computer interface provides a unifying structure for finding, viewing and invoking the different components of a system

The Process of Designing Interfaces and Dialogues

- User-focused activity
- Parallels form and report design process
- Employs prototyping methodology
  - Collect information
  - Construct prototype
  - Assess usability
  - Make refinements

The Process of Designing Interfaces and Dialogues

- Deliverables
  - Design Specifications
    - Narrative
    - Sample Design
    - Testing and usability assessment

Designing Interfaces

Designing Layouts

- Standard formats similar to paper-based forms and reports should be used
- Screen navigation on data entry screens should be left-to-right, top-to-bottom as on paper forms

Designing Layouts

Flexibility and consistency are primary design goals

- Users should be able to move freely between fields
- Data should not be permanently saved until the user explicitly requests this
- Each key and command should be assigned to one function

Structuring Data Entry

Entry	Never require data that are already online or that can be computed
Defaults	Always provide default values when appropriate
Units	Make clear the type of data units requested for entry
Replacement	Use character replacement when appropriate
Captioning	Always place a caption adjacent to fields
Format	Provide formatting examples
Justify	Automatically justify data entries
Help	Provide context-sensitive help when appropriate

Controlling Data Input

One objective of interface design is to reduce data entry errors
Role of systems analyst is to anticipate user errors and design features into the system's interfaces to avoid, detect, and correct data entry mistakes
Table 8-9 describes types of data entry errors
Table 8-10 lists techniques used by system designers to detect errors

Table 8.9 Types of Data Errors

Data Error	Description
Appending	Adding additional characters to a field
Truncating	Losing characters from a field
Transcripting	Entering invalid data into a field
Transposing	Reversing the sequence of one or more characters in a field

Table 8.10 Techniques Used by Systems Designers to Detect Data Errors before Saving or Transmission

Validation Test	Description
Class or composition	Test to assure that data are of proper type (e.g., all numeric, all alphabetic, alphanumeric)
Combinations	Test to see if the value combinations of two or more data fields are appropriate or make sense (e.g., does the quantity sold make sense given the type of product?)
Expected values	Test to see if data are what is expected (e.g., match with existing customer names, payment amount, etc.)
Missing data	Test for existence of data items in all fields of a record (e.g., is there a quantity field on each line item of a customer order?)
Pictures/templates	Test to assure that data conform to a standard format (e.g., are hyphens in the right places for a student ID number?)
Range	Test to assure data are within a proper range of values (e.g., is a student's grade point average between 0 and 4.0?)
Reasonableness	Test to assure data are reasonable for situation (e.g., pay rate for a specific type of employee)
Self-checking digits	Test where an extra digit is added to a numeric field in which its value is derived using a standard formula (see Figure 8-15)
Size	Test for too few or too many characters (e.g., is social security number exactly nine digits?)
Values	Test to make sure values come from a set of standard values (e.g., two-letter state codes)

Providing Feedback

1. Status Information
   - Keeps users informed of what is going on in system
   - Displaying status information is especially important if the operation takes longer than a second or two
2. Prompting Cues
   - Best to keep as specific as possible
3. Error and Warning Messages
   - Messages should be specific and free of error codes and jargon
   - User should be guided toward a result rather than scolded
   - Use terms familiar to user
   - Be consistent in format and placement of messages

Providing Help

Place yourself in user's place when designing help

Guidelines

- Simplicity
  - Help messages should be short and to the point
- Organization
  - Information in help messages should be easily absorbed by users
- Demonstrate
  - It is useful to explicitly show users how to perform an operation

Providing Help

Context-Sensitive Help

- Enables user to get field-specific help

  Users should always be returned to where they were when requesting help

Designing Dialogues

- Dialogue
  - Sequence in which information is displayed to and obtained from a user
    - Primary design guideline is consistency in sequence of actions, keystrokes, and terminology
    - Three-step process
      1. Design dialogue sequence
      2. Build a prototype
      3. Assess usability

Designing the Dialogue Sequence

Define the sequence

Have a clear understanding of the user, task, technological and environmental characteristics

Dialogue Diagram

- A formal method for designing and representing human-computer dialogues using box and line diagrams
- Consists of a box with three sections
  1. Top: Unique display reference number used by other displays for referencing dialogue
  2. Middle: Contains the name or description of the display
  3. Bottom: Contains display reference numbers that can be accessed from the current display

Figure 8.18 A dialogue diagramming box has three sections.

Designing Dialogues: Building Prototypes and Assessing Usability

- Often optional activities
- Task is simplified by using graphical design environment

Figure 8.20 Dialogue Diagram for the Customer Information System at Pine Valley Furniture

Electronic Commerce Application: Designing the Human Interface at Pine Valley Furniture

Design Guidelines

- Navigation via cookie crumbs
  - A technique that uses a series of tabs on a Web page to show users where they are and where they have been in the site
  - Tabs are hyperlinks to allow users to move backward easily within the site
  - Two important purposes
    - Allows users to navigate to a point previously visited
    - Shows users where they have been and how far they have gone from point of entry into site

Electronic Commerce Application: Design Guidelines

Lightweight Graphics

- The use of small images to allow a Web page to be displayed more quickly

Forms and Data Integrity

- All forms that record information should be clearly labeled and provide room for input
- Clear examples of input should be provided to reduce data errors
- Site must clearly designate which fields are required, which are optional and which have a range of values

Electronic Commerce Application : Design Guidelines

- Template-based HTML
  - Templates to display and process common attributes of higher-level, more abstract items
  - Creates an interface that is very easy to maintain

Summary

- Designing Forms and Reports
- General guidelines for designing forms and reports
- Formatting text, tables and lists
- Design guidelines for interfaces
  - Layout design
  - Structuring data entry fields
  - Providing feedback
  - Designing help

Summary

- Human-Computer dialogue design
- Interface design guidelines unique to the Internet