Objectives of Designing interface and Dialogues

✓ **Explain the process of designing interfaces and dialogues** and the deliverables for their creation.

✓ **Contrast and apply several methods** for interacting with a system.

✓ **List and describe various input devices** and discuss usability issues for each in relation to performing different tasks.

✓ **Describe and apply** the general guidelines for designing interfaces and specific guidelines for layout design, structuring data entry fields, providing feedback, and system help.

✓ **Design human-computer dialogues** and understand how dialogue diagramming can be used to design dialogues.

✓ **Design graphical user interfaces**.

✓ **Discuss guidelines** for the design of interfaces and dialogues for Internet-based electronic commerce systems.

Designing Interfaces and Dialogues

1. **User-focused activity**
2. Prototyping methodology of iteratively:
   a. Collecting information
   b. Constructing a prototype
   c. Assessing usability
   d. Making refinements
3. Must answer the who, what, where, and how questions
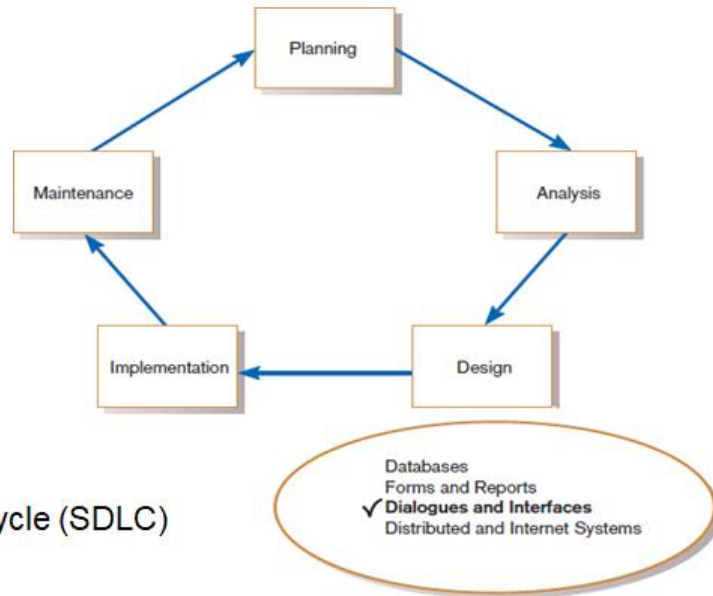
FIGURE 11-1
Systems development life cycle (SDLC)

Deliverables and Outcomes

Creation of a design specification

A typical interface/dialogue design specification is similar to form design, but includes **multiple forms and dialogue** sequence specifications.

- The specification includes:
    - Narrative(descriptive) overview
    - Sample design
    - Testing and usability assessment
    - Dialogue sequence

Dialogue sequence is the ways a user can move from one display to another.

Interaction Methods and Devices

Interface: a method by which users interact with an information system

All human-computer interfaces must:

   i. have an interaction style, and

   ii. use some hardware device(s) for supportingthis interaction.

Methods of Interacting

Command line Includes keyboard shortcuts and function keys

Menu

Form

Object-based

Natural language

Command language interaction

- **Command language interaction:** a human-computer interaction method whereby users enter explicit statements into a system to invoke operations

- Example from MS DOS:
  - ☐ COPY C:PAPER.DOC A:PAPER.DOC
  - ☐ Command copies a file from C: drive to A: drive

Menu Interaction

- **Menu interaction**: a human-computer interaction method in which a list of system options is provided and a specific command is   invoked by user selection of a menu option

- **Pop-up menu**: a menu-positioning method that places a menu near the current cursor position.

- **Drop-down menu** is a menu-positioning method that places the access point of the   menu near the top line of the display.
  - ☐ When accessed, menus open by droppingdown onto the display.
  - ☐ Visual editing tools help designers construct menus.

■ Guidelines for Menu Design

☐ **Wording** — meaningful titles, clear command   verbs, mixed upper/lower case

☐ **Organization** — consistent organizing principle

☐ **Length** — all choices fit within screen length

☐ **Selection** — consistent, clear and easy selection   methods

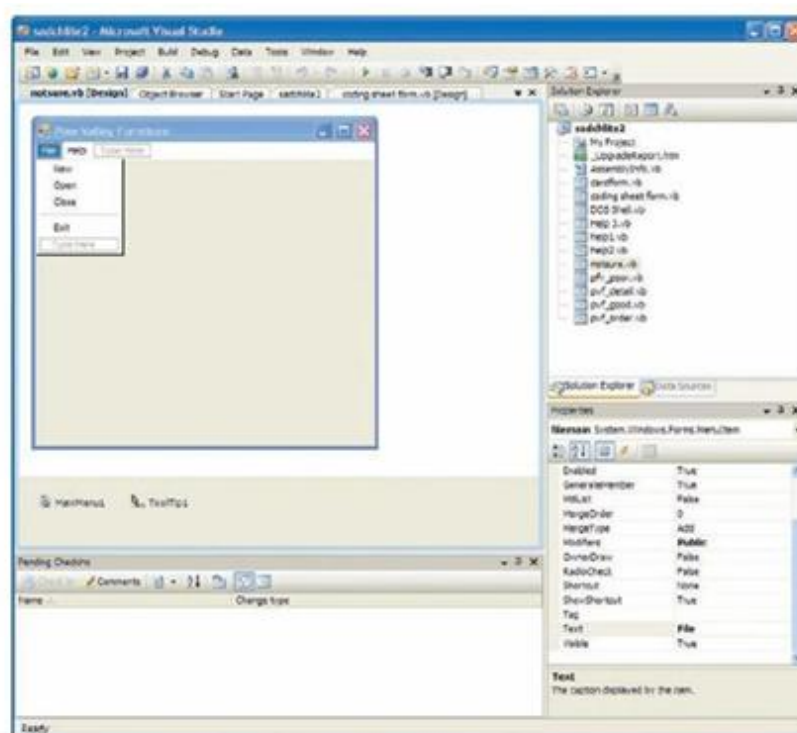☐ **Highlighting** — only for selected options or   unavailable options


FIGURE 11-8
Menu building with
Microsoft Visual Basic
.NET

Form interaction

■ **Form interaction**: a highly intuitive human-computer interaction method whereby data fields are formatted in a manner similar to paper-based forms

☐ Allows users to fill in the blanks when working   with a system.

FIGURE 11-9
Example of form interaction from the Google Advanced Search Engine (*Source: Google.*)
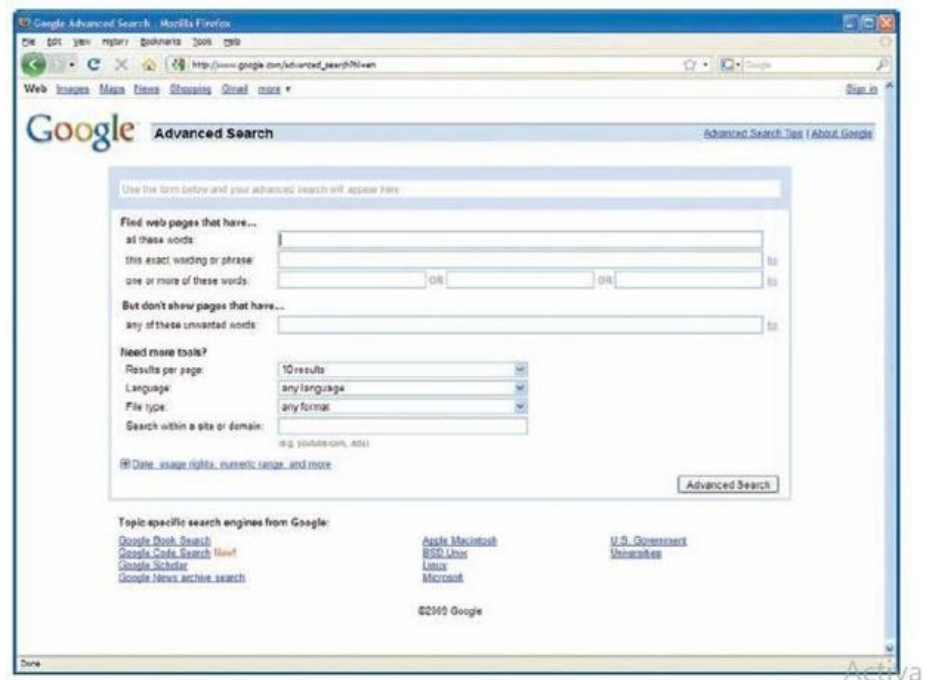
Object based interaction

- **Object-based interaction**: a human- computer interaction method in which symbols are used to represent commands or functions
- **Icons**: graphical pictures that represent   specific functions within a system
    ☐ Use little screen space and are easilyunderstood by users

FIGURE 11-10
Object-based (icon) interface from Microsoft Visual Basic .NET
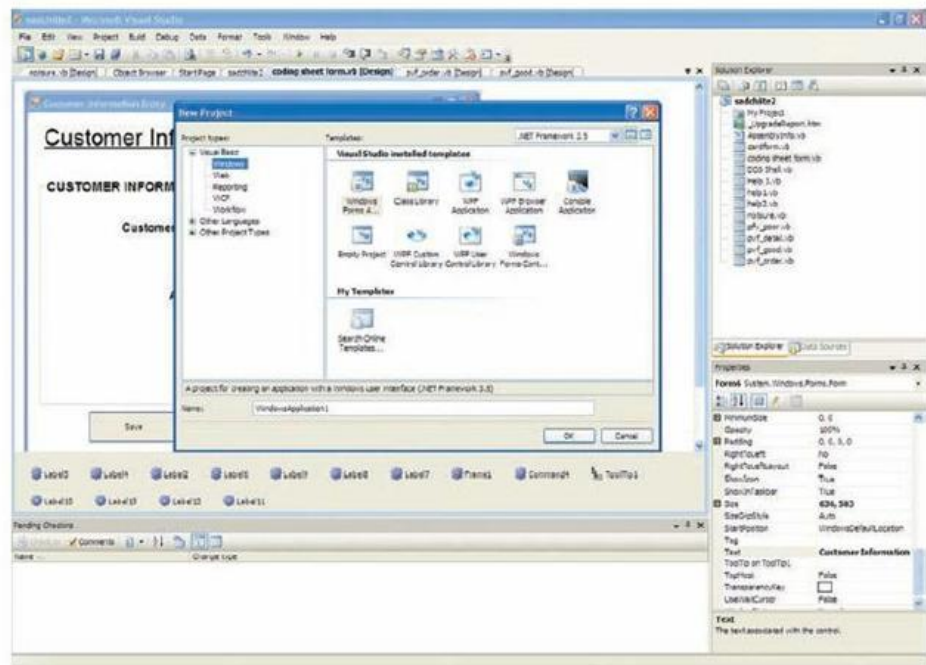
Natural Language interaction

- **Natural language interaction**: a human- computer interaction method where by inputs to and outputs from a computer-based application are in a conventional spoken language such as English
- Based on research in artificial intelligence.
- Current implementations are tedious and difficult to work with, not as viable as other interaction methods.

Usability problem with hardware devices

- Visual Blocking
  - □ touch screen, light pen
- User Fatigue
  - □ touch screen, light pen
- Movement Scaling
  - □ keyboard, mouse, joystick, trackball, graphics tablet, voice
- Durability
  - □ trackball, touch screen
- Adequate Feedback
  - □ keyboard, mouse, joystick, trackball, graphics tablet, voice
- Speed
  - □ keyboard
- Pointing Accuracy
  - □ joystick, touch screen, lightpen, voice

TABLE 11-4 Summary of General Conclusions from Experimental Comparisons of Input Devices in Relation to Specific Task Activities

Task	Most Accurate	Shortest Positioning	Most Preferred
Target Selection	trackball, graphics tablet, mouse, joystick	touch screen, light pen, mouse, graphics tablet, trackball	touch screen, light pen
Text Selection	mouse	mouse	—
Data Entry	light pen	light pen	—
Cursor Positioning	—	light pen	—
Text Correction	light pen, cursor keys	light pen	light pen
Menu Selection	touch screen	—	keyboard, touch screen

(*Source:* Based on Blattner & Schultz, 1988.)
Key:
    Target Selection = moving the cursor to select a figure or item
    Text Selection = moving the cursor to select a block of text
    Data Entry = entering information of any type into a system
    Cursor Positioning = moving the cursor to a specific position
    Text Correction = moving the cursor to a location to make a text correction
    Menu Selection = activating a menu item
    — = no clear conclusion from the research

Designing Interfaces

- Forms have several general areas in   common :
  - ☐ Header information
  - ☐ Sequence and time-related information
  - ☐ Instruction or formatting information
  - ☐ Body or data details
  - ☐ Totals or data summary
  - ☐ Authorization or signatures
  - ☐ Comments

  - Use standard formats similar to paper- based forms and reports.
  - Use left-to-right, top-to-bottom navigation.

- Flexibility and consistency:
  - ☐ Free movement between fields
  - ☐ No permanent data storage until the user requests
  - ☐ Each key and command 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

Objective: Reduce data entry errors

Common sources data entry errors in a field:

Appending: adding additional characters

Truncating: losing characters

Transcripting: entering invalid data

Transposing: reversing   sequence   of   characters

Providing Feedback

The three types of system feedback are :

Status information: keep user informed of what's going on, helpful when user has to   wait   for response.

Prompting cues : tell user when input is needed, and how to provide the input.

Error or warning messages: inform user that   something is wrong, either with data entry or system operation.

Providing Help

Place yourself in user's place when designing help.

Guidelines for designing usable help:

 Simplicity — Help messages should be short   and to the point.

 Organize — Information in help messagesshould be easily absorbed by users.

Show — It is useful to explicitly show users   how to perform an operation.

Designing Dialogues

Dialogues: the sequence of interaction between a user and a system

Dialogue design involves:

Designing a dialogue sequence.

Building a prototype and Assessing usability.

Designing the Dialogue sequence

Typical dialogue between user and Customer Information System:

Request to view individual customer information.

Specify the customer of interest.

Select the year-to-date transaction summarydisplay.

Review the customer information.

Leave system.

Dialogue diagramming: a formal methodfor designing and representing human- computer dialogues using box and line diagrams

Three sections of the box are used as:

Top contains a unique display reference number used by other displays for referencing it.
Middle contains the name or description of the display.
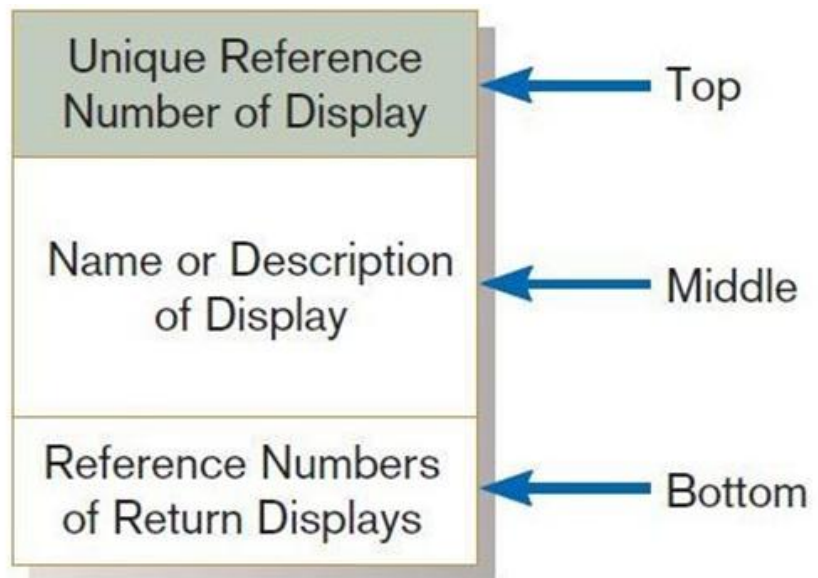*Bottom* contains display reference numbers thatcan be accessed from the current display.

FIGURE 11-17
Sections of a dialogue diagramming box

Dialogue diagrams depict the sequence,conditional branching, and repetition of dialogues.
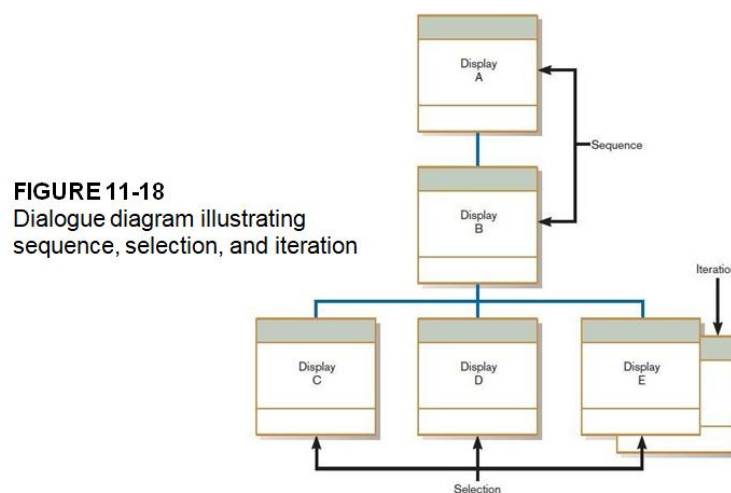

FIGURE 11-18
Dialogue diagram illustrating sequence, selection, and iteration

Building Prototypes and Accessing Usability

Optional activities

Building prototypes displays using a   graphical development

environment

 Microsoft's Visual Studio .NET

 Borland's Enterprise Studio

 Easy-to-use input and output (form, report, orwindow) design utilities

Graphical Interface Design Issues

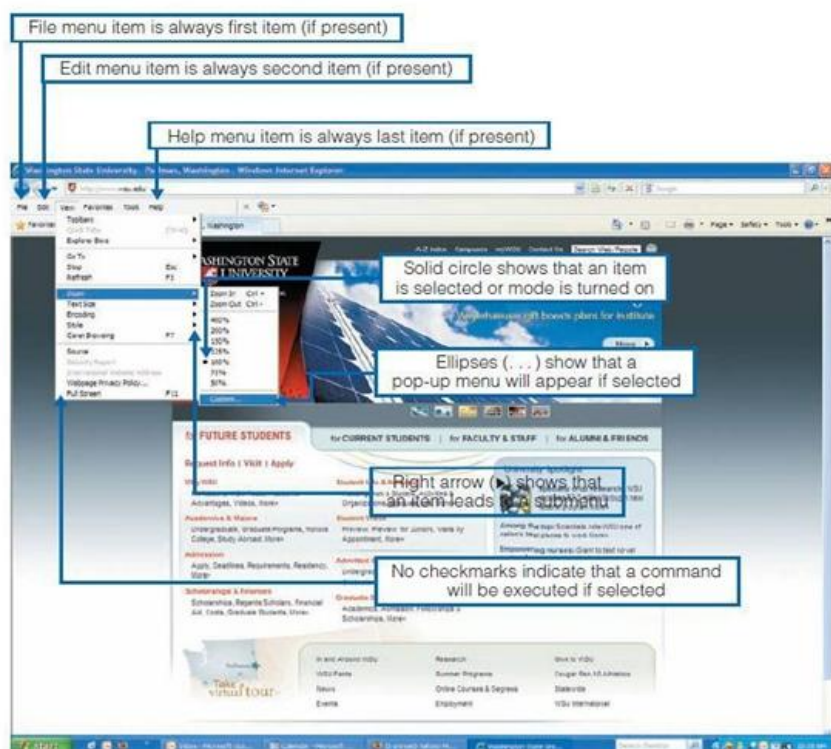### Become an expert user of the GUI environment.

 Understand how other applications have been designed.

 Understand standards.

Gain an understanding of the availableresources and how they can be used.

 Become familiar with standards for menus and forms.

FIGURE 11-20
Highlighting graphical user interface design standards

Electronic Commerce Application:

Designing Interfaces and Dialogues for Pine Valley Furniture Web Store

- Central and critical design activity
- Where customer interacts with the company
  - ☐ Care must be put it design!
- Prototyping design process is most appropriate to design the human interface.

Several general design guidelines haveemerged.

General Guidelines

- Web's single "click-to-act" method of loading static hypertext documents (i.e. most buttons on the Web do not provideclick feedback).

- Limited capabilities of most Web browsersto support finely grained user interactivity.

- Limited agreed-upon standards for encoding Web content and controlmechanisms.

Lack of maturity of Web scripting and programming languages as well as limitations in commonly used Web GUI   component libraries.

Designing Interfaces and Dialogues for Pine Valley Furniture

- Key feature PVF wants for their Web Storeis:
  - □ To incorporate into design an interface with "menu-driven navigation with cookie crumbs".

Menu-Driven Navigation with Cookie Crumbs

- **Cookie crumbs**: the technique of placing"tabs" on a Web page that show a user where he or she is on a site and where he or she has been

□ Allow users to navigate to a point previouslyvisited and will assure they are not lost.

□ Clearly show users where they have been   and how far they have gone from home.

Summary

- ✓ Explain the process of designing interfaces and dialogues and the deliverables for their creation.
- ✓ Contrast and apply several methods for interacting witha system.
- ✓ List and describe various input devices and discussusability issues for each in relation to performing different tasks.
- ✓ Describe and apply the general guidelines for designinginterfaces and specific guidelines for layout design, structuring data entry fields, providing feedback, and system help.

- ✓ Design human-computer dialogues and understandhow dialogue diagramming can be used to design dialogues.
- ✓ Design graphical user interfaces.
- ✓ Discuss guidelines for the design of interfaces anddialogues for Internet-based electronic commerce systems.