Universitas Esa Unggul

Smart, Creative and Entrepreneurial

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Prodi Teknik Informatika dan Sistem Informasi - Fakultas Ilmu Komputer

Chapter 14
Designing User Interfaces

Systems Analysis and Design

Kendall & Kendall

Sixth Edition

Major Topics

- User interfaces
- Dialogue guidelines
- Feedback
- Help
- Ecommerce dialogue
- Data mining
- Ergonomics

The User Interface

The user interface is the system that helps users communicate with the computer system and/or the application system

User Interface Design Objectives

To design a better user interface, use the following objectives:

- Match the user interface to the task.
- Make the user interface efficient.
- Provide appropriate feedback to users.
- Generate usable queries.
- Improve productivity of knowledge workers.

Components of the User Interface

The user interface has two main components:

- Presentation language, which is the computer-to-human part of the transaction.
- Action language that characterizes the human-to-computer portion.

Types of User Interfaces

There are several types of user interfaces:

- Natural-language interfaces.
- Question-and-answer interfaces.
- A menu interface.
- Form-fill interfaces.
- Command-language interfaces.
- Graphical User Interfaces (GUIs).

Natural-Language Interfaces

Natural-language interfaces permit users to interact with the computer in their everyday or "natural" language.

Question-and-Answer Interfaces

- The computer displays a question for the user on the screen.
- The user enters an answer via the keyboard or a mouse click.
- The computer acts on that input information in a preprogrammed manner.
- New users may find the question-and-answer interface most comfortable.

A Menu Interface

- A menu interface, that provides the user with an onscreen list of available selections.
- A nested menu is a menu that can be reached through another menu.

Advantages of Nested Menus

The advantages of nested menus are:

- Less cluttered screen.
- Eliminate menu options which do not interest a user.
- Allow users to move quickly through the program.

Graphical User Interface (GUI) Menus

GUI menus guidelines:

- The main menu is always on the screen.
- The main menu uses single words.
- The main menu should have secondary menus grouped into similar features.

Graphical User Interface (GUI) Menus

GUI menus guidelines (continued):

- The secondary drop-down menus often consist of more than one word.
- Secondary options perform actions or display additional menu options.
- Menu items in grey are unavailable for the current activity.

Form-Fill Interfaces

- Form-fill interfaces are onscreen forms displaying fields containing data items or parameters that need to be communicated to the user.
- Form-fill interfaces may be implemented using the Web.

Advantages and Disadvantages of Web Forms

- Advantages of using a Web-based form are:
  - User enters the data.
  - Data may be entered 24 hours a day, globally.
- Disadvantages of a Web-based form are:
  - The experienced user may become impatient with input/output forms.

Command-Language Interfaces

- Allow the user to control the application with a series of keystrokes, commands, phrases, or some sequence of these.
- Require memorization of syntax rules.
- May be an obstacle for inexperienced users.

Graphical User Interfaces (GUIs)

Allow direct manipulation of the graphical representation on the screen.

- Can be accomplished with keyboard input, joystick, or mouse.
- Requires more system sophistication than other interfaces.

Voice or Speech Recognition

- Voice or speech recognition systems are developing rapidly
- There are two different types of voice recognition:
  - Continuous speech systems, allowing for dictation.
  - Speaker independence, so people can enter commands or words at a given workstation.

Evaluating User Interfaces

The five useful standards in evaluating the interfaces are:

- The training period for users should be acceptably short.
- Users early in their training should be able to enter commands without thinking about them, or referring to a help menu or manual.

Evaluating User Interfaces

The five useful standards in evaluating the interfaces are (continued):

- The interface should be seamless so that errors are few, and those that do occur are not occurring because of poor design.
- Time necessary for users and the system to bounce back from errors should be short.
- Infrequent users should be able to relearn the system quickly.

Dialog

- Dialog is the communication between a person and the computer
- Three key points to be considered are:
  - Meaningful communication.
  - Minimal user action.
  - Standard operation and consistency.

Communication

- Communication means that the user understands the information that is being presented
- Users with less skill require a greater amount of communication
- Provide easy to use help screens
- Often these contain hyperlinks to other related help topics

Minimal User Action

Minimal user action is achieved by:

- Entering codes instead of code meanings.
- Enter only data that are not stored on files.
- Not requiring users to enter editing characters.
- Supplying default values on entry screens.
- Providing inquiry, change, or delete programs with short entry fields.

Minimal User Action

Minimal user action is achieved by:

- Providing keystrokes for selecting menu options that are normally selected using a mouse
- Selecting codes from a pull-down menu on a GUI screen

Standard Operation

Standard operation is achieved by:

- Keeping header and footer information in the same locations for all screens.
- Using the same keystrokes to exit a program.
- Using the same keystroke to cancel a transaction.
- Using a standard key for obtaining help.

Standard Operation

- Standard operation is achieved by (continued):
  - Standardized use of icons when using graphical user interface screens.
  - Consistent use of terminology within a screen or Web site.
  - Providing a consistent way to navigate through the dialog.
  - Consistent font alignment, size, and color on a Web page.

Tab Control Dialogue Boxes

- Tab control dialog boxes are a feature of GUI design.
- They should have logically grouped functions on each tab.
- Each tab dialog box should have OK, Cancel or Apply, and perhaps Help buttons.

Feedback

All systems require feedback in order to monitor and change behavior by:

- Comparing current behavior with predetermined goals.
- Giving back information describing the gap between actual and intended performance.

Types of Feedback

Feedback to the user is necessary in seven distinct situations:

- The computer has accepted the input.
- The input is in the correct form.
- The input is not in the correct form.
- There will be a delay in processing.
- The request has been completed.
- The computer cannot complete the request.
- More detailed feedback is available.

Program Help

Program help comes in a variety of ways:

- Pressing a function key, such as F1.
- A GUI pull-down menu.
- Context-sensitive help, specific for the operation being performed.
- Iconic help, obtained when a cursor is left over an icon for a few seconds.

Program Help

Program help comes in a variety of ways (continued):

- Wizards, which provide a series of questions and answers when trying to perform an operation
- Telephone help desks provided by the software manufacturer
- Software forums on nation wide bulletin boards

Ecommerce Dialog

- Extra considerations are needed when developing ecommerce Web sites.
- Feedback needs to be solicited from customers, using either of two methods:
  - Launch the user's email program.
  - Create a blank feedback template with a submit button labeled "feedback".

Intuitive Navigation for Ecommerce Sites

Intuitive navigation should be designed for:

- Creating a rollover menu.
- Building a collection of hierarchical links.
- Placing a site map on the home page and emphasizing the link to it from every page on the site.
- Placing a navigational bar on every inside page that repeats the categories used on the entry screen.

Types of Queries

- The six different types of queries are :
  - Obtain specified data for a particular entity.
  - Find a group of entities that have certain characteristics.
  - Find attributes for an entity for certain characteristics.
  - Display all the attributes for a certain entity.

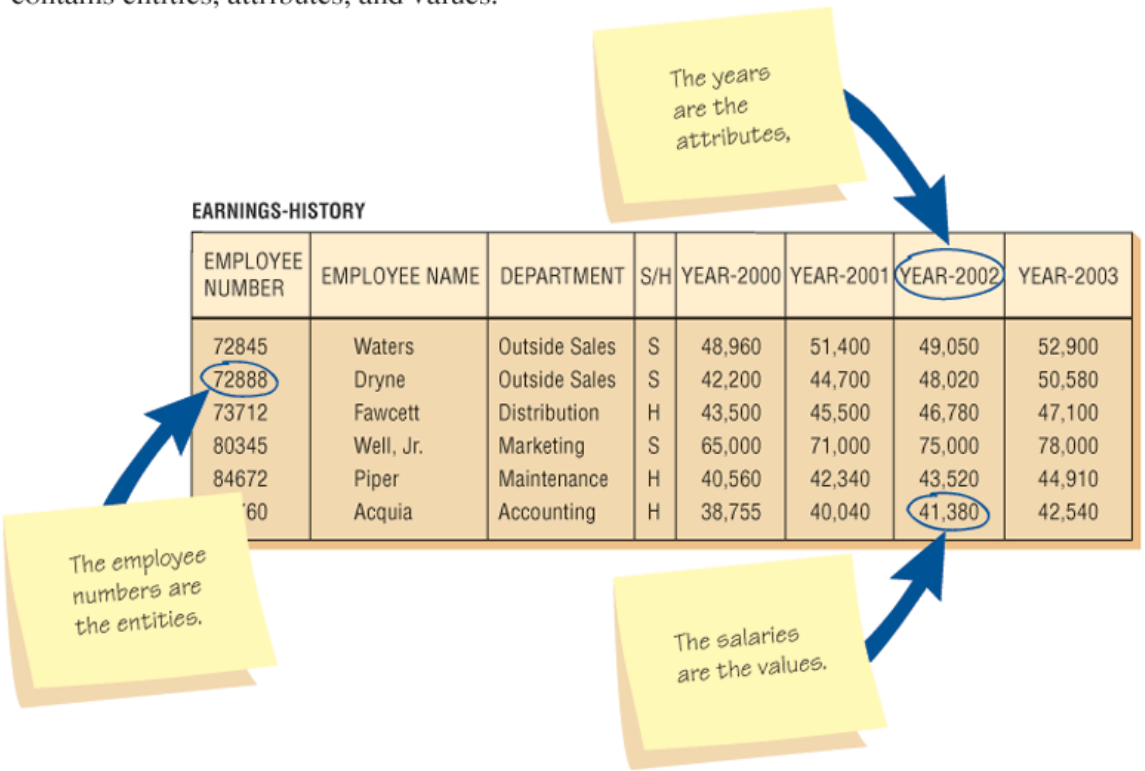
Types of Queries

The different types of queries are (continued):

- Find all entities with a certain characteristic.
- List attributes for all entities for certain characteristics.

Entities, Attributes, and Values

Figure 14.12 It is possible to perform six basic types of queries on a table that contains entities, attributes, and values.



Query Notation

V is value, E is entity, A is attributes, variables in parentheses are given:

- Query type 1: V <--- (E,A)
- Query type 2: E <--- (V,A)
- Query type 3: A <--- (V,E)
- Query type 4: V <--- (E, all A)
- Query type 5: E <--- (V, all A)
- Query type 6: A <--- (V, all E)

Methods for Implementing Queries

There are two methods for implementing database queries:

- Query By Example (QBE), which allows users to select fields and specify conditions using a grid.
- Structured Query Language (SQL), which uses a series of keywords and commands to select the rows and columns that should be displayed.

SQL Example

Figure 14.20 Structured Query Language commands for the CUSTOMER STATUS query.

```
SELECT DISTINCTROW
          Customer.[Customer Number],
          Customer.[Customer Name],
          [Account Status Codes].[Status Code Meaning],
          [Account Type Codes].[Type Code Meaning],
          Customer.City,
          Customer.Telephone
  FROM [Account Type Codes]
  INNER JOIN ([Account Status Codes]
  INNER JOIN Customer
  ON [Account Status Codes].[Account Status Code]
        = Customer.[Account Status Code])
  ON [Account Type Codes].[Account Type Code]
        = Customer.[Account Type Code]
  WHERE (((Customer.[Account Status Code])="1")
        AND ((Customer.[Account Type Code])="C"))
        OR
          (((Customer.[Account Status Code])="1")
        AND ((Customer.[Account Type Code])="D"))
  ORDER BY Customer.[Customer Name];
```

Parameter Queries

A parameter query allows users to enter a value to select records without changing the query syntax.

Web Searches

- Web searches uses search engines to answer a query.
- Guidelines for searching the Web are:
  - Decide whether to search or surf the Web.
  - Think of the key terms before searching.
  - Construct the search questions logically, with attention to the use of AND and OR search logic.

Web Searches

Guidelines for searching the Web are (continued):

- Use a metasearch engine that saves your searches
- Use a search engine that informs you of changes in the Web sites you select
- Look for new search engines periodically

Data Mining

- Data mining is gathering a large amount of information about a person and their habits and using that information as a predictor of future behavior.
- It must be carefully and ethically used to avoid infringing on an individual's privacy.

Data Mining

Figure 14.21 Data mining collects personal information about customers in an effort to be more specific in interpreting and anticipating their preferences.