



FORMS DESIGNING THE HUMAN INTERFACE

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92-1



Learning Objectives

- ✓ 1. Explain the process and deliverables of designing forms and reports
- ✓ 2. Discuss general design guidelines for forms and reports: highlighting, formatting text, tables and lists
- ✓ 3. Explain the process and deliverables of designing interfaces and dialogues
- ✓ 4. Discuss the general guidelines for interface design and dialogues
- ✓ 5. Explain interface design guidelines unique to the design of e-commerce systems



تعريف

➤ 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
- Most effective method of online data entry is form filling



Management Information Systems

Forms

Figure 11-2 The layout of a data input form using a coding sheet

SYSTEM																														
PROGRAM					Customer Information Entry																									
PROGRAMMER										STAN										DATE										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
												CUSTOMER INFORMATION																		

												CUSTOMER NUMBER :																		
												NAME :																		
												ADDRESS :																		
												CITY :																		
												STATE :																		
												ZIP :																		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

A coding sheet is an “old” tool for designing forms and reports, usually associated with text-based forms and reports for mainframe applications.



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Forms

Figure 11-3

A data input screen designed in Microsoft's Visual Basic .NET

Customer Information Entry

Customer Information Today: 11-OCT-05

CUSTOMER INFORMATION

Customer Number: 1273

Name: Contemporary Designs

Address: 123 Oak Street

City: Austin

State: TX

Zip: 28384

Save Help Exit

Visual Basic and other development tools provide form and report generation.



The Process of Designing Forms and Reports

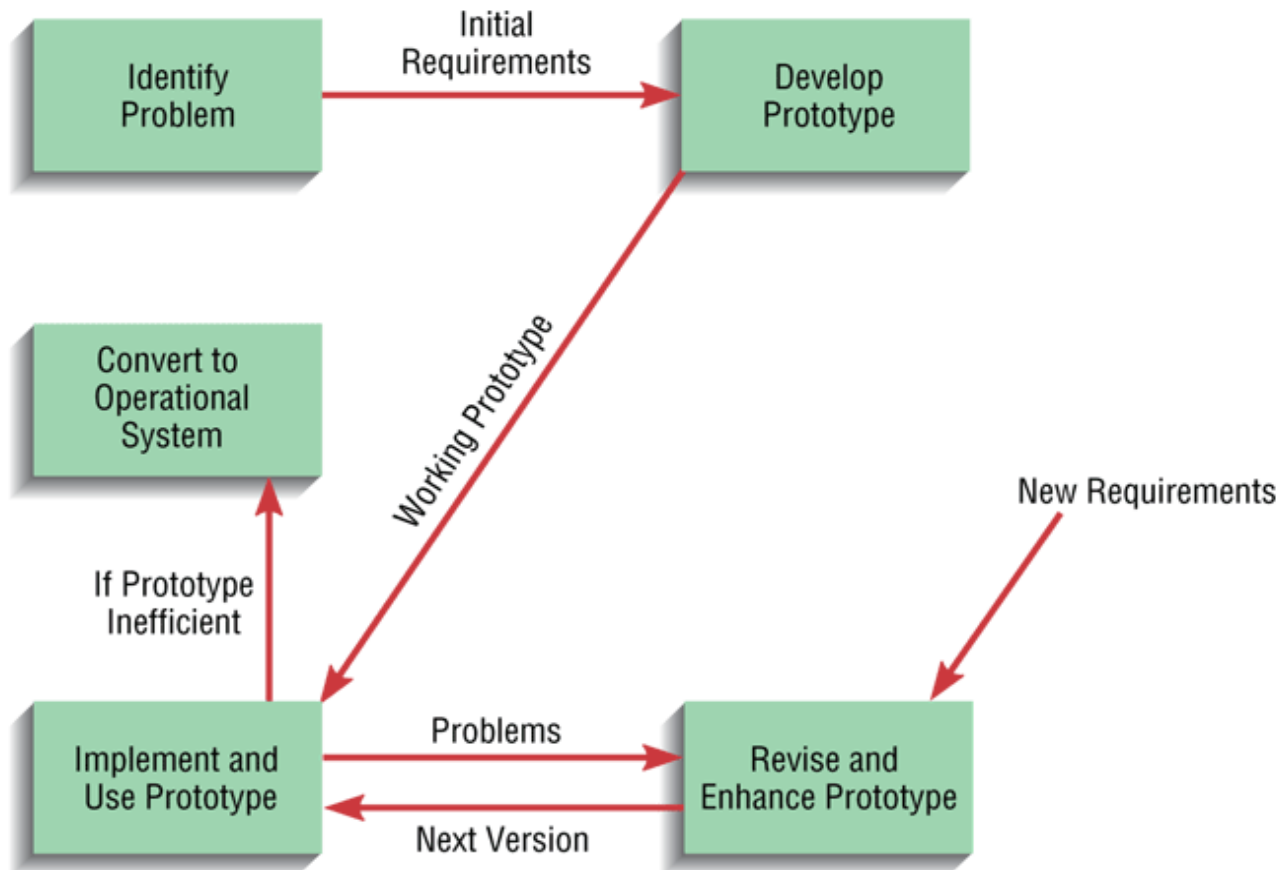
- **Follows a prototyping approach**
 - Initial prototype is designed from requirements
 - Users review prototype design and either accept the design or request changes
 - If changes are requested, the construction-evaluation-request cycle is repeated until the design is accepted



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Forms

Figure 1.16 The Prototyping Method



Source: Adapted from J. D. Naumann and A. M. Jenkins, "Prototyping: The New Paradigm for Systems Development," *MIS Quarterly* 6, no. 3 (1982): 29–44.



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?**



بررسی فرم های یک سیستم

- آیا تمام اقلام اطلاعاتی فرم ها لازم است؟
- آیا اطلاعاتی وجود دارد که در فرم وجود ندارد ولی ثبت و انتقال آنها لازم باشد؟
- آیا دو فرم را می توان در هم ادغام نمود؟
- آیا اصولا وجود فرم لازم است؟
- آیا تعداد نسخ فرم مناسب است؟



اصول اساسی طراحی فرم ها

• کاهش مقدار ورودی

– هدف:

- داده ها با کمترین زمان وارد شود

– رویکرد:

- اسکنر
- داده ها قبلی
- مقادیر پیش فرض



اصول اساسی طراحی فرم ها

• جلوگیری از ورود اشتباه / خطا

– هدف:

- داده ها به طور صحیح وارد شود
- امنیت سیستم

– رویکرد:

- کدهای کنترلی
- استفاده از واسطه ها
- جلوگیری از دسترسی افراد غیر مسئول به اطلاعات

– کلمه عبور و شماره شناسایی، صدا، اثر انگشت

– سطوح دسترسی



Management Information Systems

Forms

Structuring Data Entry

Entry	Never require data that are already online or that can be computed دست نوشته ها حداقل شود
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

• ورود داده ها باید طبق یک توالی منطقی باشد به طوری که مانند کتاب چیدمان آن از بالا به پایین و از راست (چپ) به چپ (راست) باشد.



Structuring Data Entry

- **کاربر سیستم باید همیشه نسبت به اقدام بعدی آگاه شود.**
 - به کاربر بگویید در حال حاضر سیستم دقیقاً چه انتظاری دارد.
 - به کاربر بگویید که داده ها به درستی وارد شده اند.
 - به کاربر بگویید که داده ها به درستی وارد نشده اند.
 - برای تاخیر در پردازش دلیل را به کاربر توضیح دهید
 - به کاربر بگویید که فعالیت تکمیل شده یا در حال انجام است.
- **صفحه باید به گونه ای فرمت دهی شود که اطلاعات، توضیحات و پیامهای مختلف همیشه در فضای مناسبی از صفحه ظاهر شوند. پیامها، اطلاعات و توضیحات باید به مدی در صفحه باقی بماند یا سرعت حرکت آن کند باشد که کاربر بتواند آن را کامل مطالعه کند.**
- **مشخصه های نمایش باید فاصله و مفید باشند**
- **مقادیر از پیش تعریف شده فیلدها و فیلدهایی که متما باید توسط کاربر وارد شوند باید مشخص شوند.**
- **فطاهای ممکن کاربر را پیش بینی کنید**
- **در فصوص هر فطا تا زمانی که فطا رفع نشده کاربر نباید بتواند ادامه کار دهد. اگر کاربر اقدامی انجام می دهد که ممکن است فاجعه به بار آورد باید کیبورد قفل شده و الارم لازم به کاربر داده شود.**



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Forms

Table 8.8 Display Design Options for Entering Text

Options

Line caption

Drop caption

Boxed caption

Delimited characters

Check-off boxes

Example

Phone Number () -

() -
Phone Number

Phone Number

(| | |) | | | - | | | |
Phone Number

Method of payment (check one)

Check

Cash

Credit card: Type



Management Information Systems

Forms

جریان نامناسب در فرم ورود اطلاعات

The screenshot shows a web form titled "Bad Entry Layout" with a window title bar containing standard OS controls. The form is divided into two main sections: "Applicant Information:" and "Other Information:".

Applicant Information:

- Social Security #:** A text input field.
- Saluation:** A dropdown menu.
- Current Date:** A text input field with a calendar icon.
- First Name:** A text input field.
- Last Name:** A text input field.
- State:** A dropdown menu.
- Middle Name:** A text input field.
- Telephone:** A text input field.
- Zip Code:** A text input field.
- City:** A text input field.
- Address Line 1:** A text input field.
- Address Line 2:** A text input field.

Other Information: A large, empty rectangular area.

Arrows indicate the flow of data entry from the "Applicant Information" fields to the "Other Information" area, highlighting a poor layout where fields are not clearly grouped or labeled, leading to confusion.



Management Information Systems

Forms

جریان مناسب در فرم ورود اطلاعات

The screenshot shows a web form titled "Good Entry Layout" with a window title bar containing a minimize, maximize, and close button. The form is titled "Applicant Information:" and contains the following fields and controls:

- Social Security #: Text input field
- Saluation: Dropdown menu
- Current Date: Text input field with a calendar icon
- First Name: Text input field
- Middle Name: Text input field
- Last Name: Text input field
- Address Line 1: Text input field
- Telephone: Text input field
- Other Information: Large text area
- Address Line 2: Text input field
- City: Text input field
- State: Dropdown menu
- Zip Code: Text input field

Arrows indicate the flow of data entry: from top-left to top-right, then down to the middle row, then across to the right, then down to the bottom row, and finally across to the right. A vertical arrow points down from the City field to the bottom of the form.



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Figure 8.14b Contrasting the Navigation Flow within a Data Entry Form — Poor Flow between Data Entry Fields with Inconsistent Flow

The image shows a screenshot of a software window titled "Business Contact Cardfile". The window contains several data entry fields: "Last:", "First:", "MI:", "Address:" (two instances), "Country:", "Phone:", "Fax:", "E-mail:", and "Comments:". The "Comments:" field is a large text area with multiple lines. Black arrows indicate the navigation flow between these fields. The flow starts at the top row (Last, First, MI), moves down to the first "Address:" field, then to the second "Address:" field, then to "Country:", "Phone:", "Fax:", and "E-mail:". From "E-mail:", an arrow points to the "Comments:" field. From the "Comments:" field, an arrow points back to the "E-mail:" field. From the "E-mail:" field, an arrow points to the "Phone:" field. From the "Phone:" field, an arrow points to the "Country:" field. From the "Country:" field, an arrow points to the second "Address:" field. From the second "Address:" field, an arrow points to the "MI:" field. From the "MI:" field, an arrow points to the "First:" field. From the "First:" field, an arrow points to the "Last:" field. This flow is highly non-linear and inconsistent, jumping between fields in a way that does not follow a standard top-to-bottom or left-to-right sequence.



Management Information Systems

Forms

Figure 8.14a Contrasting the Navigation Flow within a Data Entry Form — Proper Flow between Data Entry Fields with a Consistent Left-to-Right, Top-to-Bottom Flow

The image shows a screenshot of a software window titled "Business Contact Cardfile". The window contains a data entry form with the following fields and navigation flow:

- Three input fields at the top: "Last:", "First:", and "MI:". Arrows indicate a flow from left to right across these three fields.
- Two "Address:" input fields. Arrows indicate a flow from the top "Address:" field down to the bottom "Address:" field.
- A "Country:" input field. An arrow indicates a flow from the bottom "Address:" field down to the "Country:" field.
- A "Phone:" input field. An arrow indicates a flow from the "Country:" field down to the "Phone:" field.
- A "Fax:" input field. An arrow indicates a flow from the "Phone:" field down to the "Fax:" field.
- An "E-mail:" input field. An arrow indicates a flow from the "Fax:" field down to the "E-mail:" field.
- A "Comments:" text area with four horizontal lines. An arrow indicates a flow from the "E-mail:" field down to the "Comments:" field.



Input Design

- You can also reduce errors by using well-designed data entry screens and by using data validation checks
- Input Errors
 - Reducing the number of input errors improves data quality
 - A data validation check improves input quality by testing the data and rejecting any entry that fails to meet specified conditions
- 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



Controlling Data Input

- **Table 8-9 describes types of data entry errors**
- **Table 8-10 lists techniques used by system designers to detect errors**



Controlling Data Input

Table 8.9 Types of Data Errors

Data Error	Description
Appending	Adding additional characters to a field
Truncating	Losing characters from a field
Transcribing	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)



پیغام خطا

- در صورت وجود خطا کاربر باید مطلع شود. این کار با پیغام خطا انجام می شود. پیغام ها باید شفاف و گویا باشند.

Table 8.11 Examples of Poor and Improved Error Messages

Poor Error Messages

ERROR 56 OPENING FILE

WRONG CHOICE

DATA ENTRY ERROR

FILE CREATION ERROR

Improved Error Messages

The file name you typed was not found. Press F2 to list valid file names.

Please enter an option from the menu.

The prior entry contains a value outside the range of acceptable values. Press F9 for list of acceptable values.

The file name you entered already exists. Press F10 if you want to overwrite it. Press F2 if you want to save it with a new name.



تهیه راهنما برای فرم ها

- Place yourself in user's place when designing help
- Users should always be returned to where they were when requesting help

Table 8.12 Guidelines for Designing System Help

Guideline	Explanation
Simplify	Use short, simple wording, common spelling, and complete sentences. Give users only what they need to know, with ability to find additional information.
Organize	Use lists to break information into manageable pieces.
Show	Provide examples of proper use and the outcomes of such use.



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Forms

Figure 8.16a Contrasting Help Screens — A Poorly Designed Help Screen

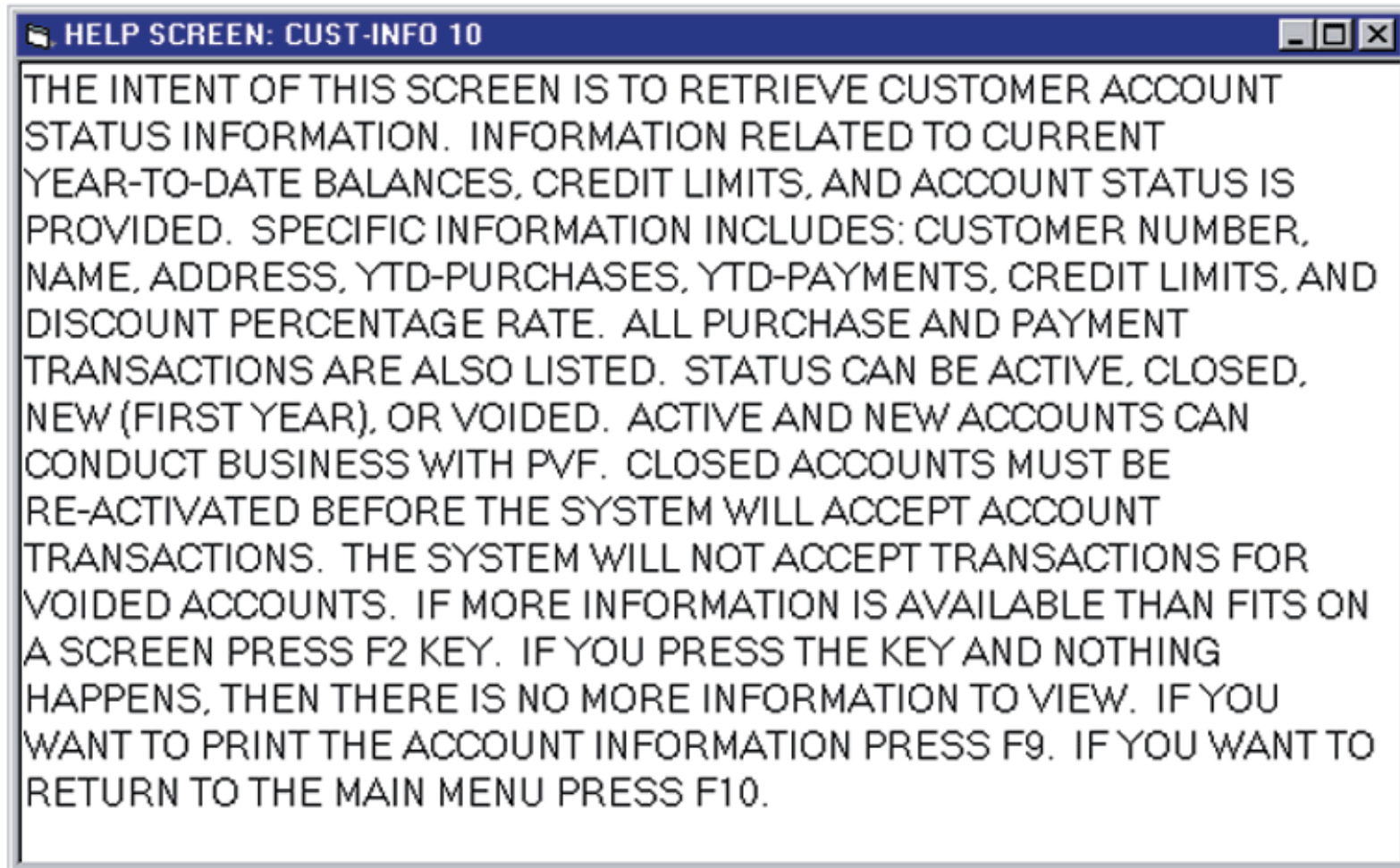
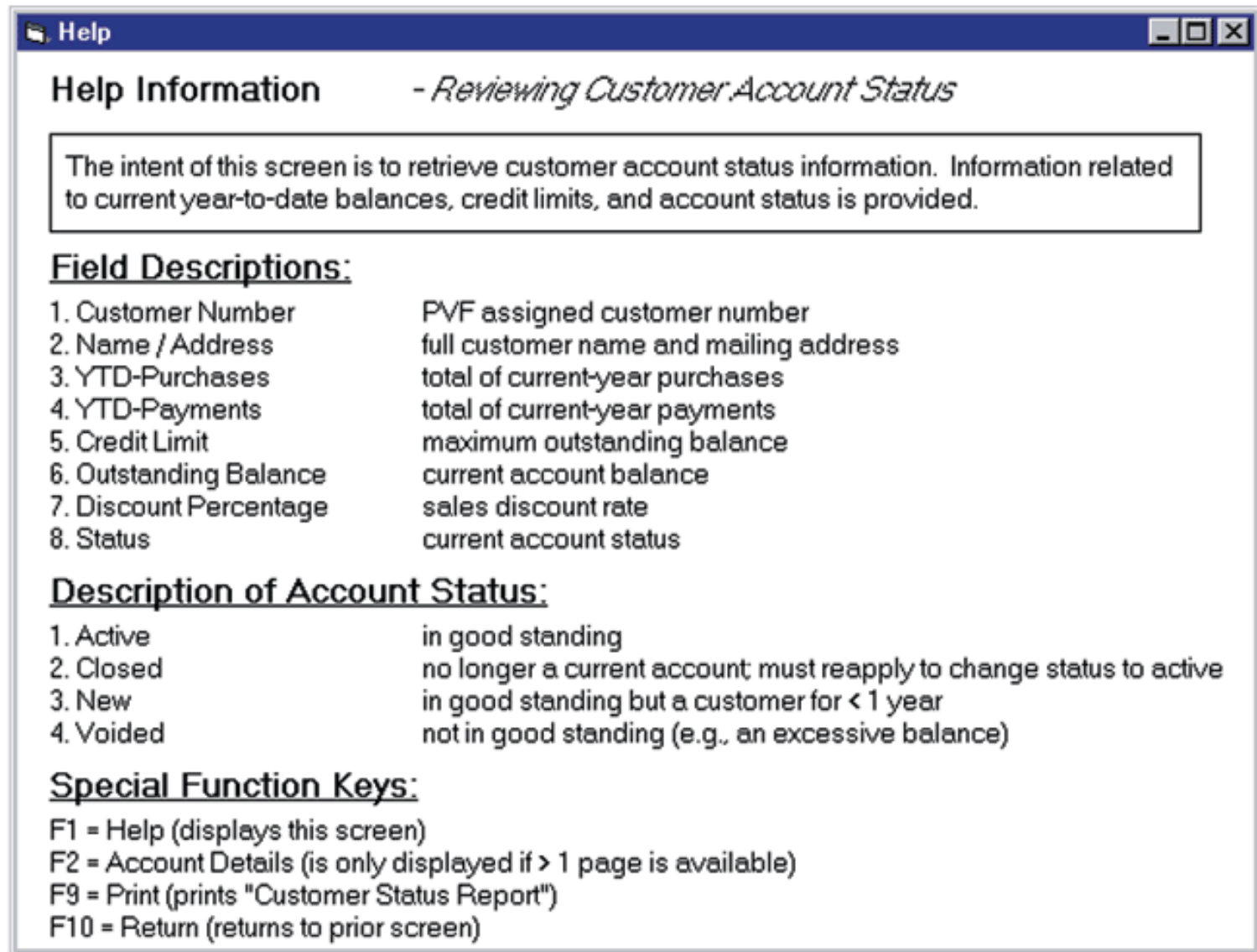


Figure 8.16b Contrasting Help Screens — An Improved Design for a Help Screen





نحوه اعمال ورودی ها در سیستم

- ورود به صورت دسته ای
- ورود به صورت برخط



Management Information Systems

Forms

User Interface Controls

- Menu bar
- Toolbar
- Command button
- Dialog box
- Text box
- List box
- Option button, or radio button
- Check box
- Calendar control

STUDENT REGISTRATION SYSTEM

Semester: F Academic Year: 2005-2006

August 2005

On-line data entry

SSN: 111-11-1111 City: New Hope

Last Name: Hamilton ST: PA

First Name: Rose Zip: 12345

MI: M. Home Phone: (555) 999-9999

Street: 607 West Spring Street Work Phone: (555) 555-9999

Advisor Assigned

Transcript OK

Full Time

Part Time

Courses

Prefix	Number	Section	Grade
MAT	111	2	
CIS	110	3	
BUS	285	1	

Find Student

Print Record

HELP

Remind students that tuition and fees are due by the first day of class.



Input Volume

- **An effective way to reduce input errors is to reduce input volume**
- **Guidelines will help reduce input volume**
 1. **Input necessary data only**
 2. **Do not input constant data**
 3. **Do not input data that the user can retrieve from system files or calculate from other data**
 4. **Use codes**



Management Information Systems

Forms

Input Volume

- Generated by the system
- Entered by the user
- Retrieved or calculated by the system

CustOrders

Order Number: Date and Time:

Customer ID: Customer Name:

Item	Description	Quantity	Price	Extended Price
<input type="text" value="ABCD1234"/>	<input type="text" value="Nylon Carry Bag, Red"/>	<input type="text" value="3"/>	<input type="text" value="19.95"/>	<input type="text" value="\$59.85"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Total Price:

Sales Tax:

Grand Total:



Input Design

- **Designing Data Entry Screens**
(Guidelines will help you design data entry screens)
 1. Restrict user access to screen locations where data is entered
 2. Provide a descriptive caption for every field, and show the user where to enter the data and the required or maximum field size
 3. Display a sample format if a user must enter values in a field in a specific format
 4. Require an ending keystroke for every field
 5. Do not require users to type leading zeroes for numeric fields
 6. Do not require users to type trailing zeroes for numbers that include decimals
 7. Display default values so operators can press the ENTER key to accept the suggested value



Input Design

- **Designing Data Entry Screens**
(Guidelines will help you design data entry screens)
 9. Display a list of acceptable values for fields, and provide meaningful error messages
 10. Provide a way to leave the data entry screen at any time without entering the current record
 11. Provide users with an opportunity to confirm the accuracy of input data before entering it
 12. Provide a means for users to move among fields on the form
 13. Design the screen form layout to match the layout of the source document
 14. Allow users to add, change, delete, and view records
 15. Provide a method to allow users to search for specific information



Input Devices and Mechanisms

- **Capture data as close to original source as possible**
- **Use electronic devices and automatic entry whenever possible**
- **Avoid human involvement as much as possible**
- **Seek information in electronic form to avoid data re-entry**
- **Validate and correct information at entry point**



Input technology

- امروزه ضرورت شناسایی خودکار عناصر و جمع آوری داده مرتبط به آنان بدون نیاز به دفالت انسان جهت ورود اطلاعات در بسیاری از عرصه های صنعتی، علمی، خدماتی و اجتماعی احساس می شود.
 - به مجموعه ای از فناوری ها که از آنان برای شناسایی اشیاء، انسان و حیوانات توسط ماشین استفاده می گردد، شناسایی خودکار و یا به اختصار Auto ID گفته می شود.
 - هدف اکثر سیستم های شناسایی خودکار، افزایش کارآیی، کاهش خطاء ورود اطلاعات و آزاد سازی زمان کارکنان است.
 - تاکنون فناوری های مختلفی به منظور شناسایی خودکار طراحی و پیاده سازی شده است.
- **Input technology has changed dramatically in recent years**



Management Information Systems

Forms

Prevalent Input Devices to Avoid Human Data Entry

- **Magnetic card strip readers**





Management Information Systems

Forms

Prevalent Input Devices to Avoid Human Data Entry

- Bar code readers



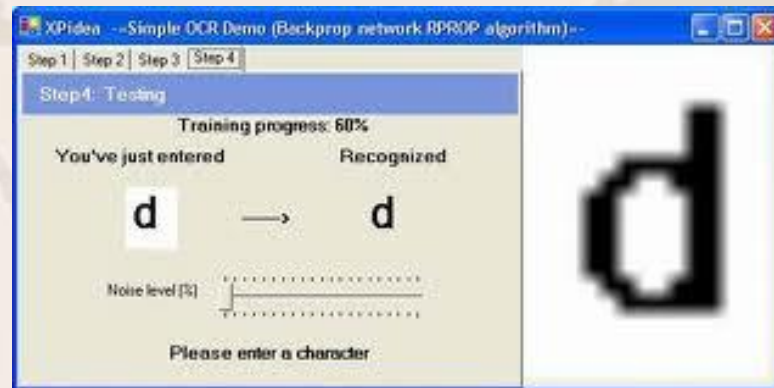


Management Information Systems

Forms

Prevalent Input Devices to Avoid Human Data Entry

- Optical character recognition readers and scanners





Prevalent Input Devices to Avoid Human Data Entry

- **Digitizers (device which converts analog data into digital data), such as digital cameras and digital audio devices**





Prevalent Input Devices to Avoid Human Data Entry

- **Radio-frequency identification tags**

– به مجموعه ای از فناوری ها که در آنان برای شناسایی خودکار افراد و اشیاء از امواج رادیویی استفاده می گردد، RFID گفته می شود. از روش های مختلفی برای شناسایی افراد و اشیاء استفاده می شود. ذخیره شماره سریال منتسب به یک فرد و یا شی درون یک ریزتراشه که به آن یک آنتن متصل شده است، یکی از متداولترین روش های شناسایی خودکار است.

به تلفیق تراشه و آنتن، تگ RFID و یا فرستنده خودکار RFID گفته می شود. تراشه به کمک آنتن تعبیه شده، اطلاعات لازم جهت شناسایی آیتم مورد نظر را برای یک کدخوان ارسال می نماید. کدخوان امواج رادیویی برگردانده شده از تگ RFID را به اطلاعات دیجیتال تبدیل می نماید تا در ادامه، امکان ارسال داده برای کامپیوتر و پردازش آن فراهم گردد.



Management Information Systems

Forms

Prevalent Input Devices to Avoid Human Data Entry

- Radio-frequency identification tags



یک نمونه کدخوان RFID بی سیم



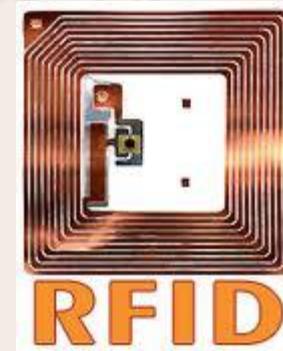
یک نمونه تگ RFID





Prevalent Input Devices to Avoid Human Data Entry

- Radio-frequency identification tags



- Touch screens and devices



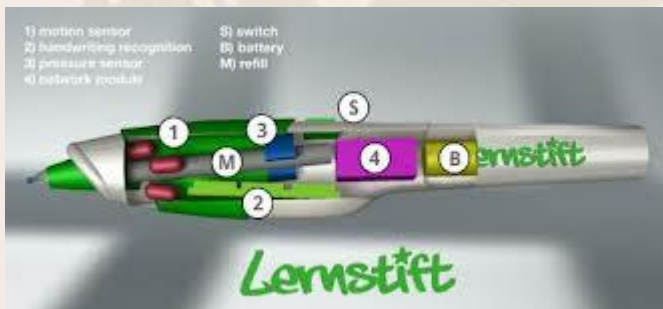


Management Information Systems

Forms

Prevalent Input Devices to Avoid Human Data Entry

- Electronic pens and writing surfaces





Quick Response Code (QR code)

- رمزگذاری ماتریسی
- اعداد و حروف
- رمزینه اولین بار برای استفاده ی صنعتی در یکی از کارخانه های اتومبیل سازی ژاپنی طراحی و تولید شد ولی به تدریج در سطح گسترده تری در جهان به کار گرفته شد.





Quick Response Code (QR code)

- اطلاعات کالاها، شرکت ها، اقلام و ...
- کارت ویزیت ها (اطلاعات تماس و ...)

- Examples

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امام حسین علیہ السلام:

من دلائل العالم انتقادة بحديثه و علمه بحقائق فنون النظر

از نشانه های عالم، نقد سخن و اندیشه خود و آگاهی از نظرات مختلف است.

(بهار الانوار، ج 75، ص 119)

پایان