User Interface Design

- User interface design requires an understanding of Human-Computer Interaction (HCI) and user-centered design principles.

8 User-centered Design Principles

1. Understand the Underlying Business Functions
2. Maximize Graphical Effectiveness
3. Profile the System's Users
4. Think like a User
5. Use Prototyping
6. Design a Comprehensive Interface
7. Continue the Feedback Process
8. Document the Interface Design

Good User Interface Design

- Good user interface design is based on a combination of Ergonomics (人類工作學), Aesthetics (知覺), and Interface Technology.
  - Ergonomics – How people work, learn and interact with computer.
  - Aesthetics – How an interface attractive and easy to use.
  - Interface Technology – Provide the operational structure for design objective.
User Interface Design Guidelines

- Focus on Basic Objectives
- Build an Interface that is Easy to Learn and Use
- Provide Features that Promote Efficiency
- Make it Easy for Users to Obtain Help or Correct Errors
- Minimize Input Data Problems
- Provide Feedback to Users
- Create an Attractive Layout and Design
- Use Familiar Terms and Images

User Interface Controls

- The designer can include many control features, such as Menu Bars, Toolbars, Dialog Boxes, Text Boxes, Toggle Buttons, List Boxes, Scroll Bars, Drop-down List Boxes, Option Buttons, Check Boxes, Command Buttons, Spin Bars, and Calendars among others.

Input Design Issues

- **Data Capture** is the identification and recording of source data.
- **Data Entry** is the process of converting source data into computer-readable form and entering it into the information system.
6 Main Input Design Objectives

1. Select a suitable input and data entry method
2. Reduce input volume
3. Design attractive data entry screens
4. Use validation checks to reduce input errors
5. Design required source documents
6. Develop effective input controls

Input and Data Entry Methods

- Input processes should be efficient, timely and logical.
- Two major input methods:
  - Batch Input
    - Data entry is performed on a specified time schedule, such as daily, weekly, monthly, or longer.
  - Online Input
    - Offers major advantages, including the immediate validation and availability of data.

Input Volume

- To reduce input volume, you must reduce the number of data items required for each transaction.
- Guidelines:
  - Input necessary data only.
  - Do not input data that the user can retrieve from system files or calculate from other data.
  - Do not input constant data.
  - Use codes.

Data Entry Screens Design

- Restrict user access.
- Provide a descriptive caption.
- Display a sample format.
- Require ending keystroke for every field.
- Do not require users to type leading zeroes for numeric fields.
- Do not require users to type trailing zeroes for numbers that include decimals.
- Display default values.
- Use a default value when a field value will be constant.
Data Entry Screens Design

- Display list of acceptable values.
- Provide a way to leave the data entry screen at any time.
- Provide users with an opportunity to confirm the accuracy of input data before entering it.
- Provide a means for users to move among fields on the form in a standard order or in any order they choose.
- Design the screen form layout to match the layout of the source document.
- Allow users to add, change, delete, and view records.
- Provide a method to allow users to search for specific information.

Input Errors Validation

- Reducing the number of input errors improves data quality.
- Some data validation checks:
  - Sequence checks.
  - Existence checks.
  - Data type checks.
  - Range checks.
  - Reasonableness checks.
  - Validity checks.
  - Combination checks.
  - Batch controls.

Source Documents Design

- A source document is a form used to request and collect input data, trigger or authorize an input action, and provide a record of the original transaction.

Input Control

- Input control includes the necessary measures to ensure that input data is correct, completed and secure.
  - Audit trail
    - Records the source of each data item and when it entered the system. Show how and when data is accessed or changed, and by whom.
  - Data security
    - Protects data from lost or damaged and recovers data when it is lost or damaged.
Output Design Issues

- Some questions to consider before designing output:
  - What is the purpose of the output?
  - Who wants the information, why it is needed, and how will it be used?
  - What specific information will be included?
  - Will the output be printed, viewed on-screen, or both?
  - When will the information be provided, and how often must it be updated?
  - Do security or confidentiality issues exist?

Types of Output

- Internet-Based Information Delivery.
- E-Mail.
- Audio Output.
- Automated Facsimile Systems.
- Computer Output Microfilm (COM).

Specialized Forms Of Output

- Retail point-of-sale terminals
- Automated teller machines (ATM)
- Special-purpose printers
- Plotters
- Digitized photos
- Programmable devices

Printed Output

- Detail Report
  - A detail report produces one or more lines of output for each record processed. Each line of output printed is called a detail line.
- Exception Report
  - An exception report displays only those records that meet a specific condition or conditions.
- Summary Report
  - Upper-level managers often want to see total figure and do not need supporting details.
Detailed Report

- Lists one record per line

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Product</th>
<th>Customer</th>
<th>Quantity Purchased</th>
</tr>
</thead>
<tbody>
<tr>
<td>1788</td>
<td>sptbr</td>
<td>Starlight Foods</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wilson Automotive</td>
<td>40</td>
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<tr>
<td>2372</td>
<td>postage scale</td>
<td>Regal Camera</td>
<td>13</td>
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<tr>
<td>3029</td>
<td>letter opener</td>
<td>AAA Rentals</td>
<td>1</td>
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<tr>
<td>6942</td>
<td>bulletin board</td>
<td>Wilson Automotive</td>
<td>8</td>
</tr>
</tbody>
</table>

Exception Report

- Identifies data outside of normal condition
- Conditions, called exception criteria, define normal activity or status range

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Product</th>
<th>Total Quantity on Hand</th>
<th>Reorder Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>9042</td>
<td>bulletin board</td>
<td>228</td>
<td>240</td>
</tr>
<tr>
<td>3029</td>
<td>letter opener</td>
<td>328</td>
<td>350</td>
</tr>
</tbody>
</table>

Summary Report

- Consolidates data, so you can review it quickly and easily
- Usually has totals, tables, or graphs

User Involvement

- When designing a report, you should prepare a mock-up, or prototype, for users to review.
Report Design Principles

- Printed reports must be attractive, professional, and easy to read.
- Good report design, like any other aspect of the user interface, requires effort and attention to detail.
- To produce a well-designed report, the analyst must consider several topics, including Report Headers and Footers, Page Headers and Footers, Column Headings and Alignment, Column Spacing, Field Order, and grouping of detail lines.

Printing Volume and Time Requirements

- Efficient printing operations, timely delivery of finished reports, and accurate forecasts of paper and storage needs all depend on accurate estimates of print volumes and times.

Measurement

- Length Calculations
  - After completing a report design, it is important to estimate the length of the printed output.
- Time Calculations
  - You also can estimate the time required to print the report.
Output Control and Security

- Output must be accurate, complete, current, and secure. Companies use various output control methods to maintain output integrity and security.

Output Security Control

- Limit the number printed copies.
- Use a tracking procedure to account for each copy.
- Output is delivered to authorized recipients only.
- All sensitive reports should be stored in secure areas.
- All pages of confidential reports should be labeled appropriately.