SYSTEMS ANALYSIS & DESIGN

SYSTEM DESIGN

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Chapter Description

Expected Outcomes

• Able to know database design
• Able to understand designing form and report
• Able to know designing interfaces

References

• Klaus Pohl, "Requirement Engineering Fundamentals", Santa Barbara, CA : Rocky Nook, 2011
• C.J. Date,"An Introduction to Database Systems”,8/E,Pearson, 2003
A process of transforming from logical design into physical phase.
It is a transition from “what is” into “what should be”.
Database Design

Database – “a set of information held in a computer”  
Oxford English Dictionary

Database design is the process of developing a detailed data model of a database. The data model has all the needed logical and physical design, and physical storage. Logical database - describes data using notation that corresponds to a data organization used by a database management system, using relational database model.
Physical database - Prescribe the technical specifications for computer files and databases in which to store the data.
Logical database modelling and design has four steps:

1. Normalization concepts been use to develop a logical data model
2. Combine normalized data requirements from all user interfaces into one consolidated logical database model
3. Transform the conceptual E-R data model of the system into normalized data requirements.
4. Compare the consolidated logical database design with the E-R model then generate final logical database model for the system.
Each module is taught by a lecturer
Based on logical database model choose a storage format.

Grouping attributes from the logical database model into physical records.

Arranging related records in secondary memory (hard disks and magnetic tapes) so that records can be stored, retrieved and updated rapidly.

Selecting media and structures for storing data to make access more efficient.
Relational Database Model

Introduced by E.F. Codd

Relational database model concerned with three issues:

Data structure (how data is represented)
Data integrity (allowable data)
Data manipulation (what can be done with the data)
Relation: has a named, two-dimensional table of data. Each relation consists of a set of named columns and an arbitrary number of unnamed rows.
Normalization

Normalization is a steps of transforming complex data structures into simple and stable data structures. The output of normalization is that every nonprimary key attribute depends upon the whole primary key.
Form is a business document that contains some predefined data and may include some areas where additional data are to be filled in.

Report is a business document that contains only predefined data.

It is a document used solely for reading or viewing data.
Form and Report Characteristics

User
mental capability, experience, skill, motivation, education, etc.

Task
time pressure, cost of errors, etc.

Environment
Social issues and environmental concerns, (norms, interruptions, etc.)

System
Hardware, platform, OS, devices, etc.
General Design Rules

Meaningful Titles – title must be clear and specific, version information, and current date when we generate the form and report.

Balanced Layout - information should be balanced on the screen, adequate spacing and margins, and clear labels.
Highlighting Methods

- Color differences
- Size differences
- Underlining
- Capital letter
- Blinking and audible
- Intensity differences
Using Color

Advantages:
Soothes or strikes the eye
Highlights the important information
Attention to warning etc.

Disadvantages:
Colour pairing may cause problem to colour blindness
Resolution may degrade etc.
## Displaying Text

<table>
<thead>
<tr>
<th>Case</th>
<th>- display text in mixed uppercase and lowercase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing</td>
<td>- use double spacing if possible.</td>
</tr>
<tr>
<td>Justification</td>
<td>- left justify</td>
</tr>
<tr>
<td>Hyphenation</td>
<td>- do not hyphenate words between lines.</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>- use for widely understood</td>
</tr>
</tbody>
</table>
Table and List Rules

- Use meaningful labels
- Formatting columns, rows and text
- Formatting numeric, textual and alphanumeric data
Table and Graph

Table is used to read individual data value.

Graph is used when:
• Quick summary of information is needed.
• Tracking trends over time.
• Forecasting activities.
Usability of Forms and Reports

Consistency
Efficiency
Ease
Format
Flexibility
The process of designing interfaces and dialogues is a user-focused activity. To design usable interfaces and dialogues, designer must ask who, what, when, and how questions used to guide during this process.
All human-computer interfaces must have an interaction methods style:
Command Language Interaction
User enter explicit statements into system to invoke operations.
Menu Interaction
list of system options is provided
Drop-down Menu
menus open by dropping down onto the display
Interaction Methods

Form Interaction
Data fields are formatted as similar to paper-based form

Object-based Interaction
Symbols are used to represent commands or function
Interaction Methods

Form Interaction
Data fields are formatted as similar to paper-based form

Object-based Interaction
Symbols are used to represent commands or function

Natural Language Interaction
Inputs are in a conventional language
Interaction Devices

Keyboard
Mouse
Joystick
Trackball
Touch Screen
Light Pen
Graphics Tablet
Voice
Designing Interface

Designing Layouts:
  - Header information
  - Sequence and time related instruction and formatting
  - Body or data detail
  - Totals or data summary
  - Authorization
  - Comments
Designing Interface

Structuring Data Entry:
Entry
Defaults
Units
Captioning
Format
Help
Designing Interface

Controlling Data Input:
Proper data type
Combinations
Expected values
Range
Self-checking digit
Values
Designing Interface

Providing Feedback:
Status information
Prompting cues
Errors and warning message
Providing Help:
Provide extensive system help
A dialogue is the sequence in which information is displayed to and obtained from user.
First must gain an understanding of how the users might interact with the system. Therefore designer must have clear understanding of user, task, technological, and environmental characteristics. Formal method to representing dialogues is using “dialogue diagram”.
Second step is a designer building dialogue prototype. They might use several available tools.

Last step is all dialogues must be assess their usability.