

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

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System Design

A process of transforming from logical design into physical phase.

It is a transition from “what is” into “what should be”.



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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



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Database Design

Physical database - Prescribe the technical specifications for computer files and databases in which to store the data.



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Database Design Process

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



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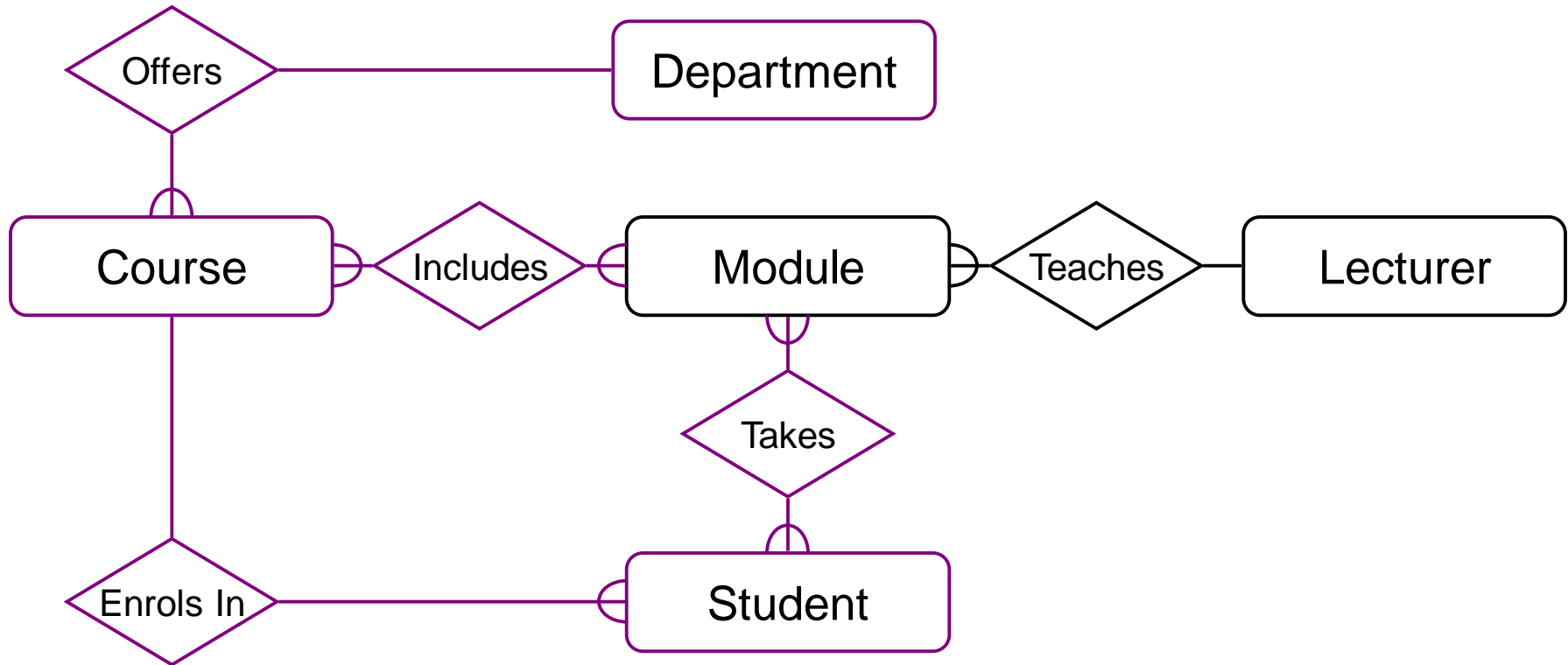
Database Design Process

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.



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Example –E-R Diagram



Each module is taught by a lecturer



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Physical Database Design

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.



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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)



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Relational Database Model

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



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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.



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Form and Report Design

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.



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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.



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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



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Highlighting Methods

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



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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



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Displaying Text

- Case - display text in mixed uppercase and lowercase
- Spacing - use double spacing if possible.
- Justification - left justify
- Hyphenation - do not hyphenate words between lines.
- Abbreviations - use for widely understood



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Table and List Rules

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



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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.



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Usability of Forms and Reports

Consistency

Efficiency

Ease

Format

Flexibility



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Designing Interfaces and Dialogues

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.



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Interaction Methods

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



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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



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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



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Interaction Devices

Keyboard

Mouse

Joystick

Trackball

Touch Screen

Light Pen

Graphics Tablet

Voice



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Designing Interface

Designing Layouts:

Header information

Sequence and time related
instruction and formatting

Body or data detail

Totals or data summary

Authorization

Comments



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Designing Interface

Structuring Data Entry:

Entry

Defaults

Units

Captioning

Format

Help



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Designing Interface

Controlling Data Input:

Proper data type

Combinations

Expected values

Range

Self-checking digit

Values



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Designing Interface

Providing Feedback:

Status information

Prompting cues

Errors and warning message



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Designing Interface

Providing Help:
Provide extensive system help



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Designing Dialogues

A dialogue is the sequence in which information is displayed to and obtained from user.



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Designing Dialogue

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”.



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Designing Dialogue

Second step is a designer building dialogue prototype. They might use several available tools.

Last step is all dialogues must be assess their usability.



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