

# Information Systems (තොරතුරු පද්ධති)

**Lesson 05 - Part - 02**  
**(System Analysis & Design)**



# Objectives – Learning Outcomes

The objectives of this section are to get knowledge on system design phase.

When you have followed this section you will:

- Understand about logical data modeling
- Demonstrate Process specification
- Understand to define Business system options



# Objectives – Learning Outcomes

- Understand to Identify the concept of Logical Design
- Understand about logical data structures
- Understand to Describe the Process specification, Data dictionary and Interface design



# Outline

- Logical Design
- Business system options
- Process specification
- Data dictionary
- Interface design



# Logical Design

- In SSADM the vehicle for analysing the logical structure of an organisation's information is the Logical Data Model (LDM).
- A Logical Data Model is a way of *graphically* representing what that information is really all about, how it relates to other information and business concepts, and how business rules are applied to its use in the system.



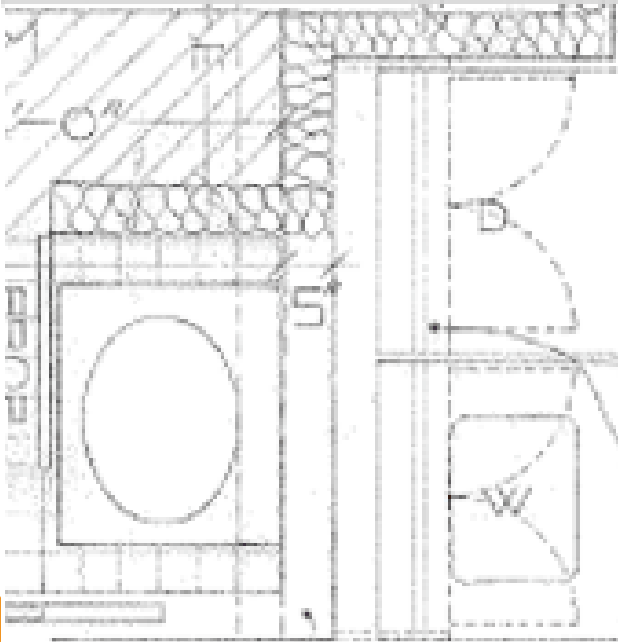
# Logical Design

- The LDM is possibly the most important and ultimately the most rigorous product of an entire SSADM project.
- Logical Data Models consist of two parts:
  - a diagram called the Logical Data Structure (LDS);
  - a set of associated textual descriptions that explain each part of the diagram.

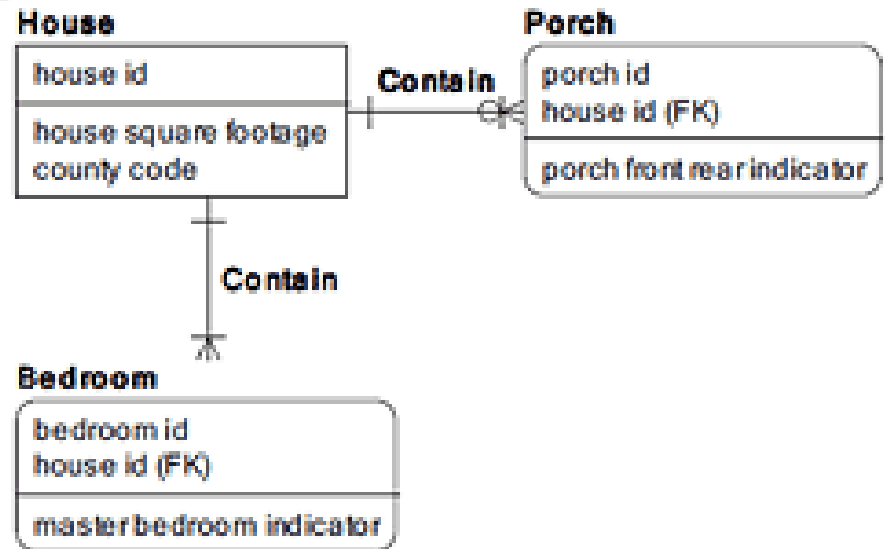


# Logical Design - Example

## Floor Plan



## Logical Data Model



# Business System Options

- Business Systems Options (BSOs) provide a range of possible solutions for the business to consider.
- Each BSO may have more than one way of being implemented technically. These are known as Technical System Options (TSOs)





# Business System Options Cont.

## Contents of a Business Systems Options Report

- The degree of automation
- The boundary between the system and the users
- The distribution of the system, for example, is it centralized to one office or spread out across several?
- Cost/Benefit analysis



# Business System Options Cont.

## Contents of a Business Systems Options Report

- Development time scale
- Known technical constraints
- Organisation of the system - types of access (on-line or off-line), interfaces with other systems
- Approximate data and transaction volumes
- Training requirements
- Benefits & impact on the organisation



# Business System Options Cont.

- Up-to 3 shortlisted. Each Option presented formally to the management.
- Strengths & Weaknesses explained to facilitate a decision.
- Opportunity to reassess the viability of the project (to carry on / cancel it).
- Selected BSO could be one option or an hybrid.
- Document selected BSO (reasons for selection & rejection others).
- Form the basis for the rest of the project and for the final system.



# Process Specification

- A process specification is a method used to document, analyze and explain the decision-making logic and formulas used to create output data from process input data
- Created for primitive processes as well as for some higher level processes on a data flow diagram
- Its objective is to flow down and specify regulatory/engineering requirements and procedures



# Process Specification

## - Uses

- Reduce process ambiguity
- Obtain a precise description of what is accomplished
- Validate the system design
- **This is not for**
  - Processes that represent physical input and/or output
  - Processes that represent simple data validation
  - Processes that use prewritten code



# Process Specification - Example

---

Number 1

Name                      Add Customer Order

Description              Key and add the Customer Order.  
The order should be edited for correct information.  
Customer and Item master files are updated.

Input Data Flow

Customer Order Form from the Customer  
Customer Record from data store D1, Customer Master File  
Item Record from data store D2, Item Master File

Output Data Flow

Pending Order to data store D3, Order File  
Backordered Item Record to the Inventory Control Department  
Updated Customer and Item records

Type of process              Online



# Data Dictionary

- A data dictionary is a collection of data about data.
- It maintains information about the definition, structure, and use of each data element that an organization uses.



# Data Dictionary

In a relational database, the metadata in the data dictionary includes the following:

- Names of all tables in the database and their owners
- Names of all indexes and the columns to which the tables in those indexes relate
- Constraints defined on tables, including primary keys, foreign-key relationships to other tables, and not-null constraints





# Data Dictionary - Example

| ID | Business Data Object | Field Name | Property 4 | Property 5 | Property 6 | Property 7 | Property ... |
|----|----------------------|------------|------------|------------|------------|------------|--------------|
|    |                      |            |            |            |            |            |              |
|    |                      |            |            |            |            |            |              |
|    |                      |            |            |            |            |            |              |
|    |                      |            |            |            |            |            |              |
|    |                      |            |            |            |            |            |              |
|    |                      |            |            |            |            |            |              |
|    |                      |            |            |            |            |            |              |

| ID    | Business Data Object | Field Name                       | Description   | Alternate Names     | Associated Business Data Object | Data Field           | Unique Values? | Data Type    | Length | Valid Values   | Default Value   | Calculation   | Reqd? | Business Rules  | Customer Role | Sales Rep Role | Track Changes? | Sequence | Owner         | Status   | Notes |
|-------|----------------------|----------------------------------|---|---------------------|---------------------------------|----------------------|----------------|--------------|--------|--|---|---|-------|---|---------------|----------------|----------------|----------|---------------|----------|-------|
| DD001 | Order                | Shipping Address                 | The entire shipping address for the order   | Ship-to Address     | Address                         | shipping address     | N              | Alphanumeric | 50     | May only contain letters, digits, and periods. May not contain a "PO" or "P.O." as a word. Case insensitive. | Customer's preferred Shipping Address if returning customer, otherwise null | N/A   | Y     | N/A   | View, Edit    | View, Edit     | Yes            | 1        | Purchase Team | Reviewed |       |
| DD002 | Order                | Billing Address Same As Shipping | An indicator of whether the shipping address and the billing address are the same     |                     | N/A                             | billing address same | N              | Boolean      | N/A    | True/False   | Customer's preferred setting if returning customer, otherwise TRUE          | N/A   | N     | N/A   | View, Edit    | View, Edit     | No             | 7        | Purchase Team | Reviewed |       |
| DD003 | Order                | Billing Address                  | The entire billing address for the order  |                     | Address                         | billing address      | N              | Alphanumeric | 50     | May only contain letters, digits, and periods  | Customer's preferred Billing Address if returning customer,                 | N/A   | Y     | N/A   | View, Edit    | View, Edit     | Yes            | 8        | Purchase Team | Reviewed |       |
| DD004 | Order                | Coupon Code                      | Payment can be made in full or partial with use of valid promotional coupon or codes. | Valid system coupon | N/A                             | payment coupon       | N              | Alphanumeric | 15     | Any  | null  | N/A   | N     | Must be a legitimate coupon code that is still valid (not expired) and not redeemed | View, Edit    | View, Edit     | Yes            | 14       | Business SME  | Draft    |       |
| DD005 | Order                | Payment Info Subtotal            | Subtotal of price of items in cart  | Cart subtotal       | N/A                             | payment subtotal     | N              | Currency     | 10     | 0.00..999,999.99   | null  | If a "Dollar Off" coupon code is entered: Sum of the price of all items in the cart minus the coupon amount. If result is < 0, then 0.<br>If a "Percent Off" coupon code is entered: (Sum of the price of all items in the cart) * (100-Percent Off)/100, rounded to the nearest cent (round 0.5 up).<br>Otherwise: Sum of the price of | Y     | Subtotal must be in USD   | View          | View, Edit     | Yes            | 15       | Finance       | Draft    |       |
| DD006 | Order                | Payment Info Sales Tax           | Sales tax added to the order subtotal depending upon customer's location              | Sales Tax S         | N/A                             | payment tax          | N              | Currency     | 10     | 0.00..999,999.99   | null  | Tax calculated using Payment Info Subtotal and Shipping Address; see tax calculations   | Y     | See "tax calculations"  | View          | View           | Yes            | 16       | Finance       | Draft    |       |



# Interface Design

## What is a System Interface

- A system transforms its inputs into its outputs. The inputs must come from somewhere; in the systems perspective, they always come from some other system (in the form of that other system's outputs). Similarly, system outputs are made available to other systems (and become those other systems' inputs).
- The collection of all the inputs and outputs of a system define its *interface*.



# Interface Design

**Interface can be categorized as**

- **System Interface**  
Inputs or Outputs that require minimal human intervention
  
- **User Interface**  
System interfaces that directly involve a system user



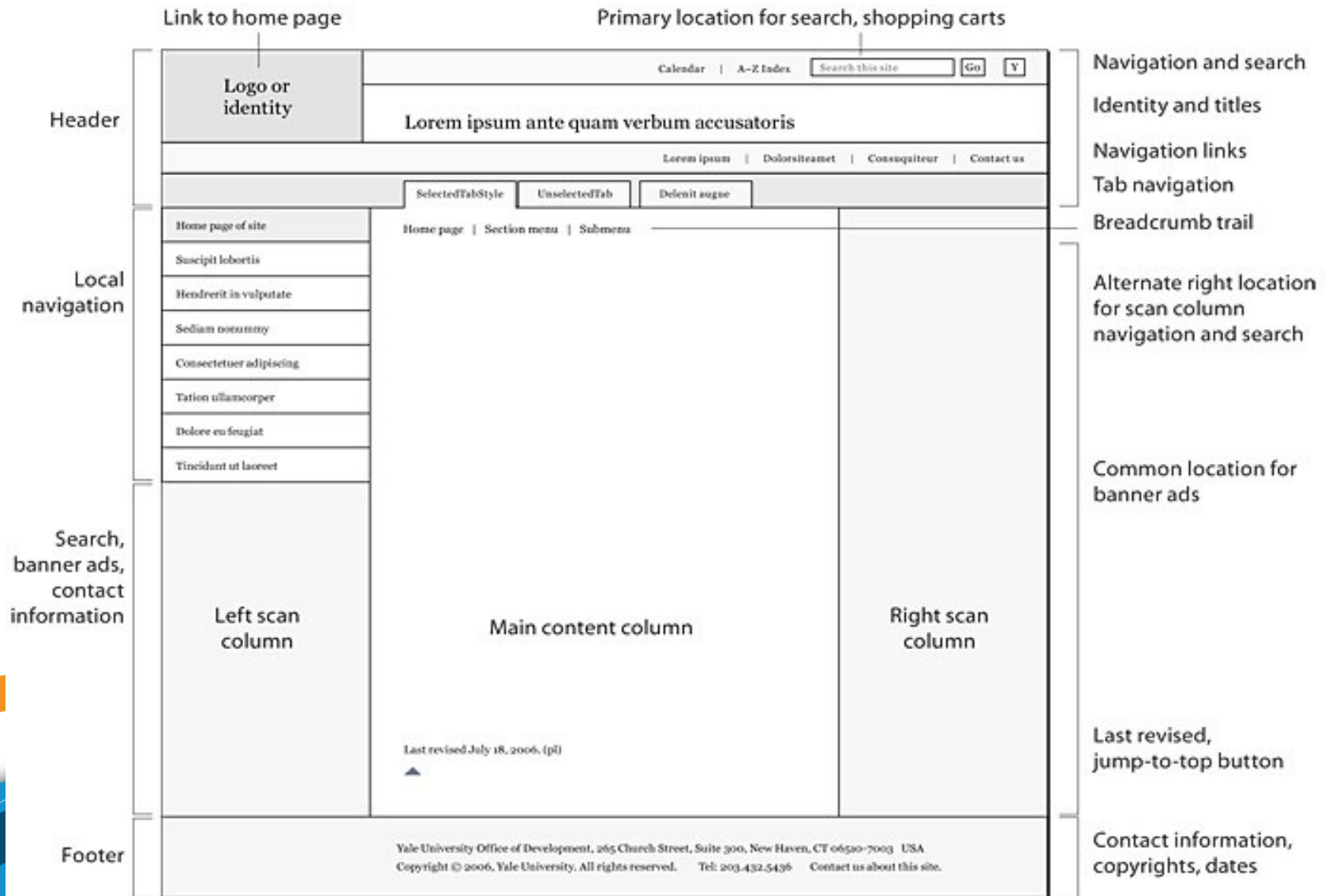
# Interface Design

## Good Interface characteristics

- User centered
- Affordance and visibility
- Consistency
- Shortcuts
- Error Handling



# Interface Design - Sample Interface



# Summery

In this section you have given an idea about business system options, process specification, data dictionary and interface design of System Analysis and Design phase.



# References

- SOFTWARE ENGINEERING, Ninth Edition, Ian Sommerville

**Next Lesson >>>**

**Lesson 06 : System Development, Testing**

