Database Design

10-1

System Development Life Cycle

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Objectives

- This lesson covers the following objectives:
  - List and describe the different stages of the system development life cycle (SDLC)
  - Identify the role of data modeling in the system development life cycle
  - Relate the project tasks to the different stages of the system development life cycle

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In this lesson, we discuss the system development life cycle and tie it in with professional skills needed at each stage. We go through an overview of the system development life cycle to show students where they've been and where they're going in the process of designing and creating a database.

Purpose

- When you build a house, you draw up the plans before you start construction
- During construction, you lay the foundation before you start putting up walls, you finish all the major construction before you start decorating
- The architect, the builder, and the decorator coordinate their efforts so that they do their jobs at the appropriate times
- A knowledge of the tasks associated with each stage of the system-development life cycle will help you better plan a project and be a productive member of the team

The system development life cycle is quite common in the business world.

Although the names of the stages may change (some will call it planning instead of strategy, etc.), the tasks and the sequence remain largely the same.

System Development Life Cycle

- You can develop a database, from concept through production, by using the system development life cycle (SDLC) for software development

- Applying this top-down, systematic approach to database development transforms business-information requirements into an operational database

DOCUMENTATION

Strategy and Analysis

Design

Build

Transition

Production
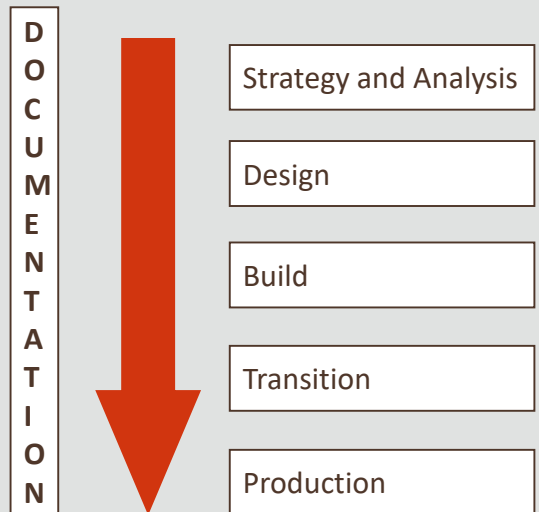
System development life cycle: The process of developing information systems through a multi-step process.
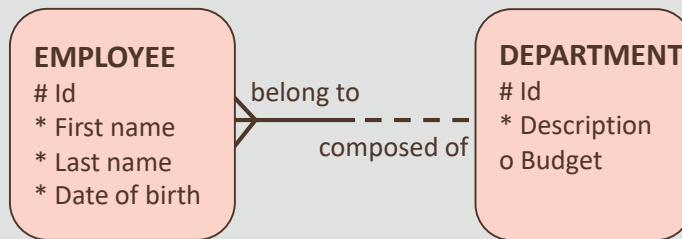
Some diagrams will have documentation as part of build. In reality, documentation should really be a part of every stage.

Strategy and Analysis

- Project tasks at this stage of the Systems Development Life Cycle (SDLC):
    - Study and analyze the business requirements
    - Interview users and managers to identify the information requirements
    - Incorporate the enterprise and application mission statements as well as any future system specifications
    - Build conceptual models of the system

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Strategy and Analysis

- Transfer the business narrative into a graphical representation of business-information needs and rules
- Confirm and refine the model with the analysts and experts

EMPLOYEE		DEPARTMENT
# Id	belong to	# Id
* First name		* Description
* Last name	composed of	o Budget
* Date of birth		

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Data modeling happens in the strategy and analysis phase.

Design

Project tasks in the design phase:
- Transform the model developed in the strategy and analysis phase
- Map entities to tables, attributes to columns, relationships to foreign keys, and business rules to constraints

EMPLOYEES (EPE)

Key Type	Optionality	Column name
pk	*	id
	*	first_name
	*	last_name
	o	date_of_birth
fk	*	dpt_code

refers to

DEPARTMENTS (DPT)

Key Type	Optionality	Column name
pk	*	id
	*	description
	o	budget

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In the design phase, we create table diagrams, not actual tables. At this stage, several implementation issues will be taken into consideration, such as type of database, storage, location of the database (centralized or distributed?), the way the data is used, etc. These types of considerations affect decisions such as supertype/subtype implementations, where to put the foreign key in a 1:1 mandatory relationship, etc.

Build

- Project tasks in the Build phase:
  - Write and execute the commands to create the tables and supporting objects for the database
  - Populate the tables with data
  - Develop user documentation, help text, and operations manuals to support the use and operation of the system

Populate: to enter data into a table.
This is also the stage where applications (screens, reports, web pages, etc.) are built to run with the database.

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Transition

- Transition phase tasks:
  - Conduct user-acceptance testing
    - This type of testing is where monitored users determine whether a system meets all their requirements, and will support the business for which it was designed
  - Convert existing data

Parallel operations: The simultaneous execution of two different operations.

User-acceptance testing involves having the users try out the system and provide feedback on the interface, compare it with the old system, etc. This feedback is used to tweak the system – make a few adjustments to satisfy the users.

Existing data often has to be converted for several reasons: the database system uses different formats, the new database design requires that the data be broken down into more detail or summarized into group totals, the new system tracks data that did not exist in the old system but can be derived somehow, etc.

Transition

- Transition phase tasks:
  - Parallel operations
    - Both systems (old and new) are running at the same time
    - This is done to give users time to train and switch over to the new system and to check that the new system is producing the same results as the old system
  - Make any modifications required

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Production

- Production phase tasks:
  - Roll out the system to the users
  - Operate the production system
  - Monitor its performance and enhance and refine the system
- The various phases of the system development life cycle can be carried out iteratively

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Iteration: the act of repeating a process until the desired result is achieved.

Terminology

- Key terms used in this lesson included:
  - Parallel operations
  - Populate
  - System development life cycle
  - User acceptance testing
  - Iteration

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Summary

- In this lesson, you should have learned how to:
  - List and describe the different stages of the system development life cycle (SDLC)
  - Identify the role of data modeling in the system development life cycle
  - Relate the project tasks to the different stages of the system development life cycle

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