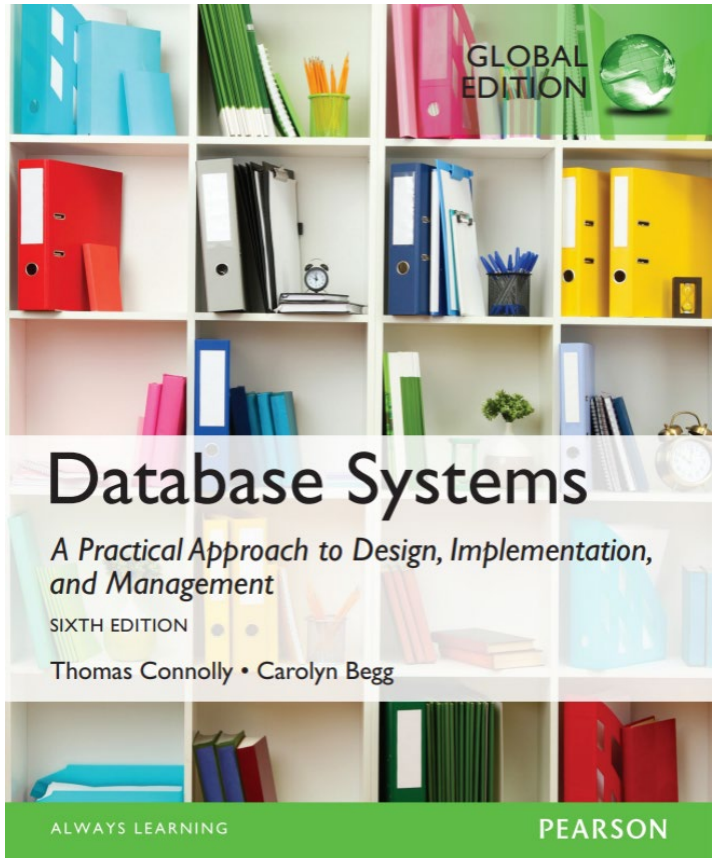
Database Design and Development

Unit 4



Lecture 3

Database Design

BTEC Alliance with FPT Education

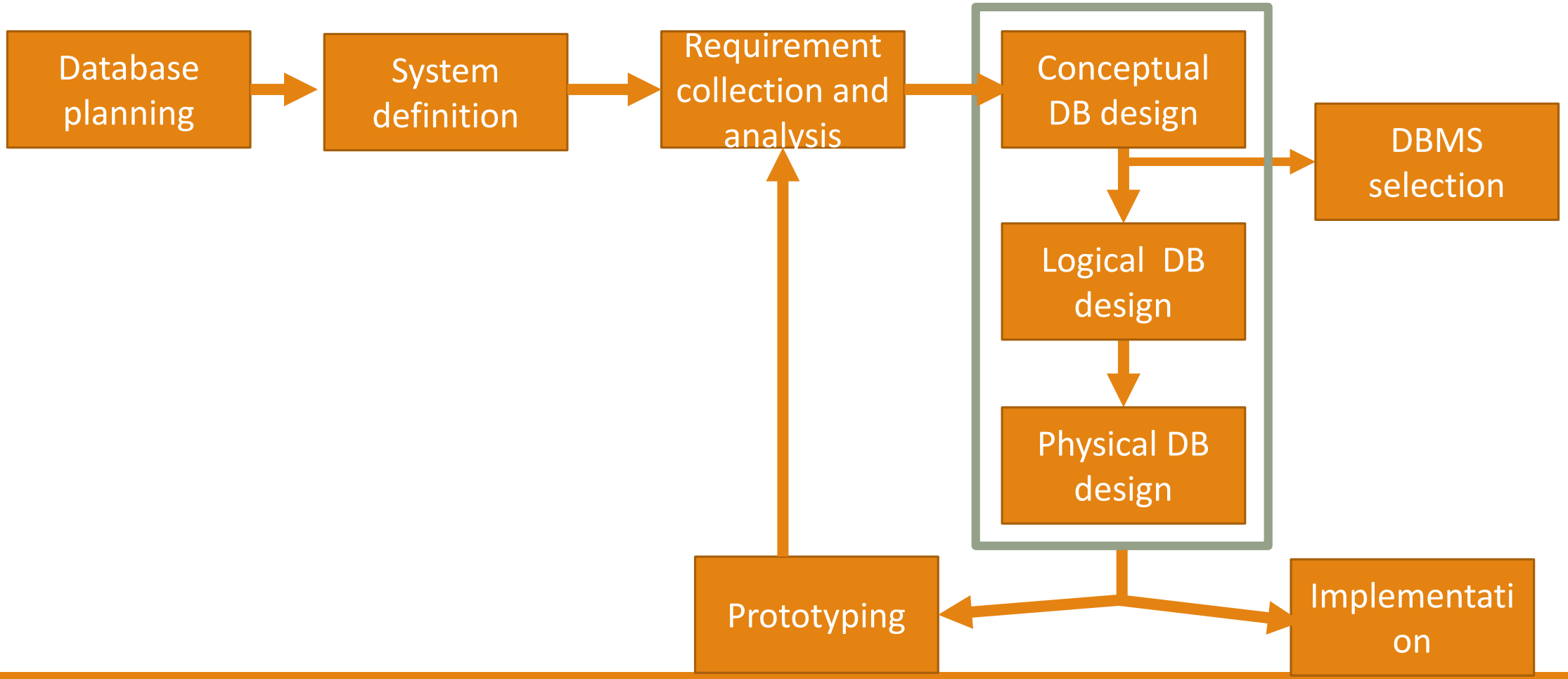
Pearson

Overview

By the end of this chapter you will be able to:

- The main stages of the database system development lifecycle (DSDLC)
- The main phases of database design: conceptual, logical, and physical design

Database system development lifecycle



Database system development lifecycle

STAGE	MAIN ACTIVITIES
Database planning	Planning how the stages of the lifecycle can be realized most efficiently and effectively.
System definition	Specifying the scope and boundaries of the database system, including the major user views, its users, and application areas.
Requirements collection and analysis	Collection and analysis of the requirements for the new database system.
Database design	Conceptual, logical, and physical design of the database.
DBMS selection	Selecting a suitable DBMS for the database system.
Application design	Designing the user interface and the application programs that use and process the database.
Prototyping (optional)	Building a working model of the database system, which allows the designers or users to visualize and evaluate how the final system will look and function.

Database planning

- Evaluation of current information systems to determine existing strengths and weaknesses
- Appraisal of IT opportunities that might yield competitive advantage

Requirement collection

Techniques: Survey, interview, questionnaire, document analysis, observation, etc.

Example: to prepare an interview, in which you can ask about

What things the client is doing/recording?

What business constraints are required?

What reports are expected?

Identifying the big topics

After the interview, first thing to do is to identify the big topic

- What the database is about?
- What are the major components going to be?
- What does it include?

Specifically, list the entities of the DB and specify the attributes inside them

How to find these?

- One way is to look at the **nouns** in your document

Entities and Attributes?

An entity is something that the database is concerned with

- Data is stored about this
- It may have relationship with other entities

Attributes define entities

- The entity student has attributes like Id, name, DoB, email, etc.

Getting the scope

Statement of work

- Is a short statement of one or more paragraphs
- Says in clear, general terms what project will do
- It's a more complete statement about the objectives and timeline of the project

Why?

- We are making a DB for a client not just ourselves
- Not get trapped by preconceived notions
- Need to get as clear as possible about what DB is intended to do

Elements of Statement of Work (1)

History: Reasons for the project

- Problem of the current system or
- Opportunity to provide new services

Scope: Requirements and expectations

- States high level requirements
- It doesn’t go into details about how things are done
- May include some general constraints (time, budgets)

Elements of Statement of Work (2)

Objectives: Things intended to achieve

- What database is supposed to achieve
- I.e., why the client wants the DB

Tasks and deliverables:

- Project is broken into discrete tasks with time and deliverables

Database design

The process of creating a design that will support the enterprise's mission statement and mission objectives for the required database system

Three phases of database design:

- ***Conceptual database design***: to build the conceptual representation of the database, which includes identification of the important entities, relationships, and attributes.
- ***Logical database design***: to translate the conceptual representation to the logical structure of the database, which includes designing the relations.
- ***Physical database design***: to decide how the logical structure is to be physically implemented (as base relations) in the target DBMS.

Data modeling and the ANSI SPARC architecture