Database Management System (DBMS)

L-5:

Database Planning, Design, and Administration

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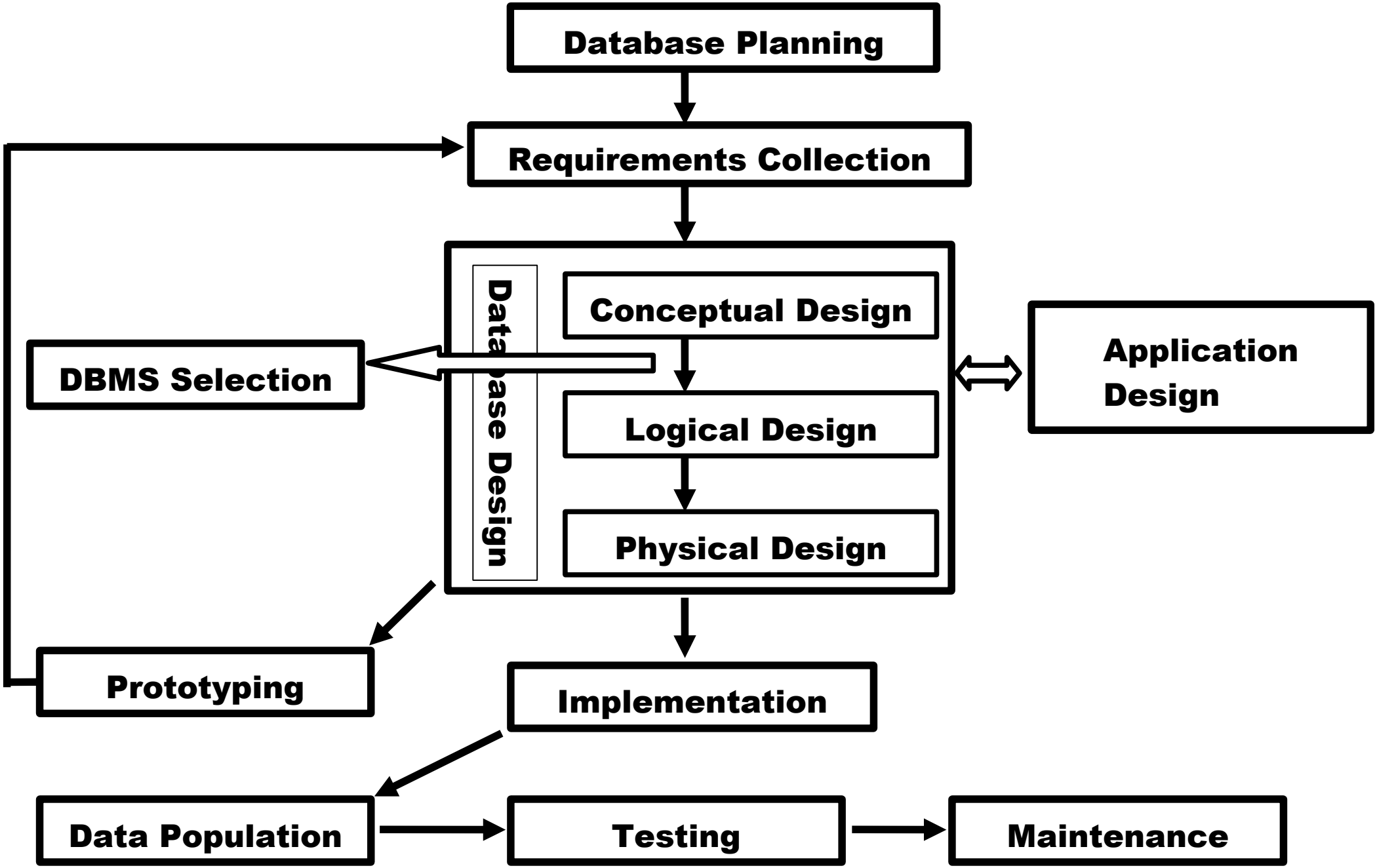
Lecture Content

- Database Application Life-cycle
- Planning
- Analysis
- Design – Conceptual, Logical and Physical
- Data Administration
- Database Administration

Why Planning?

- *80-90% databases do not meet their performance*
- *About 80% databases are delivered late and over budget*
- *About 40% databases fail or abandoned*
- *Less than 25% databases properly integrate enterprise and technology objectives*
- *Only 10-20% databases meet the success criteria*

Database Application Life-Cycle



Database Planning

A plan to collect requirements, analysis, design, implementation and testing of a database.

Requirements Collection

The process of collection and analysing the requirements of the database by understanding the scope and boundaries of the database application and the major user views.

- User views refers to the perspective of a particular user usage.

- Analysis involves finding WHAT and HOW

Database Design

The process of creating a design for a database that will support the enterprise operations and objectives.

- *Two approaches -*
  - *Top Down*
  - *Bottom Up*

- *Phases of Database Design -*
  - *Conceptual Database Design*
  - *Logical Database Design*
  - *Physical Database Design*

Conceptual Database Design

The process of constructing a model of information used in an enterprise, independent of all physical considerations.

- Build a data model
- Database design is entirely independent of implementation

Logical Database Design

The process of constructing a model of the information used in an enterprise based on a specific data model, but independent of a particular DBMS and other physical considerations.

- Build a logical data model based on Conceptual Data Model
- Independent of a particular DBMS

Physical Database Design

The process of producing a description of the implementation of the database on secondary storage, it describes the base relations, file organizations, and indexes used to achieve efficient access to the data, and any associated integrity constraints and security measures.

- *Build a physical database design based on Logical Data Model and Conceptual Data Model*
- *DBMS specific as*
- *DBMS specific*

DBMS Selection

Main Steps of DBMS selection -

- *Know the DMBS and their capabilities*
- *Short-list two or three products*
- *Evaluate short-listed products*
- *Recommend selection and produce report*

Application Design

The design of the user interface and the application programs that use and process the database.

- *More than one application program can use a database*
- *More than one user in an application may interact with the database*
- *Application program and database are totally independent as two entities*

Implementation

Implementation is the process of coding /programming the actual software (here database and application programs)

- *In the implementation stage, programmers code the database according to the design stage*

- *Create Database*

- *Create Schemas / Tables*

Testing

Testing is the process of executing the application programs and database with the intent of finding error.

- *Test the database*

- *Test the application program/s*

- *Test the connectivity between database and application programs*

Operational Maintenance

The process of monitoring and maintaining the system after installation / deployment.

- *Operational Maintenance*

- *System Upgrade / Downgrade*

- *User Authentication / Access*

Data Administration

The management of the data resource, which includes database planning, development, and maintenance of standards, policies and procedures, and conceptual and logical database design.

- *The person (IT personnel) who looks after this is called a* ***Data Administrator (DA)***

Database Administration

The management of the database and database applications which includes physical database design, implementation, setting security and integrity controls, monitoring system performance, data reorganizing the database as necessary.

- *The person (IT personnel) who looks after this is called a* ***Database Administrator (DBA)***

Summary

From this lecture we have learned the details of

- Database life-cycle - plan, analysis, design, implementation, Testing, Maintenance
- Data Administration
- Database Administration