



The University of Manchester

DATA MODELLING OF DATABASE APPLICATIONS

COMP23111 – Database Systems

OUTLINE

Database Application Model

Database Application Design Phases

Conceptual Data Model

Logical Data Model

Physical Data Model

数据库应用模型 数据库应用设计阶段 概念性数据模型 逻辑数据模型 物理数据模型

DATABASE APPLICATION MODEL

Username:

User123_

Username is not available!

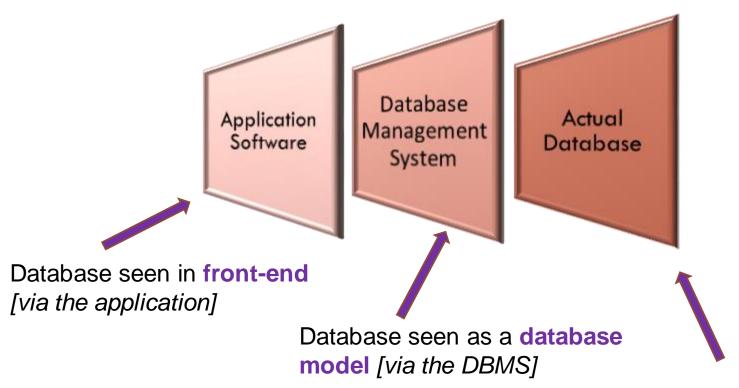
DATABASE APPLICATION MODEL





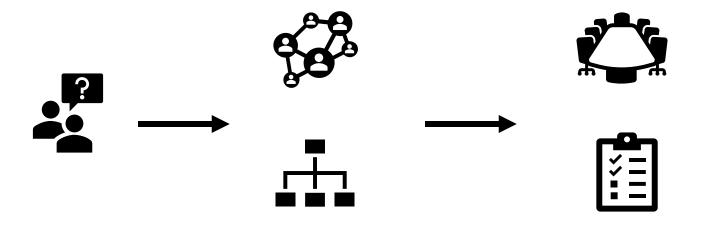


DATABASE APPLICATION MODEL

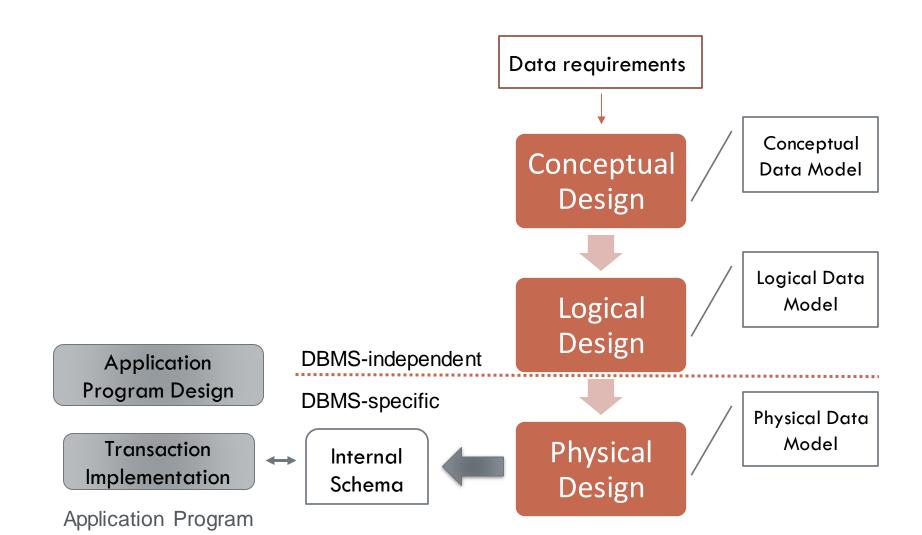


Data organised in data structures [Integrated database]

DATABASE APPLICATION DESIGN PHASES



DATABASE APPLICATION DESIGN PHASES



DATABASE APPLICATION DESIGN PHASES

- DATA MODELLING

Data requirements

Conceptual Data Model

Logical Data Model Physical Data Model

- "A user should be able to place an order."
- "An order should save all the selected products of the user."

- Customer
- Orders
- Products
- Customer (c id, name...)
- Orders (o id, c id...)
- Products (p id, o id...)

- Customer (c_id, name...)
- Orders (o_id, c_id...)
- Products (p_id, o_id...)
- + PK/FK, datatypes...

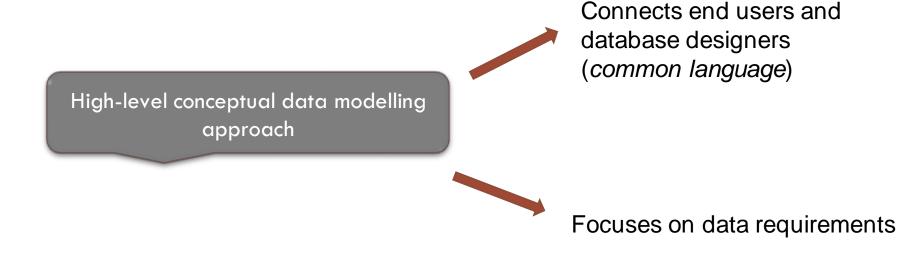
DATABASE APPLICATION DESIGN PHASES - DATA MODELLING

Conceptual Data Model Logical Data Model Physical Data Model

Entity-Relationship Diagram (ERD)

DATABASE APPLICATION DESIGN PHASES - ERD

ER Modelling



DATABASE APPLICATION DESIGN PHASES - ERD

Why ER modelling?

Simple

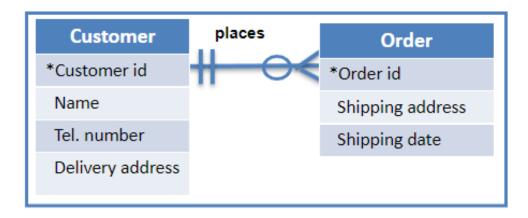
Flexible

Famous <

CONCEPTUAL DATA MODEL

Also known as conceptual schema.

- ➤ Precise, high-level description of data requirements (via the **ERD**).
- ➤ Aids systematic mapping into an elaborate, logical model.



LOGICAL DATA MODEL

Also known as logical schema.

Relational model in our case.

- Represents data structures that will eventually implement the database (agnostic to the DBMS intended for use).
- These data structures include the specifics about entities and relationships among data, emerging from the conceptual model.

	Customer	places		Order
PK	Customer id	# ⊖<	PK	Order id
	Name			Shipping address
	Tel. number			Shipping date
	Delivery address		FK	Customer id

PHYSICAL DATA MODEL

Also known as physical schema.

Represents the data structures as they will be implemented <u>in</u> <u>a specific DBMS</u>, with all the technical details needed.

These data structures will essentially be the implemented database schema (relational database in our

case).

	Customer	places		C_Order
PK	Customer_id: int	"	PK	Order_id: int
	Name: varchar(255), NOT NULL			Payment_status: varchar(20), DEFAULT 'Processing'
	Tel_number: varchar(15), NULL		FK	Customer_id: int