

8 Databases 数据库

8.1 Database Concepts 数据库概念

file-based approach

store data in multiple separate files. It has many limitations in the integrity, privacy, redundancy, inconsistency, and dependency of data.

data redundancy 数据冗余

the same data stored more than once.

database 数据库

a structured collection of items of data that can be accessed by different applications.

relational database 关系型数据库

a database model in which each item of data is stored in a relation.

entity 实体

an object that can have data stored about it.

relation (table) 关系 (表)

the special type of table used in a relational database.

field 字段

a column in a relation containing values.

attribute 属性

an individual data item stored for an entity, represented by a field in a relation.

record 记录

a row in a relation storing data for one entity.

tuple 元组

data that describes one instance of an entity, represented by a record in a relation.

candidate key 候选键

one attribute or a combination thereof for which each no tuple has the same value and hence **could** be a primary key.

primary key 主键

one candidate key or a combination thereof that has been chosen as the unique identifier of the tuples.

secondary key 辅助索引

a candidate key that has not been chosen as the primary key.

foreign key 外键

an attribute in one table that refers to the primary key in another table.

relationship 关系

the situation in which one table has a foreign key that refers to a primary key in another table in the database. It could be one-to-one, one-to-many, many-to-one or many-to-many.

Entity-Relationship (E-R) model 实体关系图

a graphical representation of a database and the relationships between the entities.

referential integrity 参照完整性

the use of a foreign key to ensure that a value can only be entered in one table when the same value already exists in the referenced table.

repeating group 冗余数据组

a set of attributes that have more than one set of values when the other attributes each have a single value.

normalisation 规范化

organising data into two or more tables with relationships between them to minimise data redundancy.

first normal form (1NF) 第一范式

entities do not contain repeated groups of attributes.

second normal form (2NF) 第二范式

entities are in 1NF and no partial dependency any non-key attributes depend upon the primary key.

third normal form (3NF) 第三范式

entities are in 2NF and no non-key dependency: all non-key attributes are independent and fully dependent on the primary key only.

6.2 Data Management System (DBMS) 数据库管理系统

software that controls access to data in a database.

database administrator (DBA) 数据库管理员

a person who uses the DBMS to customise the database to suit user and programmer requirements.

data dictionary 数据字典

data about the characteristics of the data about to be stored (metadata), such as field names and types, table names, relationships, etc. (example: the information specified in `CREATE TABLE`).

logical schema 逻辑模式

the conceptual data model for a specific database that is independent of the DBMS used to build that database (example: design of entities, E-R diagram).

developer interface 开发者界面

a software tool allowing users to create items (tables, forms, reports) in the DBMS.

query 查询

used to select data from a database subject to defined conditions, allowing searches to find specific data.

query processor 查询处理器

software tools provided by a DBMS to allow creation and execution of a query, and organises the results to be displayed to the user

index 索引表

a small secondary table used for rapid searching which contains one attribute from the table being searched and pointers to the tuples in that table.

6.3 DDL and DML 数据定义与操纵语言**data definition language (DDL) 数据定义语言**

a language used to create, modify and remove the data structures that form a database.

data manipulation language (DML) 数据操纵语言

a language used to add, modify, delete and retrieve the data stored in a relational database.

Structured Query Language (SQL) 结构化查询语言

the standard language used with relational database as DDL and DML.