

Database Management System

Data Structure Design

Contents

- **Function**
- **Design**
- **Implementation**

Copyright Declaration

Contents included in this document are protected by copyright laws. The copyright owner belongs to solely Ruankosoft Technologies (Shenzhen) Co., Ltd, except those recited from third party by remark.

Without prior written notice from Ruankosoft Technologies (Shenzhen) Co., Ltd, no one shall be allowed to copy, amend, sale or reproduce any contents from this book, or to produce e-copies, store it in search engines or use for any other commercial purpose.

All copyrights belong to Ruankosoft Technologies (Shenzhen) Co., Ltd. and Ruanko shall reserve the right to any infringement of it.

This system is a relational database management system. This article will design its data structure to implement the following core functions of DBMS:

1. Data Definition Function

It can define the data object in the database.

2. Data Organization, Storage and Management

It can organize, store and manage various data by type, including the data dictionary, data storage path, etc, and implement the relation between data.

3. Data Manipulation

It can manipulate the database, implement the basic database operations, such as insert, select, update, delete, and so on.

Basic Data Type

All the data in DBMS will be stored with the following basic data types.

Data Type	Description	Size	Program Type
INTEGER	Integer	4 bytes	int
BOOL	Boolean type	1 byte	bool
DOUBLE	Floating point number	2 bytes	double
VARCHAR	String type, maximum length is 255, ended with “\0” to mark the end of a string.	256 bytes	char[n]
DATETIME	Date time type	16 bytes	SYSTEMTIME

This system is a relational DBMS. It stores data with the binary file .

1. File Design

The files in DBMS are mainly divided into two types: data definition file and data file

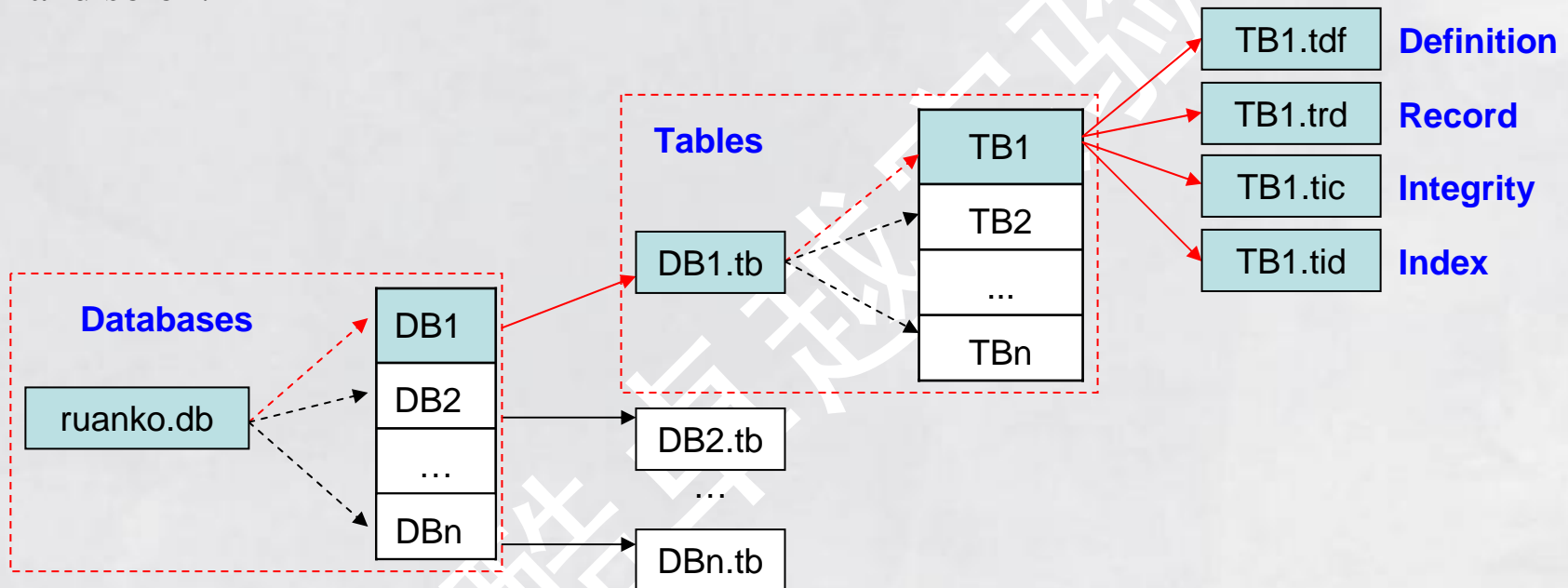
(1) **Data definition file**: saves the definitions of various objects in DBMS.

(2) **Data file**: saves various data in DBMS.

Type	File	Name	Remark
Data definition file	Database description file	ruanko.db	Save the database information.
	Table description file	*.tb	Save the table information.
	Table definition file	*.tdf	Save the field information.
	Integrity description file	*.tic	Save the integrity constraints.
	Index description file	*.tid	Save the definition of the index.
Data File	Record File	*.trd	
	Index data file	*.ix	
	Log file	*.log	

2. File Structure

The database management system supports multi-database. A database can include many tables. A table includes the data of the table definition, integrity constraint, index, record and so on.



3. Directory Structure

Taking **[DBMS_ROOT]** as the root directory, each database creates a folder to save various files in the database. Path :**[DBMS_ROOT]\data\DB_NAME**.

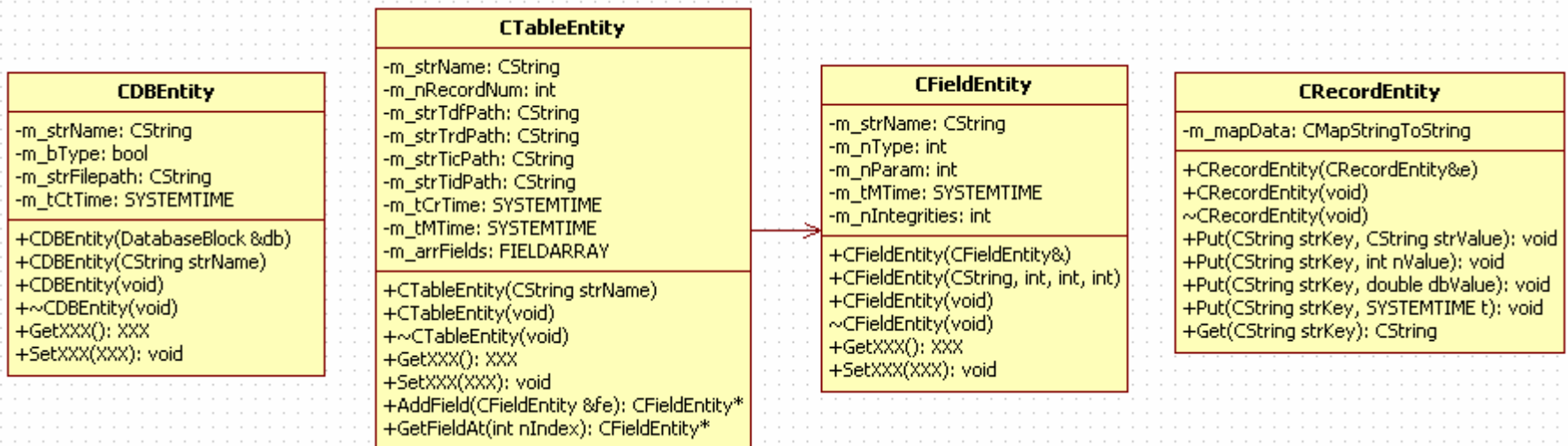
Example: create a “**Ruanko**” database, and create "Student“ table in the database. The presented directory structure is as follows:

File	Path
Database description file	[DBMS_ROOT]\ruanko.db
Table description file	[DBMS_ROOT]\data\Ruanko\Ruanko.tb
Table definition file	[DBMS_ROOT]\data\Ruanko\Student.tdf
Record file	[DBMS_ROOT]\data\Ruanko\Student.trd
Integrity description file	[DBMS_ROOT]\data\Ruanko\Student.tic
Index description file	[DBMS_ROOT]\data\Ruanko\Student.tid

4. Entity Class Design

Create the entity class to pass data in the program. Define the private data member and initialize with the constructor. Provide public GetXX() function\SetXX() function to get value and assign value.

- (1) CDBEntity
- (2) CTableEntity
- (3) CFieldEntity



Create a Ruanko database. Create Student table in the database and insert data into the table. The implementation steps are as follows:

Step 1: create database description file “ruanko.db” to save the database information.

Step 2: create table description file “..\data\Ruanko\Ruanko.tb” to save the table information.

Step 3: create table definition file “..\data\Ruanko\Student.tdf” define the table structure.

Step 4: create record file “..\data\Ruanko\Student.trd” to insert the record.

www.ruankoweb.com

Thanks

Data Structure Design