Analysis and Design of the Database of Library Network Management System

XueLian Feng, HaiYan Liu
Baotou railway vocational technical college,
Baotou, Inner Mongolia, 014040, China
snow_snowflake@sina.com.cn, liuhaiyanliuhaiyan@live.cn

Abstract. In this paper we construct a library network management system which is suitable for the higher vocational college. It is based on B/S structure with ASP.NET as interface programming language, SQL Server as DBMS to save database. It has realized the processing of book purchasing, book cataloging, book circulating, book retrieval and journal management automation. This system connects to the Internet to make the reader search information conveniently. It greatly improves the efficiency of library management and the utilization of books. Analysis and design of the database is an important part of the development of the library network management system.

Keywords: database, model, library management system.

1 Introduction

There are many secondary vocational schools upgraded to higher vocational colleges in recent years, along with upgrading of the school, expanding of the school-running model, the number of books and the scale is constantly expanding. How to build a proper library management system in the college is becoming more and more important. Most of the present library management systems are based on C/S structure suitable for the LAN. With the popularity of the Internet the shortcoming and the limitation of the old management system are growing obvious. It can not satisfy the necessary any more.

This library network management system is based on B/S structure, using ASP.NET as interface programming language and SQL Server as DBMS to save database. By connecting to the Internet the system greatly improves the efficiency of library management and the utilization of books. It also greatly save the human and material resource.
2 Database Analysis

Developing system is based on the analysis of database. Database analysis work directly affects the database utility. Database analysis can be divided into two parts. One is the analysis of conceptual model, the other is a logical model analysis.

2.1 Conceptual Model Analysis

The conceptual model is the abstraction and generalization of the real world. It reflects the real world relations between things and keep the satisfy of the user's data processing requirements.

The powerful tool for Conceptual model is E-R model (entity relationship diagram). The E-R model is a problem-oriented conceptual model, which uses a simple graphical way to describe data of the real world. This description is not related to the data in the database and access way, much closer to people's way of thinking. In E-R model, information consists of entity type, entity properties and entity relationship.

The library NMS E-R diagram analysis is based on the UML system model. The database model is based on drawing E-R diagrams.

2.2 Logical Model Analysis

Conceptual model E-R diagram is an abstract expression of the user requirement, it is independent of any kind of specific data model, and thus can not be supported by any specific DBMS. In order to be able to establish the final proper system, the conceptual model needs to be converted into a logical model to complete the design of the database logical structure. Database logic structure design is divided into two steps: First, convert the E-R diagram to the entity-relationship model. Secondly, optimize the entity-relationship model. The specific steps: each entity is converted to a relationship (a data tables). The entity property is the data table properties (field in the tables). The primary key is the relationship.

The logic model diagram, namely that is the analysis of the fields and the tables, is based on the E-R diagram of the library NMS. After coming to the decision what fields and tables you need you can create a database model.

3 Database Design

Once you have the database model you can start the database design. First according to the various models, you can create different databases. Then go to the decision of the fields and the tables about those databases.
3.1 Create Databases

According to the analysis of the Library NMS, we mainly need some databases as following:
(1) Subscribing database, mainly used for the purchasing subsystem stores the information of the books. The librarian who is responsible for purchasing operates this subsystem.
(2) Cataloging database, mainly used for sorting and cataloging subsystem. And it is accessed only by the librarian responsible for cataloging. Cataloging database will need to create four tables: Catalog property number table, Catalog table, Key words table and New books table.
(3) Circulation database, mainly for circulation subsystem, including the readers table, circulating book table, category table of readers, a fine record table, return books record table, lent books record table, circulation statistic table and rule table.
(4) Library database: including books table, publisher table and table for books damaged or lost.

3.2 Create Viewers

We can create the following view based on Library NMS.
(1) In circulation database in order to display different types of readers corresponding to different lending rules we create a reader rules view.
The SQL syntax of the view is as follows:
CREATE VIEW dbo.dzgzb
AS
SELECT dbo.DZZBK.ZBMC, dbo.DZZBK.ZBDM, dbo.DZZBK.DZLX,
dbo.GZK.TSJQ, dbo.GZK.WYSJQ, dbo.GZK.KJSCS,
dbo.GZK.KJWYS, dbo.GZK.XJTS, dbo.GZK.FJL FROM dbo.DZZBK
INNER JOIN
dbo.GZK ON dbo.DZZBK.DZLX = dbo.GZK.DZLX

(2) In circulation database in order to get more information about the reader and the book we create a view to display the details about the reader and the book.
The SQL syntax of the view is as follows:
CREATE VIEW dbo.LTTSVW
AS
SELECT dbo.LTK.SSH, dbo.LTK.CCH, dbo.LTK.TMH,
dbo.LTK.DZZH, dbo.LTK.JSRQ, tsLib.dbo.tsk.SM,
tsLib.dbo.tsk.DJ, tsLib.dbo.tsk.TJ, tsLib.dbo.tsk.CDW
FROM dbo.LTK INNER JOIN
4 Conclusion

Based on the analysis of system configuration and the analysis of the database, the next step will be to the library network management system implementation. At present, this system has been put into operation and the system is running properly in our school. On the whole the system has achieved the desired purpose in the following way:

(1) To raise the library management level and work efficiency. Using the library network management system greatly increases the work efficiency. It can make the flow management easier to speed up the shelving, such as subscribing book, cataloging book, borrowing book. Using bar-code in intermediate links speeds up the book borrowing and returning and simultaneously reduced the mistakes caused by hand input.

(2) Cataloging books according to Chinese Library Classification in this system, the data share is achieved with other libraries.

(3) You can do a book search on the Internet. The query way is simple and multiplex. Speeding up the query greatly increases the book utilization ratio.

Next we plan to create a digital library in order to optimize the use of digital resources.

Reference:
2. Wang Sheng, Ma LiJie, SQL Server database development classic cases analysis, Tsinghua University press, Beijing (2006)
6. Li Hao, Yan Yanqin, Development and Application of University Library Management System Based on B/S Structure, Journal of modern information (2010, 30(1))