

## Research on Library Management System Based on VBA

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**Abstract.** For the provincial and universities' libraries, the management of books and materials are generally based on complex and huge database, such as: SQL Server, Access, and Oracle. The cost of maintenance and management is very high, even though its safety and reliability can be effectively protected. Meanwhile, it's not convenient for manual input. As for smaller enterprises, they have a tiny sample size of books and staffs, according to this situation, we designed a library management system with VBA and a barcode scanner (CCD). The results show that it has obviously decreased the chattiness of the whole process which includes borrowing and returning books, make sure the management of library materials is unified and effective.

### 1. Introduction

Current library management system have a very good use in major colleges and the municipal libraries, but its structure consists of large databases and back-end servers, which maintains professional computer developers and professional library management personnel to operate.

These factors have restricted this management system from promoting to small medium enterprises or primary and secondary schools. As traditional small library, books are not a unified coding, it's difficult to find books and materials they need and also time-consuming. Librarians in the process of loan registration and loan inquiries must make sure the orders of the books are all right, it's cumbersome and not conducive to the statistics. With the proliferation of computers technologies, such methods no longer meet the needs of modern management and service.

Nowadays most of published papers focus on Library Management System in view of VC and SQL, but less of which pay a attention to a small library System Management based on VBA .Given the above, the system we designed is settle for small library management system. It is simple, easy to maintain, and needs no server or large databases, anyone can operate without requiring professional computer knowledge, meanwhile it's more convenient for the allocation of resources make books.

Barcode is a set of regularly arranged digitally coded, this character represents a series of certain identification information. The barcode scanner is similar to simulated keyboard, when irradiated with a barcode analyzer, complete with a laser principle, computers automatically read the barcode digital information originally tedious manual input. Which greatly reduces the labor cost and makes the process of the information collection of books without human intervention as possible.

### 2. Needs Analysis

According to the research needs analysis, functional modules of the system is divided into three parts: borrow books, return books and integrated view. Specific functional is shown in Fig 1.

### 3. Specific Design

#### 3.1 Overall Design.

In this system, VBA is used as a front-end development tools and Excel for background database, Microsoft BarCode Control 9.0 tools in VBA to create an independent barcode identification for staffs, the use of the property of LinkCell BarCode creating a data access as an interface in the communication table. Thereby, make sure barcode with names in the table are logical uniformly. This

barcode can make batch encoding rules by the number of the employees thanks to its continuity. With barcode scanners the process of borrowing and returning books can be easily achieved.

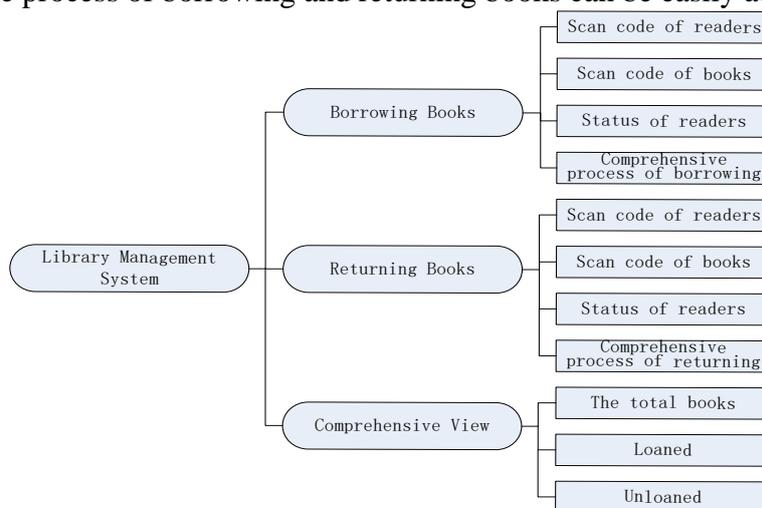


Fig. 1 System flow

### 3.2 Coding Design.

Set of design codes can do regular reserve identify easily with the character code function to process read, conducive to future expansion after the person or department barcode classified work for the future of the program to identify possible categories. It's easy for us to make codes for other members in the future if the code we designed logically and regularly. To this end, the barcode of the system is designed such as: "XX-01-0001". "XX" is short for the name of the School of Information; "01" indicates the first major in the School of Information; "0001" means the first number of the students this major. As a result, this coding contains all the information students have in that university. The length of the code string is fixed, which is "2 characters + 2 characters + 4 characters", a total of 8 characters in length. Fixed-length string helps typesetting batch barcode generation program, and also facilitates the production of making barcode cards in uniform size. In addition the hidden attribute "length = 8" is used for the data mining that may occur in the future. In fact this Sub-paragraph embodies the characteristics of high cohesion and low coupling data coding rules, it is also to be used for the use of MID () function and other functions later.

### 3.3 Database Design.

Model.

Database design of the system is divided into two modules, namely "preprocessing information" and "information record." "Preprocessing Information" module is composed of "person data", "book data" two sub-modules, which connecting students' name and personnel code. In this system, without using the new coding method for coding books, all the books have its original codes in back, with what the scan code scanner can put in storage. In addition, the "book data" also includes "loan status", "borrow time", "borrow" and other information, this part belongs to the "information record" module, along with the information of the "total record", which will update the status varying the course of borrowing and returning books.

Data Sheet.

Table 1 Total Records

Field name	Data type	Field size	Major key
Books ID	Digit	14	Yes
Books Name	Text	10	No
Borrowed Date	Date	8	No
Borrower	Text	10	No
Returned Date	Date	8	No
Due Date	Date	8	No

Personnel data: Member ID, Member Name;

Books Data: Book ID, Book Name, Status Messages;

Total Records: Borrowed Book ID, Book Name, Borrower, Borrowed Date, Returned Date, Due Date.

#### 4. Coding and Implementation Process

In order to avoid the invalid operation caused by managers scanning code simultaneously using the mouse, our design principle is possible to trigger various control methods with the associated function is called here. meanwhile, the data table saving is associated trigger. Users do not need additional operations except to click on the label control (TabStrip) whenever you decide to borrow books or check the information. The focus of the control (SetFocus) is designed to be transferred in accordance with procedures automatically.

We create a class called MultiPage1 form as book lending form, and add a TextBox control, call TextBox1\_Change () function to read information created by scan code scanner at initialization, then modify the "Name" in the Properties as tx\_jy\_ygname, if the value changes, through the function and determine whether the number of characters is set to 8 as before,if so, use LinkCell of the BarCode control to attribute access to the "personnel data tables" (Sheets ("personnel data sheet"). Cells ()) in Excel, one by one until it finds the barcode is corresponding to the name of a person, then its name is displayed on the bottom of the Label control. The concrete flow of returning will be introduced as follows:

Step1: select "Returning books" TAB in the main menu;

Step2: read READERS'BORROWING card information with barcode scanner;

Step3: If the status bar of READERS'BORROWING card displays "delinquent", the system automatically prompts the reader to pay costs and then turn to Step7; otherwise continue Step4;

Step4: read barcode information of the book with barcode scanner;

Step5: System calculates the days whether this book is over the date via Borrowed Date and Returned Date, then lock status bar as "delinquent", recorded the information in the READERS' INFORMATION card;

Step6: System prompts "Successful" and delete this entries in the database;

Step7: Exit main menu.

If the value of READERS' STATUS bar Lab\_gh\_zt. Caption displays as "Delinquent", then MsgBox will pop up a dialog box prompting the reader to pay the costs while executing Break to exit menu. Otherwise, use tx\_gh\_ygname\_Change () function to read barcode information of the book. Access the database through Sheets ("Book Information").Cells (), to find Borrowed Date and Returned Date corresponding to this book. The function Count\_Date () will judge whether the books borrowed is overdue, if it is, change READERS' STATUS Lab\_gh\_zt. Caption as "Delinquent", calculate overdue days and costs, and then record that in REDAERS'INFORMATION of the Total Records Table.

In the case of after recoding the information or the book is not overdue, MsgBox displays a dialog box prompting reader this book is returned successful, and this is the whole process of returning books.

The process of book loaning is shown as follows:

Parts of code include returning are as follows:

If Len (tx\_gh\_wjname.Text) = 13 Then

wjcode = tx\_gh\_wjname.Text

For i = 2 To Sheets ("Books Data").Cells (65536, "a").End (xlUp).Row

If CStr (Sheets ("Books Data").Cells (i, 1).Value) = wjcode Then

If CStr (Sheets ("Books Data").Cells (i, 1).Value) = wjcode And CStr (Sheets ("Books Data").Cells (i, 4).Value) = "Delinquent" And CStr (Sheets ("Books Data").Cells (i, 5).Value) <> wj\_gh\_text. Text  
Then

MsgBox "You have one book already been delinquent, please pay the cost first, thank you!"

Exit Sub

```

End If
If CStr(Sheets("Books Data").Cells(i, 1).Value) = wjcode And CStr(Sheets("Books Data").Cells(i,
6).Value) = "Overdue" Then
MsgBox "This book is overdue!"
Exit Sub
End If
End If
The form about "Borrowing book" is roughly as same as this design, only a part of code has been
modified.

```

Parts of code include borrowing are as follows:

```

If Len (Tx_jy_ygname.Text) = 8 Then
ygcode = Tx_jy_ygname.Text
For i = 2 To Sheets ("Personnel data").Cells (65536, "a").End (xlUp).Row
If CStr (Sheets ("Personnel data").Cells (i, 1).Value) = ygcode Then
Wj_jy_text.Text = Sheets ("Personnel data").Cells (i, 2).Value
Tx_jy_wjname.SetFocus
Exit For
End If
Next
If i >= Sheets ("Personnel data").Cells (65536, "a").End (xlUp).Row and t = 0 Then
Lab_jy_ygname = "Cannot find this person! "
Tx_jy_ygname.Text = ""
Tx_jy_ygname.SetFocus
Lab_jy_zt.Caption = "Loaning failed"
Exit Sub
End If
End If

```

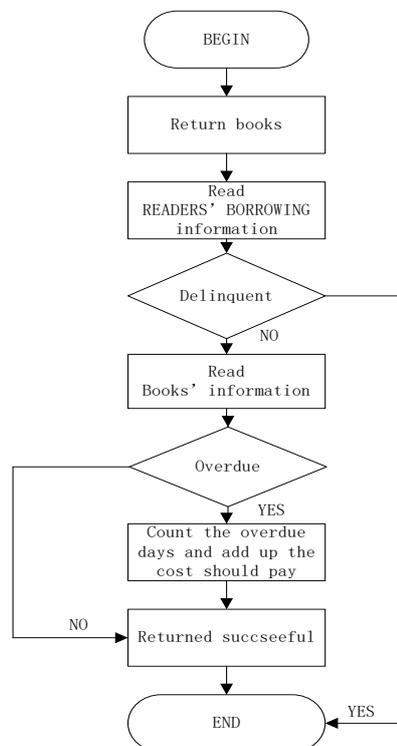


Fig. 2 Process of book loaning

## 5. Demonstration program

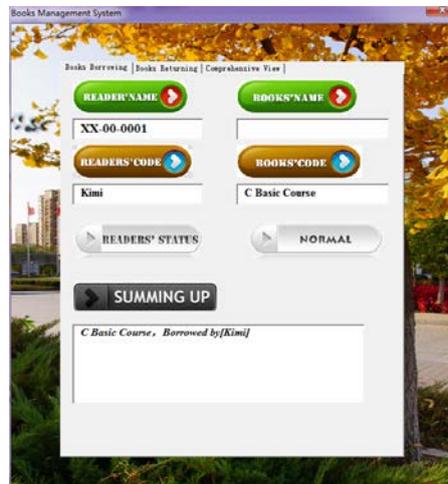


Fig. 3 Book loaning

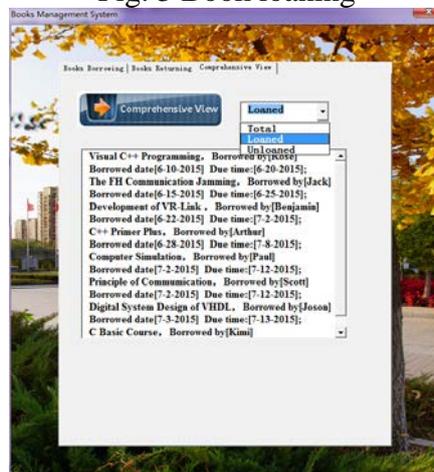


Fig. 4 Comprehensive view

## 6. Conclusion

The standpoint of this database system is designed to use of scan code analyzer and barcode to reduce complexity for operating .while, Excel as a knowledge background, so that users are not limited to computer professionals, which can be a general application in small or medium enterprises and institutions. In addition, the post-maintenance, just by simply adding data on three data tables, deleting the notes useless can achieve the whole course of updating the entire database. After developing and perfecting the system which can fulfill the desired results we want, and it can greatly improve the efficiency of library management.

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