**5.数据库实施阶段**

5.1建立数据库、数据表、视图、索引

5.1.1建立数据库

Create datebase DBTest

On

(name=DBTest,

Filename=‘c:\DBTest.mdf’,

Size=15MB,

Maxsize=100MB,

Filegrowth=15%)

Log on

(name=‘DBLog’,

Filename=‘c:\DBLog.ldf’,

Size=10MB,

Maxsize=20MB,

Filegrowth=2MB,

);

5.1.2 建立数据库

（1）读者类别信息表的建立：

Create table ReaderLB(

LBName char(10) primary key,

LBnum smallint not null check(LBnum>=0),

LBday smallint not null check(LBday>=0),

LBqx char(4) not null);

1. 管理员基本信息表的建立

Create table Manager(  
MID char(10) primary key,

MName char(10) not null,

MSex char(2) check(MSex=‘男’ or MSex=‘女’),

Mpwd char(12) not null,

MAuth char(10) not null,

MTeleph char(15),

MAddre char(30),

)

（3）图书馆基本信息表的建立

Create table Room(  
 RoomNo char(5) primary key,

RoomMID char(10)not null,

RoomNum smallint check(Roomnum>=0),

RoomAddre char(20),

Foreign key(RoomMID) references Manager(MID),

);

(4)馆藏图书基本信息表的建立：

Create table Book(  
BookID char(20) primary key,

BookNo char(10) not null,

BookName char(20) not null,

BookWriter char(8)not null,

BookPublish char(20)not null,

BookPrice float,

BookDate datetime,

BookClass char(20),

BookMain char(200),

BookPrim char(30),

BookCopy smallint check(BookCopy>=0),

BookState char(10) not null,

BookRNo char(5)not null,

Foreign key(BookRNo)references Room(RoomNp),

);

1. 读者基本信息表的建立:

Create table Reader(  
 ReaderID char(10) primary key,

ReaderName char(10)not null,

ReaderSex char(2)not null,

ReaderNo char(10)not null,

ReaderType char(20)not null,

ReaderDep char(20),

ReaderGrade char(5),

ReaderPref char(20),

ReaderNum smallint check(ReaderNum>=0),

Foreign key(ReaderType) references ReaderLB(LBName),

Check(ReaderSex=‘男’or ReaderSex=‘女’),

);

1. 借阅基本信息表的建立：

Create table Borrow(  
BookID char(20),

ReaderID char(10),

Outdate datetime not null,

YHdate datetime not null,

Indate datetime,

Fine float,

CLState char(4),

MID char(10) not null,

Primary key(BookID,ReaderID),

Foreign key(MID)references Manager(MID),

);

5.1.3 建立视图

1. 用于查询图书信息的视图定义如下：

Create view BookView(图书编号，索书号，书名，作者，出版社，价格，出版时间，图书分类，库存数，图书状态，所在馆)

As

Select BookID,BookNo,BookName,BookWriter,BookPublish,BookPrice,BookDate,BookClass,BookCopy,BookState,BookRNo from Book;

1. 用于读者基本信息查询的视图定义如下：

Create view ReaderView(读者编号，读者姓名，类型，学院，专业，已租书目)

As

Select ReaderID,ReaderNamae,ReaderType,ReaderDep,

ReaderPref,ReaderNum from Reader;

1. 用于显示当前借阅中信息的视图定义如下：

Create view BorrowView(读者编号，书名，作者，借阅日期，到期日期)

As

Select ReaderID,BookName,BookWriter,Outdate,YHdate from Borrow,Book where Borrow.BookID=Book.BookID and Borrow.Indate=””;

1. 用于借阅历史信息查询的视图的定义如下：

Create view HistoryView(读者编号，书名，借阅日期，归还日期)

As

Select ReaderID,BookName,Outdate,Indate from Borrow,Book where Borrow.BookID=Book.BookID and Borrow.Indate !=””;

1. 用于查询罚款信息的视图定义如下：

Create view fineView(读者编号，图书编号，书名，借阅日期，归还日期，

罚款，处理状态，管理员号)

As

Select ReaderID,bookid,BookName,Outdate,Indate,fine,clstate,mid from Borrow,Book where Borrow.BookID=Book.BookID and fine!=0;;

5.1.4建立索引

SQL SERVER默认是在主键上建立聚集索引的，所以不必人工建立

5.1.5 建立触发器

1. 当删除Reader表中某一读者基本信息时，触发Borrow表，删除相应的记录

Create trigger trigger\_Reader\_delete

On Reader for delete

As begin

Declare @ReaderID char(10)

Select @readerid=readerid from deleted

Delete from borrow where readerid=@readerid

End;

1. 当在borrow表中增加一条借阅记录时，使该图书的库存数减1，当库存数=0时，状态由“可借”变为“不可借”

Create trigger trigger\_borrow

On borrow for insert

As begin

Declare @bookID char(20)

Select @bookid=bookid from inserted

If((select bookstate from book where bookid=@bookid)=‘可借’)

Begin

Update book set bookcopy=bookcopy-1 where bookid=@bookid

If((select bookcopy from book where bookid=@bookid)=0)

Begin

Update book set bookstate=‘不可借’where bookid=@bookid

End

End

Else

Begin

Print(‘数量不足，无法借阅’)

End

End;

1. 当在borrow表中增加一条归还记录时，使该图书的库存数加1，状态变为“可借”

Create trigger trigger\_Return\_book

On borrow for update

As begin

Declare @RbookID char(20)

Select @bookid=bookid from inserted

Update book set bookcopy=bookcopy+1,bookstate=‘可借’

Where bookid=@bookid

End;

1. 当在borrow表中增加一条借阅记录时，使该读者的持有数加1，当持有数大于等于该读者最大持有数时，不可借阅

Create trigger trigger\_borrow\_reader

On borrow for insert

As begin

Declare @ReaderID char(10)

Declare @Readertype char(10)

Select @readerid=inserted.readerid,@readertype=readertype

from inserted,reader

where reader.readerid=inserted.readerid

If((select readernum from reader

where readerid=@readerid)<(select lbnum from readerlb

where lbname=@readertype))

Begin

Update reader set readernum=readernum+1

where readerid=@readerid

End

Else

Begin

Rollback

Print(‘已达最大借书数量’)

End

End;

1. 当在Borrow表中增加一条归还记录时，使该读者的持有数量减1

Create trigger trigger\_Return\_reader

On borrow for update

As begin

Declare @ReaderID char(10)

Select @readerid=readerid from inserted

Update reader set readernum=readernum-1

where readerid=@readerid

End;

1. 当book表中增加一本书时，使Room表中相应阅览室的馆藏图书数加1

Create trigger trigger\_book\_insert

On book for insert

As begin

Declare @bookrno char(5)

Select @bookrno=bookrno from inserted

Update room set roomnum=roomnum+1 where roomno=@bookrno

End;

1. 当book表中删除一本书时，使room表中相应阅览室的馆藏图书数减1

Create trigger trigger\_book\_delete

On book for delete

As begin

Declare @bookrno char(5)

Select @bookrno=bookrno from deleted

Update room set roomnum=roomnum-1 where roomno=@bookrno

End;

5.2数据入库

Readerlb

Insert into readerlb values(‘老师’,’10’,’60’,’十年’)

Insert into readerlb values(‘学生’,’8’,’30’,’四年’)

Insert into readerlb values(‘村官’,’6’,’30’,’两年’)

Manager

Insert into manager values(‘01’,’admin’,’男’,

’admin’,’系统管理员’,’13810123456’,’宿舍’)

Insert into manager values(‘02’,’韩意’,’男’,

’000000’,’图书管理员’,’13810456789’,’宿舍’)

Insert into manager values(‘03’,’梁林’,’男’,

’123456’,’图书管理员’,’13810456789’,’宿舍’)

Room

Insert into room values(‘101’,’02’,’0’,’良乡校区图书馆室’)

Insert into room values(‘102’,’03’,’0’,’良乡校区图书馆室’)

Book

Insert into book values(‘9787040195835’,’101001’,’数据库系统概论’,’王珊’,’高等教育出版社’,’33.8’,

’2006-5-17’,’计算机’,’系统全面的阐述数据库系统的基础理论，基本技巧和基本方法’,’数据库’,’3’,’可借’,’101’)

Insert into book values(‘9787040191234’,’101002’,’网络程序设计案例教程’,’孙践知’,’清华大学出版社’,’25’,

’2008-6-17’,’计算机’,’最新网络程序设计技术’,’ASP’,’4’,’可借’,’101’)

Insert into book values(‘9787040192344’,’101003’,’电路与电子技术基础’,’王金矿’,’机械工业出版社’,’38.2’,

’2008-3-11’,’电子电路’,’电路基础模拟电子技术及数字电子技术’,’电路’,’5’,’可借’,’101’)

Insert into book values(‘9787040196543’,’102001’,’软件人机界面设计’,’陈启安’,’高等教育出版社’,’18.6’,

’2004-2-5’,’人机界面’,’全面的介绍软件的界面设计’,’界面’,’4’,’可借’,’102’)

Insert into book values(‘9787040196789’,’102002’,’软件技术基础’,’周肆清’,’高等教育出版社’,’48.5’,

’2007-8-5’,’软件技术’,’介绍软件技术的产生与发展’,’软件’,’5’,’可借’,’102’)

Insert into book values(‘9787040199701’,’102003’,’信息检索’,’陈雅芝’,’清华大学出版社’,’32’,

’2003-7-15’,’信息’,’信息的检索技术及发展’,’信息’,’5’,’可借’,’102’)

Reader

Insert into reader values(‘001’,’韩意’,’男’,

’0614060104’,’学生’,’计算机与信息工程’,’06’,’软件工程’,0)

Insert into reader values(‘002’,’梁林’,’男’,

’0414060106’,’学生’,’计算机与信息工程’,’04’,’软件工程’,0)

Insert into reader values(‘003’,’邵翔’,’男’,

’0614060101’,’学生’,’计算机与信息工程’,’06’,’软件工程’,0)

Insert into reader values(‘004’,’韦勇’,’男’,

’0613060107’,’学生’,’计算机与信息工程’,’06’,’自动化’,0)

Insert into reader values(‘005’,’张硕’,’男’,

’0612060111’,’学生’,’经济’,’07’,’会计’,0)

Insert into reader values(‘006’,’齐麟’,’男’,

’0707030106’,’学生’,’传媒与艺术’,’08’,’数字娱乐’,0)

Borrow

Insert into borrow values(‘9787040191234’,’003’,

’2009-3-3’,’2009-4-3’,’’,’’,’否’,’03’)

Insert into borrow values(‘9787040196543’,’004’,

’2009-4-3’,’2009-5-3’,’’,’’,’否’,’02’)

Insert into borrow values(‘9787040196543’,’002’,

’2009-6-3’,’2009-7-3’,’’,’’,’否’,’03’)

5.3创建各个功能的存储过程

系统共创建了10个存储过程，具体列表如下：

表3.1 创建的存储过程列表

编号 存储过程名称 定义 作用

P-1 book\_insert 详见5.3.1 在book中插入一元组，实

现增加新书功能

P-2 reader\_insert 详见5.3.2 在reader中插入一元组，实

现加入新读者功能

P-3 manager\_insert 详见5.3.3 在manager中插入一元组，

实现加入新管理员功能

P-4 borrow\_insert 详见5.3.4 在borrow中插入一元组，实

现借书功能

P-5 borrow\_update 详见5.3.5 在borrow中更新一元组，实

现还书并自动罚金功能

P-6 delete\_book 详见5.3.6 在book中删除一元组，实

现删除图书功能

P-7 delete\_reader 详见5.3.7 在reader中删除一元组，实

现删除读者功能

P-8 query\_reader 详见5.3.8 在reader中查询读者信息

P-9 query\_book\_writer 详见5.3.9 在book中按作者查询

P-10 query\_book\_no 详见5.3.10 在book中按索书号查询

5.3.1 book\_insert

create procedure book\_insert

@bookid char(20),

@bookno char(10),

@bookname char(20),

@bookwriter char(8),

@bookpublish char(20),

@bookprice float,

@bookdate datetime,

@bookclass char(20),

@bookmain char(200),

@bookprim char(30),

@bookcopy smallint,

@bookstate char(10),

@bookrno char(5)

as

insert into book values(@bookid,@bookno,@bookname,@bookwriter,

@bookpublish,@bookprice,@bookdate,@bookclass,@bookmain,@bookprim,

@bookcopy,@bookstate,@bookrno);

5.3.2 reader\_insert

create procedure reader\_insert

@readerid char(10),

@readername char(10),

@readersex char(2),

@readerno char(10),

@readertype char(20),

@readerdep char(20),

@readergrade char(5),

@readerpref char(20),

@readernum smallint

as

insert into reader values(@readerid,@readername,@readersex,@readerno,

@readertype,@readerdep,@readergrade,@readerpref,@readernum);

5.3.3 manager\_insert

create procedure manager\_insert

@mid char(10),

@mname char(10),

@msex char(2),

@mpwd char(8),

@mauth char(8),

@mteleph char(15),

@maddre char(30)

as

insert into manager values(@mid,@mname,@msex,@mpwd,@mauth,@mteleph,@maddre);

5.3.4 borrow\_insert

create procedure borrow\_insert

@bookid char(20),

@readerid char(10),

@mid char(10)

as

declare @outdate datetime

select @outdate=getdate()

declare @readertype char(10)

select @readertype=readertype from reader where readerid=@readerid

declare @lbday smallint

select @lbday=lbday from readerlb where lbname=@readertype

declare @yhdate datetime

select @yhdate=dateadd(day,@lbday,@outdate)

insert into borrow values(@bookid,@readerid,@outdate,@yhdate,'','','',@mid);

5.3.5 borrow\_update

create procedure borrow\_update

@bookid char(20),

@readerid char(10),

@clstate char(4),

@mid char(10)

as

declare @indate datetime

select @indate=GETDATE()

declare @fine float

select @fine=CONVERT(float,DATEDIFF("d",yhdate,@indate))

from borrow where readerid=@readerid and bookid=@bookid

update borrow set indate=@indate,fine=@fine,clstate=@clstate,mid=@mid

where readerid=@readerid and bookid=@bookid;

5.3.6 delete\_book

create procedure delete\_book

@bookid char(20)

as

delete from book where bookid=LTRIM(@bookid);

5.3.7 delete\_reader

create procedure delete\_reader

@readerno char(10)

as

delete from reader where readerno=LTRIM(@readerno);

5.3.8 query\_reader

create procedure Query\_reader

as

select \* from readerview

5.3.9 query\_book\_writer

create procedure query\_book\_writer

@bookwriter char(8)

as

select \* from bookview where 作者 LIKE '%' +ltrim(@bookwriter)+'%';

5.3.10 query\_book\_no

create procedure query\_book\_no

@bookno char(10)

as

select \* from bookview where 索书号=LTRIM(@bookno)