《数据库原理与设计》实验报告

年级、专业、班级	2024 级软工 01	姓名	
实验题目	实验 7 索引		
实验时间	2024.10.22	实验地点	DS1501
实验成绩		实验性质	√验证性 □设计性 □综合性

教师评价：

□算法/实验过程正确； □源程序/实验内容提交 □程序结构/实验步骤合理；

□实验结果正确； □语法、语义正确； □报告规范；

其他：

评价教师签名：

一、实验目的

[1] 理解索引的定义及优点；
[2] 掌握创建索引的方法；
[3] 掌握管理索引的方法。

二、实验项目内容

针对数据库 Library 进行下面的实验：

1. 使用图形界面工具对 reader 表的读者编号 rno 列创建主键索引；
2. 使用图形界面工具对 book 表的 btitle 列创建全文索引 btix；
3. 使用 SQL 在 book 表中的 bno 创建一个唯一性索引 bnox；
4. 使用图形界面工具将索引 btix 重命名为 title_index；
5. 使用图形界面工具查看索引 title_index；
6. 使用图形界面工具删除索引 title_index；
7. 使用 SQL 删除索引 bnox；
8. 仿照实验 7.2，设计一个检测索引功能的实验。

三、实验过程或算法（源程序）

3.

```
create unique index bnox on book(bno);
```

7.

报告创建时间：

```
drop index bnox on book;

8 先创建了一个随着时间 year 的增长等级增长的表，没一万级增长则变换等级，等
级依次为 EDCBA，这样，在 tech_level 表中一共有五万条记录
delimiter $
create procedure insert1()
begin
declare i int default 1;
while (i<=10000)do
insert into tech_level values(i,concat('E',i));
set i=i+1;
end while;
END$

create procedure insert2()
begin
declare i int default 1;
while (i<=10000)do
insert into tech_level values(i,concat('D',i));
set i=i+1;
end while;
END$

create procedure insert3()
begin
declare i int default 1;
while (i<=10000)do
insert into tech_level values(i,concat('C',i));
set i=i+1;
end while;
END$

create procedure insert4()
begin
declare i int default 1;
while (i<=10000)do
insert into tech_level values(i,concat('B',i));
set i=i+1;
end while;
END$

create procedure insert5()
begin
declare i int default 1;
```

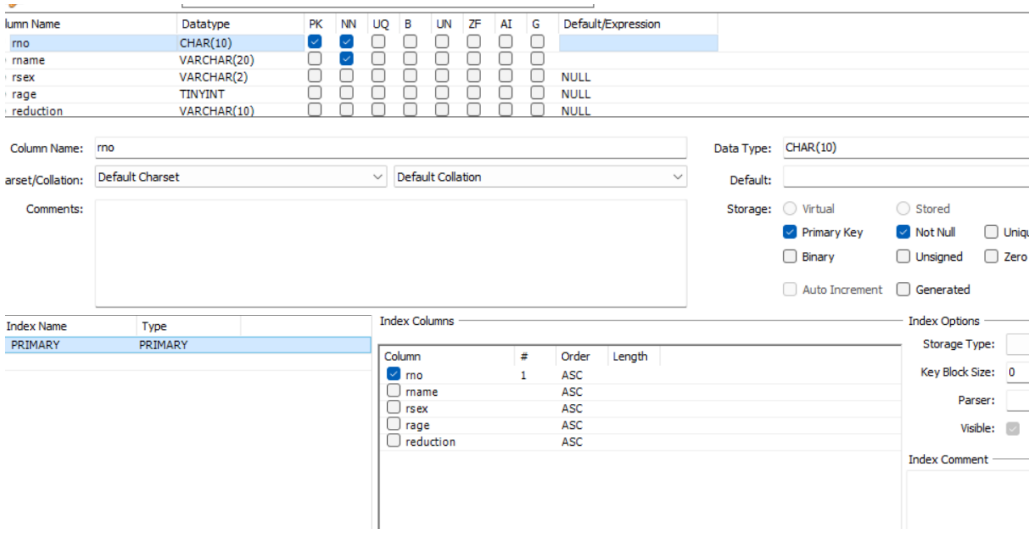
```
while (i<=10000)do
insert into tech_level values(i,concat('A',i));
set i=i+1;
end while;
END$
delimiter ;

call insert1();
call insert2();
call insert3();
call insert4();
call insert5();
```

然后比较有索引和五索引的查找速度

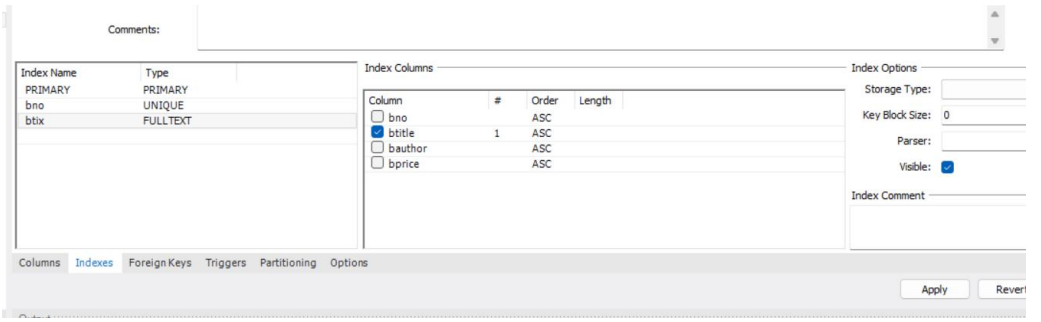
```
select * from tech_level where level='A1';
Explain select * from tech_level where level='A1';

create index level_index on tech_level(level);
select * from tech_level where level='A1';
Explain select * from tech_level where level='A1';
```

四、实验结果及分析和（或）源程序调试过程

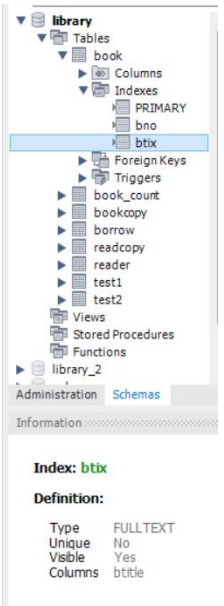
1. 创建主键，系统将自动生成主键索引



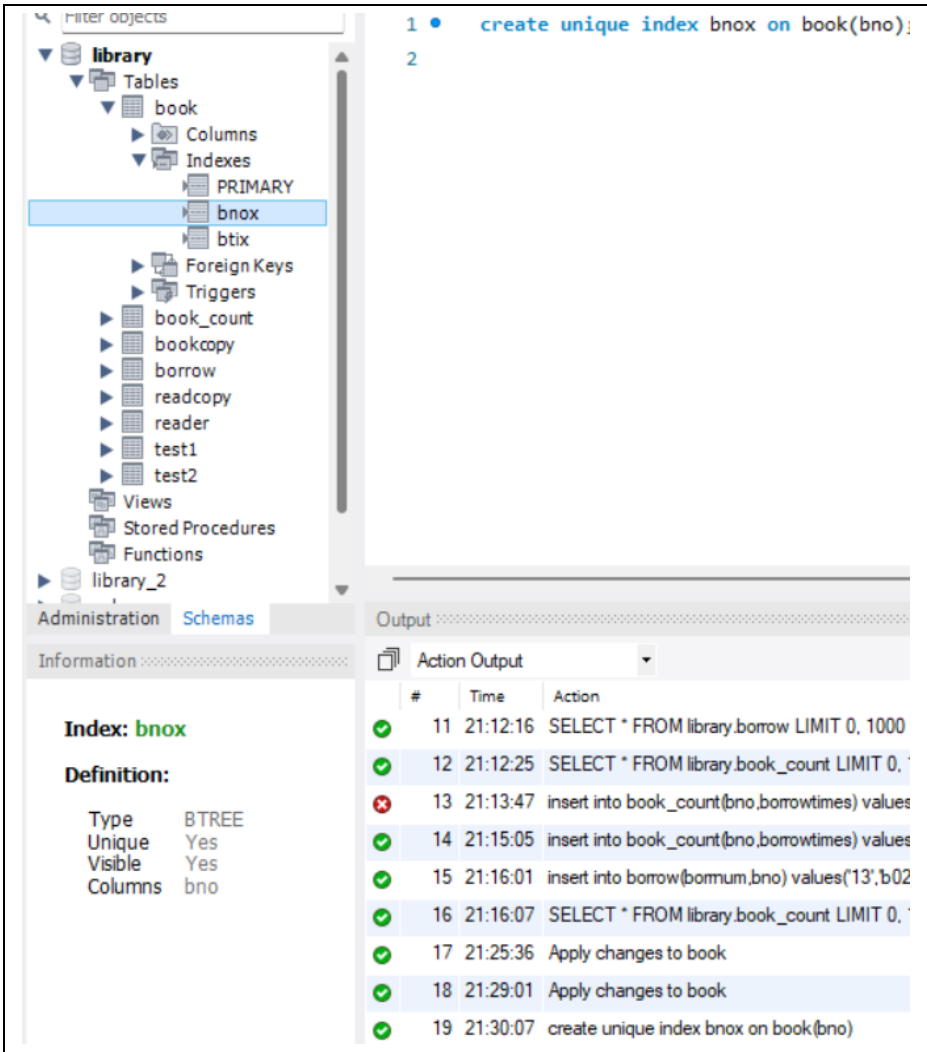
2.创建


Comments:
Index Name
Type
PRIMARY
PRIMARY
bno
UNIQUE
btix
FULLTEXT
Index Columns
Column
#
Order
Length
bno
ASC
btitle
1
ASC
bauthor
ASC
bprice
ASC
Index Options
Storage Type:
Key Block Size:
0
Parser:
Visible:
Index Comment
Columns
Indexes
Foreign Keys
Triggers
Partitioning
Options
Apply

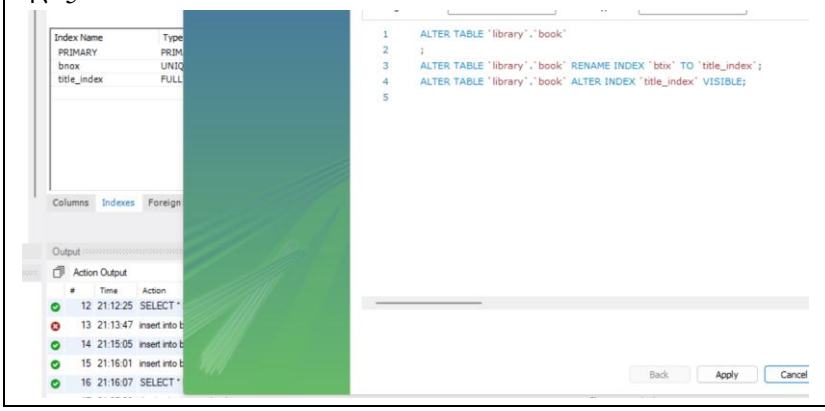
创建成功


library
Tables
book
Columns
Indexes
PRIMARY
bno
btix
Foreign Keys
Triggers
book_count
bookcopy
borrow
readcopy
reader
test1
test2
Views
Stored Procedures
Functions
library_2
Administration
Schemas
Information
Index: btix
Definition:
Type FULLTEXT
Unique No
Visible Yes
Columns btitle

3.

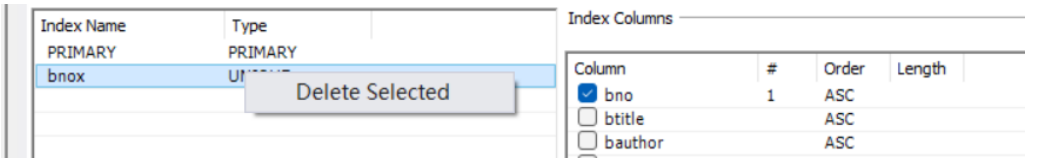

Filter objects
library
Tables
book
Columns
Indexes
PRIMARY
bnox
btix
Foreign Keys
Triggers
book_count
bookcopy
borrow
readcopy
reader
test1
test2
Views
Stored Procedures
Functions
library_2
Administration
Schemas
Information
Index: bnox
Definition:
Type BTREE
Unique Yes
Visible Yes
Columns bno
1 create unique index bnox on book(bno);
2
Output
Action Output
Time Action
11 21:12:16 SELECT * FROM library.borrow LIMIT 0, 1000
12 21:12:25 SELECT * FROM library.book_count LIMIT 0,
13 21:13:47 insert into book_count(bno,borrowtimes) values
14 21:15:05 insert into book_count(bno,borrowtimes) values
15 21:16:01 insert into borrow(bornum,bno) values('13',b02
16 21:16:07 SELECT * FROM library.book_count LIMIT 0,
17 21:25:36 Apply changes to book
18 21:29:01 Apply changes to book
19 21:30:07 create unique index bnox on book(bno)

4、5

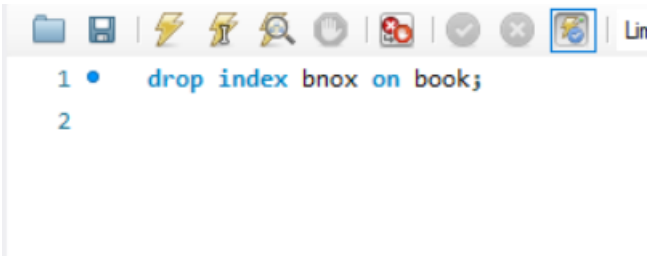

Index Name
PRIMARY
bnox
title_index
Columns
Indexes
Foreign
Output
Action Output
1 ALTER TABLE `library`.`book`
2 ;
3 ALTER TABLE `library`.`book` RENAME INDEX `btix` TO `title_index`;
4 ALTER TABLE `library`.`book` ALTER INDEX `title_index` VISIBLE;
5
Back
Apply
Cancel

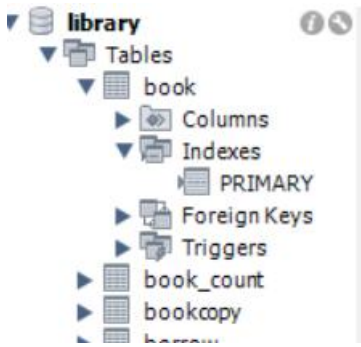

Navigator
SCHEMAS
Filter objects
library
Tables
book
Columns
Indexes
PRIMARY
bnox
title_index
Foreign Keys
Triggers
book_count
bookcopy
borrow
readcopy
reader
test1
test2
Views
Stored Procedures
Functions
library_2
Administration
Schemas
Information
Index: title_index
Definition:
Type FULLTEXT
Unique No
Visible Yes
Columns btitle

6


Index Name
Type
PRIMARY
PRIMARY
bnox
Delete Selected
Index Columns
Column
#
Order
Length
bno
1
ASC
btitle
ASC
bauthor
ASC

7.

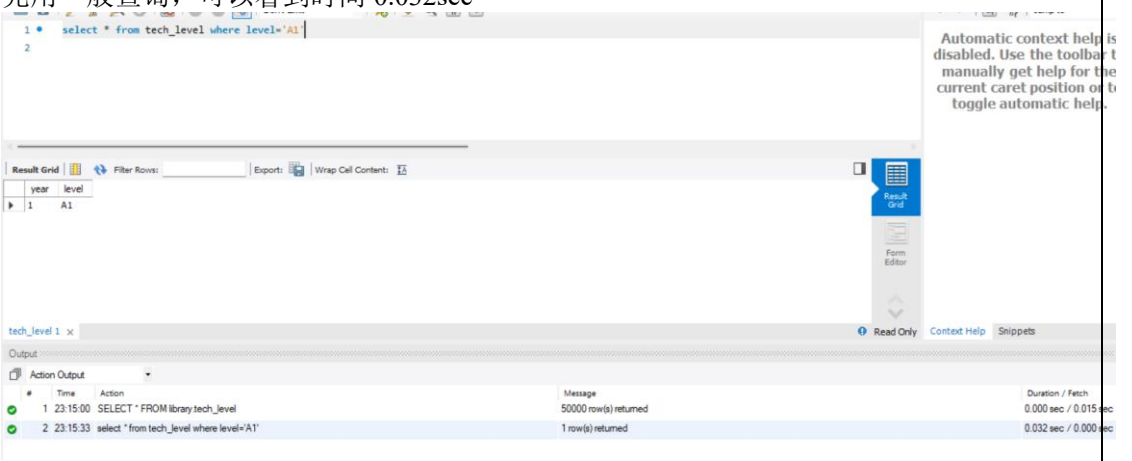

1 drop index bnox on book;
2

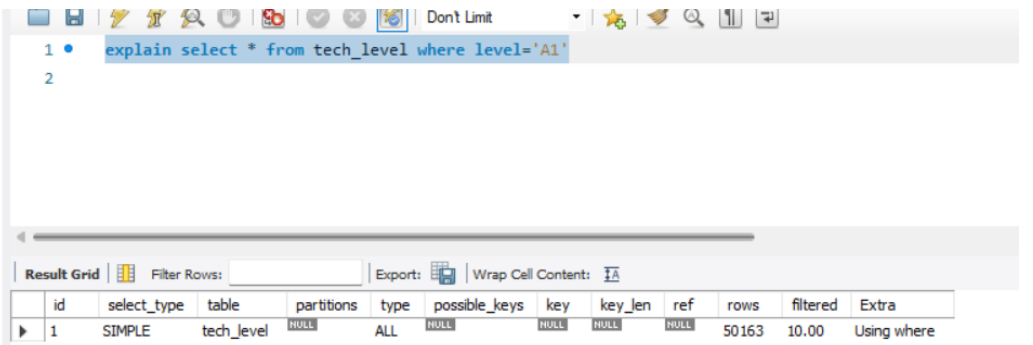


8.先创建表和批量插入数据

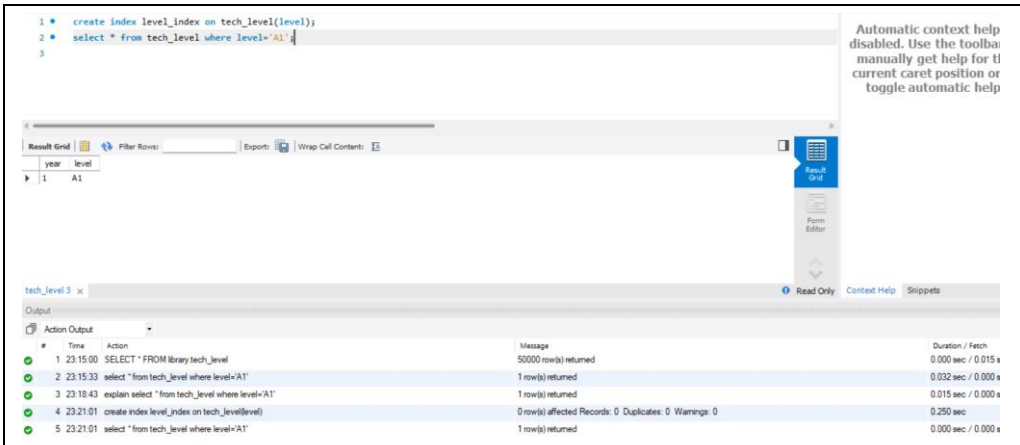
#	Time	Action	Message
1	22:58:22	call insert1()	1 row(s) affected
2	22:58:38	call insert2()	1 row(s) affected
3	22:58:54	call insert3()	1 row(s) affected
4	22:59:11	call insert4()	1 row(s) affected
5	22:59:27	call insert5()	1 row(s) affected
6	23:00:05	SELECT * FROM library.tech_level	50000 row(s) returned

先用一般查询，可以看到时间 0.032sec





然后在 level 上创建索引，时间变快了



用 explain 也可以看到，确实用了创建的索引 level_index