实验目的

1. 熟悉 SQL 的数据定义语言。
2. 能够熟练地使用 SQL 语句来创建和更改基本表,创建和取消索引。

实验内容

1. **使用 CREATE 语句创建基本表：**
   1) 创建数据库表 CUSTOMERS(CID, CNAME,CITY, DISCNT)
   2) 创建数据库表 AGENTS(AID, ANAME,CITY, PERCENT)
   3) 创建数据库表 PRODUCTS(PID. PNAME)
      其中，CID，AID, PID 分别是各表的主键，具有唯一性约束。
   4) 创建数据库表 ORDERS(ORDNA. MONTH,CID,AID,PID,QTY, DOLLARS)。

   其中， ORDNA 是主键，具有唯一性约束。CID，AID，PID 是外键，分别参照的是 表 CUSTOMERS 的 CID 字段，表 AGENTS 的 AID 字段，表 PRODUCTS 的 PID 字段。

2. **更改基本表的定义，增加列，删除列，修改列的数据类型：**
   增加数据库表 PRODUCTS 的三个属性列：CITY, QUANTITY, PRICE。

3. **创建表的升降序索引：**
   为以上 4 个表建立各自的按主键增序排列的索引。

4. **取消表、表的索引或表的约束：**
   取消上述建立的 4 个索引。

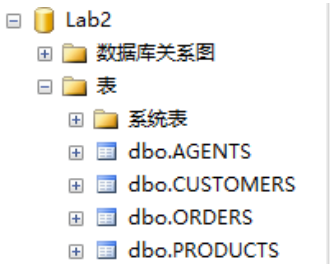
代码实现及结果

1. **创建上述要求的 4 个表**
   使用 CREATE TABLE 创建表 主键使用 UNIQUE 修饰，用 PRIMARY KEY 确定主键。
   代码如下：

```
CREATE TABLE CUSTOMERS
( CID INT NOT NULL UNIQUE,
CNAME CHAR(20) NOT NULL,
CITY CHAR(20) NOT NULL,
```

```
DISCNT FLOAT NOT NULL,
PRIMARY KEY(CID))

CREATE TABLE AGENTS
(AID INT NOT NULL UNIQUE,
ANAME CHAR(20) NOT NULL,
CITY CHAR(20) NOT NULL,
PERCENTS FLOAT NOT NULL,
PRIMARY KEY(AID))

CREATE TABLE PRODUCTS
(PID INT NOT NULL UNIQUE,
PNAME CHAR(20) NOT NULL,
PRIMARY KEY(PID))

CREATE TABLE ORDERS(
ORDNA CHAR(20) NOT NULL,
MONTHS INT NOT NULL,
CID INT NOT NULL UNIQUE,
AID INT NOT NULL UNIQUE,
PID INT NOT NULL UNIQUE,
QTY INT NOT NULL,
DOLLARS FLOAT NOT NULL,
PRIMARY KEY(CID,AID,PID),
FOREIGN KEY(CID) REFERENCES CUSTOMERS ON DELETE CASCADE,
FOREIGN KEY(AID) REFERENCES AGENTS ON DELETE CASCADE,
FOREIGN KEY(PID) REFERENCES PRODUCTS ON DELETE CASCADE,
)

SELECT  表名=c.name
,主键名=d.name
FROM  sysindexes  a
JOIN  sysindexkeys  b  ON  a.id=b.id  AND  a.indid=b.indid
JOIN  sysobjects  c  ON  b.id=c.id
JOIN  syscolumns  d  ON  b.id=d.id  AND  b.colid=d.colid  WHERE
c.xtype='U' AND exists(SELECT 1 FROM sysobjects WHERE xtype='PK'
and  name=a.name)

SELECT 表名=b.name ,
列名=a.name
FROM SysColumns a
JOIN  sysobjects b ON  a.id=b.id  WHERE b.xtype='U'
```

效果如下:（此处使用 SQL 语言查询将需要信息打印出来）



结果 消息

	表名	主键名
1	AGENTS	AID
2	PRODUCTS	PID
3	ORDERS	CID
4	ORDERS	AID
5	ORDERS	PID
6	CUSTOMERS	CID

	表名	列名
1	AGENTS	AID
2	AGENTS	ANAME
3	AGENTS	CITY
4	AGENTS	PERCENTS
5	PRODUCTS	PID
6	PRODUCTS	PNAME
7	ORDERS	ORDNA
8	ORDERS	MONTHS
9	ORDERS	CID
10	ORDERS	AID
11	ORDERS	PID
12	ORDERS	QTY
13	ORDERS	DOLLARS
14	CUSTOMERS	CID
15	CUSTOMERS	CNAME
16	CUSTOMERS	CITY
17	CUSTOMERS	DISCNT

2. **增加数据库表 PRODUCTS 的三个属性列：CITY, QUANTITY, PRICE**

使用 ALTER TABLE ADD 为表增加属性列

代码如下：

```
ALTER TABLE PRODUCTS ADD CITY CHAR(20) NOT NULL
ALTER TABLE PRODUCTS ADD QUANTITY INT NOT NULL
ALTER TABLE PRODUCTS ADD PRICE FLOAT NOT NULL
SELECT 表名=b.name ,
列名=a.name
FROM SysColumns a
JOIN  sysobjects b ON  a.id=b.id AND b.id=Object_Id('PRODUCTS')
WHERE b.xtype='U'
```

效果如下：（此处使用 SQL 语言查询将需要信息打印出来）

	表名	列名
1	PRODUCTS	PID
2	PRODUCTS	PNAME
3	PRODUCTS	CITY
4	PRODUCTS	QUA...
5	PRODUCTS	PRICE

3. **为以上 4 个表建立各自的按主键增序排列的索引**

使用 CREATE INDEX …… ON …… 创建索引（默认升序）

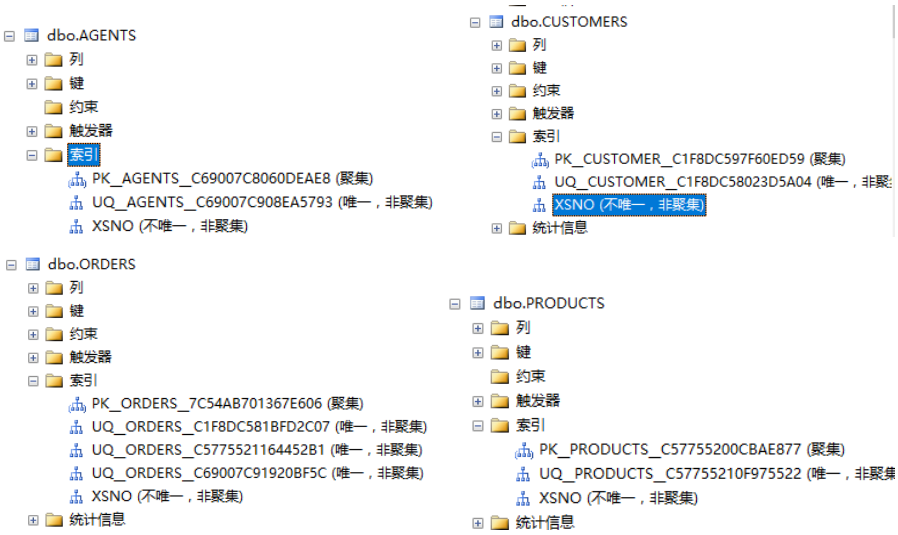
代码如下：

```
CREATE INDEX XSNO ON CUSTOMERS(CID)
```

```
CREATE INDEX XSNO ON AGENTS(AID)
CREATE INDEX XSNO ON PRODUCTS(PID)
CREATE INDEX XSNO ON ORDERS(CID,AID,PID)

SELECT  表名=c.name
,索引名=a.name
,索引字段名=d.name
FROM  sysindexes  a
JOIN  sysindexkeys  b  ON  a.id=b.id  AND  a.indid=b.indid
JOIN  sysobjects  c  ON  b.id=c.id
JOIN  syscolumns  d  ON  b.id=d.id  AND  b.colid=d.colid  WHERE
c.xtype='U' AND a.name='XSNO'
```

效果如下：

	表名	索引名	索引字段名
1	AGENTS	XSNO	AID
2	PRODUCTS	XSNO	PID
3	ORDERS	XSNO	CID
4	ORDERS	XSNO	AID
5	ORDERS	XSNO	PID
6	CUSTOME...	XSNO	CID



4. 取消上述建立的 4 个索引

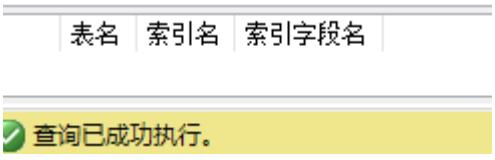
使用 DROP INDEX 删除索引

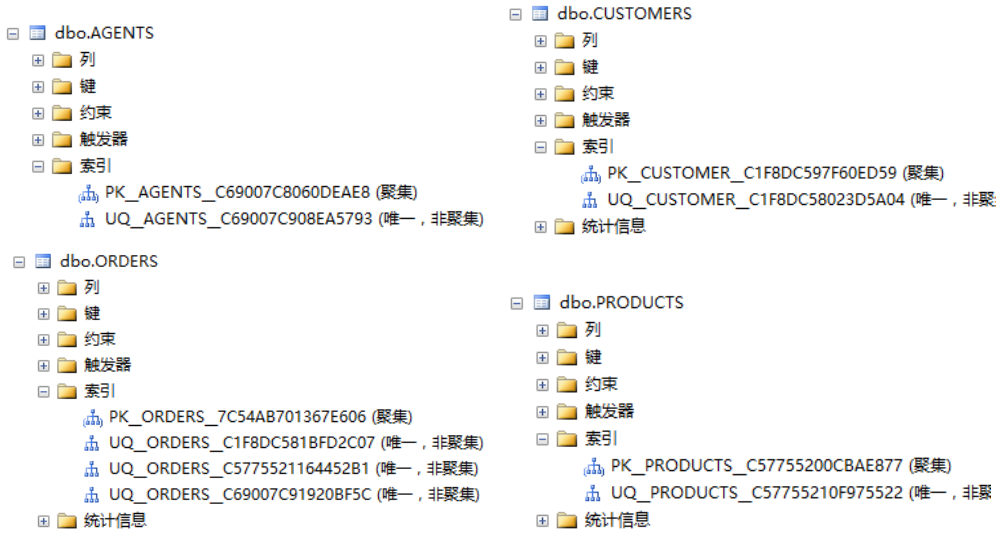
代码如下：

```
DROP INDEX CUSTOMERS.XSNO
DROP INDEX AGENTS.XSNO
DROP INDEX PRODUCTS.XSNO
DROP INDEX ORDERS.XSNO

SELECT  表名=c.name
,索引名=a.name
```

```
,索引字段名=d.name
FROM   sysindexes   a
JOIN   sysindexkeys   b   ON   a.id=b.id   AND   a.indid=b.indid
JOIN   sysobjects   c   ON   b.id=c.id
JOIN   syscolumns   d   ON   b.id=d.id   AND   b.colid=d.colid  WHERE
c.xtype='U' AND a.name='XSNO'
```

效果展示：





实验感想

这次实验主要是学习使用 SQL 语言创建数据库和表，并对表进行修改，增添属性，和删减属性，因为之前有自学过不分 mysql，所以这些操作还是比较简单的，就是 mysql 和 sqlserver 有所不同有些语句还是要去去百度一下再能写出来，比如一些查询表的信息的语句。

附件：代码（可直接复制）

```
use master
if exists (select * From master.dbo.sysdatabases where name='Lab2')
   drop database Lab2
```

```sql
create database Lab2

use Lab2

CREATE TABLE CUSTOMERS
( CID INT NOT NULL UNIQUE,
CNAME CHAR(20) NOT NULL,
CITY CHAR(20) NOT NULL,
DISCNT FLOAT NOT NULL,
PRIMARY KEY(CID))


CREATE TABLE AGENTS
(AID INT NOT NULL UNIQUE,
ANAME CHAR(20) NOT NULL,
CITY CHAR(20) NOT NULL,
PERCENTS FLOAT NOT NULL,
PRIMARY KEY(AID))

CREATE TABLE PRODUCTS
(PID INT NOT NULL UNIQUE,
PNAME CHAR(20) NOT NULL,
PRIMARY KEY(PID))


CREATE TABLE ORDERS(
ORDNA CHAR(20) NOT NULL,
MONTHS INT NOT NULL,
CID INT NOT NULL UNIQUE,
AID INT NOT NULL UNIQUE,
PID INT NOT NULL UNIQUE,
QTY INT NOT NULL,
DOLLARS FLOAT NOT NULL,
PRIMARY KEY(CID,AID,PID),
FOREIGN KEY(CID) REFERENCES CUSTOMERS ON DELETE CASCADE,
FOREIGN KEY(AID) REFERENCES AGENTS ON DELETE CASCADE,
FOREIGN KEY(PID) REFERENCES PRODUCTS ON DELETE CASCADE,
)

SELECT  表名=c.name
,主键名=d.name
FROM  sysindexes  a
JOIN  sysindexkeys  b  ON  a.id=b.id  AND  a.indid=b.indid
JOIN  sysobjects  c  ON  b.id=c.id
```

```
JOIN  syscolumns  d  ON  b.id=d.id  AND  b.colid=d.colid  WHERE
c.xtype='U' AND exists(SELECT 1 FROM sysobjects WHERE xtype='PK' and
name=a.name)

SELECT 表名=b.name ,
列名=a.name
FROM SysColumns a
JOIN  sysobjects b ON  a.id=b.id  WHERE b.xtype='U'

ALTER TABLE PRODUCTS ADD CITY CHAR(20) NOT NULL
ALTER TABLE PRODUCTS ADD QUANTITY INT NOT NULL
ALTER TABLE PRODUCTS ADD PRICE FLOAT NOT NULL

SELECT 表名=b.name ,
列名=a.name
FROM SysColumns a
JOIN  sysobjects b ON  a.id=b.id AND b.id=Object_Id('PRODUCTS') WHERE
b.xtype='U'

CREATE INDEX XSNO ON CUSTOMERS(CID)
CREATE INDEX XSNO ON AGENTS(AID)
CREATE INDEX XSNO ON PRODUCTS(PID)
CREATE INDEX XSNO ON ORDERS(CID,AID,PID)

SELECT  表名=c.name
,索引名=a.name
,索引字段名=d.name
FROM  sysindexes  a
JOIN  sysindexkeys  b  ON  a.id=b.id  AND  a.indid=b.indid
JOIN  sysobjects  c  ON  b.id=c.id
JOIN  syscolumns  d  ON  b.id=d.id  AND  b.colid=d.colid  WHERE
c.xtype='U' AND a.name='XSNO'

DROP INDEX CUSTOMERS.XSNO
DROP INDEX AGENTS.XSNO
DROP INDEX PRODUCTS.XSNO
DROP INDEX ORDERS.XSNO

SELECT  表名=c.name
,索引名=a.name
,索引字段名=d.name
FROM  sysindexes  a
JOIN  sysindexkeys  b  ON  a.id=b.id  AND  a.indid=b.indid
JOIN  sysobjects  c  ON  b.id=c.id
```

```
JOIN syscolumns d ON b.id=d.id AND b.colid=d.colid WHERE
c.xtype='U' AND a.name='XSNO'
```