Submission instructions : The SPJ database is entered according to the book data, copy the SQL statement of each question to the bottom of the question , and paste the query results (except the first question).

Submission format : student number_name_SQL final test.docx

Submission method : save the document in the U disk and log in to the XP system , open My Computer , enter ftp in the address bar : 1 72.17.4.41 , enter the user name db_ahu , password: db, upload the file or : copy the U disk to the front computer

Note : There is a list of classmates at the front desk. After submitting the classmate (no matter which method), please check with me to confirm, thank you!

1. Define the following tables with SQL statements, pay attention to primary key and foreign key constraints

Book information (book number , book title, author, publisher, ISBN number, inventory)

Requirements: The book name cannot be empty, and the ISBN number is set to 7 digits (constrained by check)

I SBN number is unique

Inventory cannot be less than 0

Reader (reader ID , name, gender, age, address)

Required; name cannot be empty

sex is 'Male' or 'Female'

Borrowing relationship (book number, reader number , borrowing date, borrowing quantity)

列名	数据类型	允许 Null 值
图书编号	char(10)	☐
图书名称	char(10)	☐
作者	char(20)	☑
出版社	char(20)	☑
ISBN号	char(10)	☑
库存量	smallint	☑
		☐

CHECK 约束   ?   ✕

选定的 CHECK 约束(S):

CK_E11714076_读者	正在编辑现有 CHECK 约束 的属性。

⊟ (常规)	
表达式	([姓名]='男' OR [姓名]='女')
⊟ 标识	
(名称)	CK_E11714076_读者
说明	
⊟ 表设计器	
强制用于 INSERT 和 UPDATE	是
强制用于复制	是
在创建或重新启用时检查现有》	是

添加(A)   删除(D)   关闭(C)

CHECK 约束   ?   ✕

选定的 CHECK 约束(S):

CK_E11714076_图书信息	正在编辑现有 CHECK 约束 的属性。
CK_E11714076_图书信息_1	

⊟ (常规)	
表达式	([库存量]>(-1))
⊟ 标识	
(名称)	CK_E11714076_图书信息
说明	
⊟ 表设计器	
强制用于 INSERT 和 UPDATE	是
强制用于复制	是
在创建或重新启用时检查现有》	是

添加(A)   删除(D)   关闭(C)

列名	数据类型	允许 Null 值
读者编号	char(10)	☐
姓名	char(10)	☐
性别	char(4)	☑
年龄	smallint	☑
地址	char(10)	☑
		☐

CHECK 约束   ?   ✕

选定的 CHECK 约束(S):

CK_E11714076_图书信息
CK_E11714076_图书信息_1

正在编辑现有 CHECK 约束 的属性。

(常规)	
表达式	(len([ISBN号])=(7))
标识	
(名称)	CK_E11714076_图书信息_1
说明	
表设计器	
强制用于 INSERT 和 UPDATE	是
强制用于复制	是
在创建或重新启用时检查现有数	是

添加(A)   删除(D)   关闭(C)

列名	数据类型	允许 Null 值
图书编号	char(10)	☐
读者编号	char(10)	☐
借阅日期	char(20)	☑
借阅数量	smallint	☑
		☐

```
□ 🗄 E11714076_图书管理
   ⊞ 📁 数据库关系图
   ⊟ 📁 表
      ⊞ 📁 系统表
      ⊞ 🔲 dbo.E11714076_读者
      ⊟ 🔲 dbo.E11714076_借阅关系
         ⊞ 📁 列
         ⊟ 📁 键
              🔑 PK_借阅关系
              🔑 FK_E11714076_借阅关系_E11714076_读者
              🔑 FK_E11714076_借阅关系_E11714076_图书信息
         ⊞ 📁 约束
         ⊞ 📁 触发器
         ⊞ 📁 索引
         ⊞ 📁 统计信息
      ⊞ 🔲 dbo.E11714076_图书信息
```
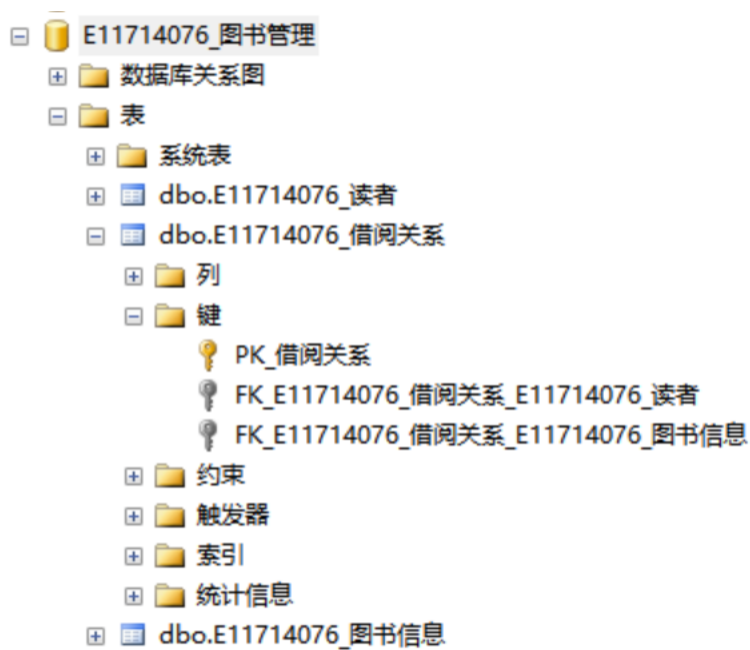
2. Complete the following query in the SPJ database

1. Query the names of cities with 2 or more suppliers .

select city
from A101_S ; _
group by city having COUNT (*)>= 2 ;

	city
1	天津
2	北京
3	北京
4	天津
5	上海

2. Find all the parts starting with "表" , and display them in descending order of weight, and display them in ascending order of Pno if they have the same weight .

select * from A101_P _ where Pname like 'screw%'

order by WEIGHT desc , pno ;

	PNO	PNAME	COLOR	WEIGHT
1	P2	螺栓	绿	17
2	P3	螺丝刀	蓝	14
3	P4	螺丝刀	红	14
4	P1	螺母	红	12

3. Query the supply information of suppliers who have provided blue parts to shipyards or Sanjian (results should include project name, part name, color and supplier name)

select Jname , Pname , Color , Sname
from A101_SPJ , A101_S , A101_P , A101_J _ _ _ _

where A101 _SPJ . SNO = A101 _S . Sno
        and A101_SPJ.PNO = A101_P.PNO _ _ _ _ _
        and A101 _SPJ . JNO = A101 _J . Jno
        and (JNAME = 'Shipyard' OR Jname = 'three construction')
        and COLOR = 'blue' ;

	Jname	Pname	Color	Sname
1	三建	凸轮	蓝	丰泰盛
2	三建	螺丝刀	蓝	东方红
3	三建	螺丝刀	蓝	盛锡
4	三建	凸轮	蓝	盛锡
5	三建	螺丝刀	蓝	为民
6	造船厂	螺丝刀	蓝	盛锡

4. Assuming that there are 100 parts in a box, query the weight of each box, and display the output results as "part number" and "weight per box" .

select pno , weight * 100 from A101_P _ ;

	pno	(无列名)
1	P1	1200
2	P2	1700
3	P3	1400
4	P4	1400
5	P5	4000
6	P6	3000

5. Query the weight difference between the heaviest part and the lightest part.

select max (weight) - min (weight) from A101_P ; _

	(无列名)
1	28

6. Query the average supply quantity of each supplier, sorted by supply quantity in descending order

select Sno , AVG (qty) from A101_SPJ _ group by Snow
order by AVG (qty) desc ;

	Sno	(无列名)
1	S2	333
2	S1	275
3	S5	250
4	S3	200
5	S4	200

7. Query the supplier information whose supplier name is 3 characters higher than that of Fengtai Sheng.

select * from A101_S _

where status > (select status from A101_S _ where Sname = 'Feng Tai Sheng')

and Sname like '____' and Sname not like '__' ;

	SNO	SNAME	STATUS	CITY
1	S3	东方红	30	北京

8. Inquiry uses the engineering number of all parts provided by S1.

select Jno from A101_SPJ _ where SNO = 's1' ;

	Jno
1	J1
2	J3
3	J4
4	J2

9. Query that each part is used in several projects.

create view A101_Q9 _

as

select pno , jno , qty from A101_SPJ _

select pno , COUNT (*) from A101_Q9 _ group by pno ;

	pno	(无列名)
1	P1	4
2	P2	2
3	P3	6
4	P5	3
5	P6	4

10. Create a view for suppliers in Tianjin, the view name is student number_PJName_QTY_View, and the view is required to display the parts and project-related information supplied by Tianjin suppliers, including project name, part name, part color, and supply quantity.

create view A101 _PJName_QTY_View

as

select Jname , Pname , color , qty

from A101_P , A101_J , A101_SPJ _ _ _

where City = 'Tianjin'

and A101 _P . Pno = A101 _SPJ . Pno

and A101 _J . Jno = A101 _SPJ . JNO ;

视图
  系统视图
  dbo.E11714076_PJName_QTY_View

|	Jname	Pname	color	qty
▶	弹簧厂	螺母	红	100
	造船厂	螺栓	绿	100
	造船厂	齿轮	红	200
	弹簧厂	齿轮	红	300
	造船厂	螺丝刀	蓝	500
	造船厂	齿轮	红	500
	造船厂	螺母	红	700
✳	NULL	NULL	NULL	NULL

11. Query the total supply of each part in the above view.

select Pname , SUM (qty)
from A101 _PJName_QTY_View

group by pname ;

	Pname	(无列名)
1	齿轮	1000
2	螺母	800
3	螺栓	100
4	螺丝刀	500

12. in question 10. The view name is student number_Color_JName_QTY, and it is required to display project-related information using red parts, including project name, part name, and supply quantity.

create view A101 _Color_JName_QTY
as
select Jname , Pname , qty
from A101 _PJName_QTY_View

where color = 'red' ;

☐ 📁 视图
  ⊞ 📁 系统视图
  ⊞ 🔲 dbo.E11714076_Color_JName_QTY
  ⊞ 🔲 dbo.E11714076_PJName_QTY_View
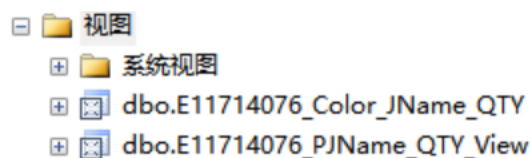
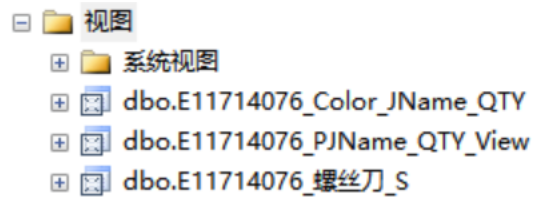|	Jname	Pname	qty
▶	弹簧厂	螺母	100
	造船厂	齿轮	200
	弹簧厂	齿轮	300
	造船厂	齿轮	500
	造船厂	螺母	700
✳	NULL	NULL	NULL

13. Create a supply view for screwdriver suppliers

create view A101 _Screwdriver_S

```
as
select *
from A101_S _
where sno in
        ( select sno from A101_SPJ _ where PNO in
                ( select PNO from A101_P _ where Pname = 'screwdriver' ));
```

- 视图
  - 系统视图
  - dbo.E11714076_Color_JName_QTY
  - dbo.E11714076_PJName_QTY_View
  - dbo.E11714076_螺丝刀_S

	SNO	SNAME	STATUS	CITY
▶	S2	盛锡	10	北京
	S3	东方红	30	北京
	S5	为民	30	上海
*	NULL	NULL	NULL	NULL

14. Query the main supply parts of each supplier (the supply of parts is greater than the average supply of all parts) (views can be built as needed to realize the query)

```
create view A101_Q14 ( sno , avg_qty ) _
as
select sno , AVG ( qty )
from A101_SPJ _
group by SNO ;


select A101 _SPJ . SNO , qty
from A101 _SPJ , A101 _Q14
where A101 _SPJ . SNO = A101 _Q14 . SNO
        and QTY > avg_qty ;
```

	SNO	qty
1	S1	700
2	S2	400
3	S2	500
4	S2	400
5	S2	400
6	S4	300
7	S5	500

15. Query the name of the supplier whose J1 supply in Beijing is greater than the average J1 supply (you can build a view as needed to realize the query)

```
select Sname
from A101_S , A101_SPJ _ _
where city = 'Beijing'
```