

1.

$$(1) \pi_{S\sharp, GRADE}(\sigma_{C\sharp='001'}(SC)) \wedge \pi_{S\sharp, GRADE}(\sigma_{C\sharp='002'}(SC))$$

$$(2) \pi_{S\sharp, SNAME, GRADE}(\sigma_{C\sharp='001'}(S \bowtie SC))$$

$$(3) \pi_{SNAME, AGE}((SC - \sigma_{C\sharp='002'}(sc)) \bowtie S)$$

$$(4) \pi_{SNAME}((\sigma_{TEACHER='gao' \wedge GRADE \geq 90}(c \bowtie sc)) \bowtie S)$$

$$(5) \pi_{SNAME}((S \bowtie SC) \div \pi_{c\sharp}(c))$$

2.

(1)

$$\pi_{J\sharp}(\sigma_{SCITY='北京' \wedge SNAME='S1' \wedge COLOR='蓝色'}(S \bowtie P \bowtie J \bowtie SPJ))$$

$$(2) \pi_{J\sharp, JNAME}(\sigma_{SCITY=JCITY}(S \bowtie J \bowtie SPJ))$$

$$(3) \pi_{P\sharp}((P \bowtie J \bowtie SPJ) - \sigma_{JCITY='长春'}(P \bowtie J \bowtie SPJ))$$

$$(4) \pi_{J\sharp, JNAME}(\sigma_{PNAME='p2'}(P \bowtie J \bowtie SPJ))$$

$$(5) \pi_{S\sharp, SNAME}(\sigma_{J\sharp='J5', COLOR='绿色'}(S \bowtie P \bowtie J \bowtie SPJ))$$

3.

$$\Pi_F(\sigma_{F \neq null}(S)) - \rho_{K \rightarrow F}(\Pi_K(R))$$

若此表达式不为空，则违反了完整性约束

4.

$$\pi_{model}(\rho_w(\pi_{model, price}(Laptop))) - \pi_{w.model, w.price}(\rho_i(Laptop) \bowtie_{i.price < w.price} \rho_w(Laptop))$$

Execution time: 2 ms

---

w.model

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$\pi_{w.screen} (\rho_i (Laptop) \bowtie_{i.screen = w.screen \text{ and } i.model \neq w.model} \rho_w (Laptop))$

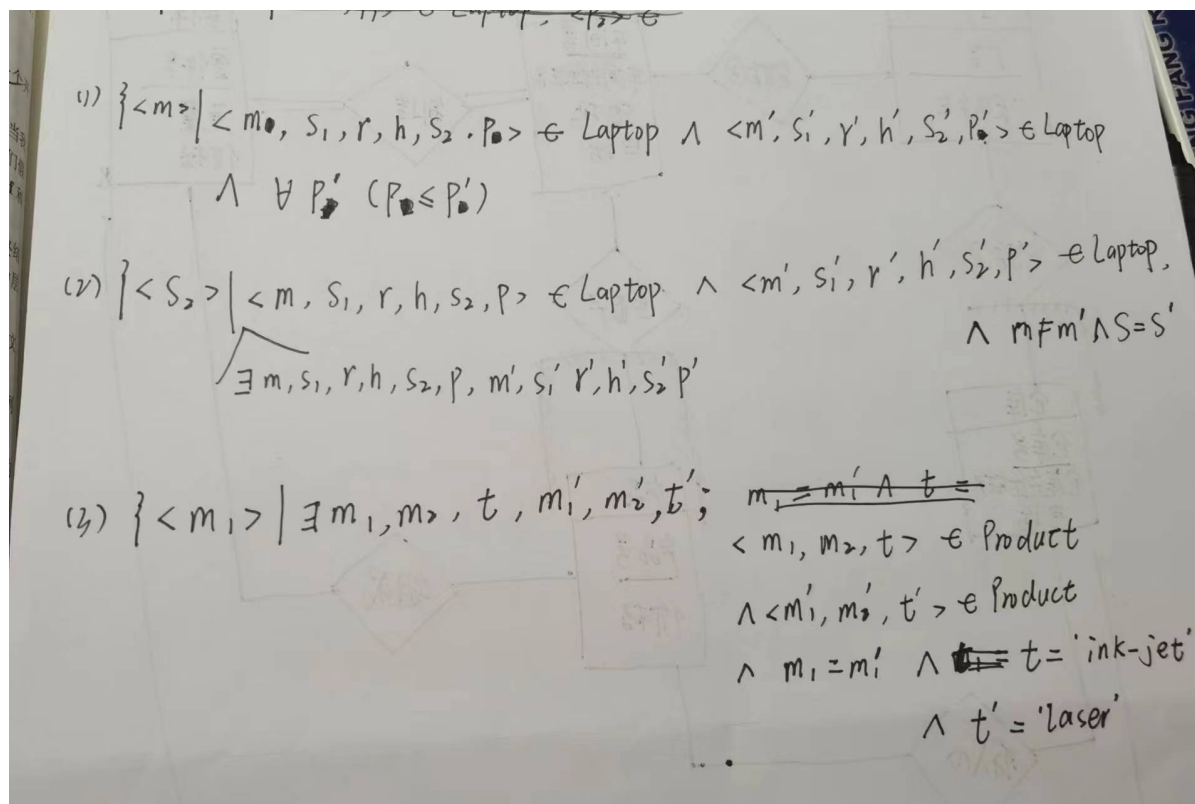
Execution time: 1 ms

w.screen
17
15.4
13.3

$\pi_{Product.maker, Printer.type} (Product \bowtie_{Product.model = Printer.model} Printer) \div \pi_{type} (Printer)$

Execution time: 1 ms

Product.maker
'D'
'E'
'H'



5.

(1)

select count(\*)

from Employee

where D#=1

(2)

select D#,count(\*) as Employeecount

from Employee,Department

where Employee.D#=Department.D#

group by D#

(3)

select Name

from Employee,Department

where Employee.D#=Department.D# and SALARY>1000 and Dname='技术部'

(4)

select Department.D#,avg(SALARY) as AVGSALARY

from Employee,Department

where Employee.D#=Department.D#

group by Department.D#

(5)

select count(\*)

from Employee,Department

where where Employee.D#=Department.D# and Dname like '张%' and Dname='技术部'

6.

(1)

select Sno#

from Borrow

group by Sno#

having count(B#) > 5

(2)

select Sname, Sage

from Student

where Sno# in (

select Sno#

from Borrow

where B# in (

select B#

from Book

where Publisher = '人民教育出版社'

)

```
)  
order by Sage DESC
```

(3)

```
select Sno#  
from Borrow  
where Sno# NOT IN (  
    select Sno#  
    from Borrow  
    where Time <= 90  
)
```

(4)

```
select Title, COUNT(*)  
from Book  
where Title like 'Big%Date'  
group by Title;
```

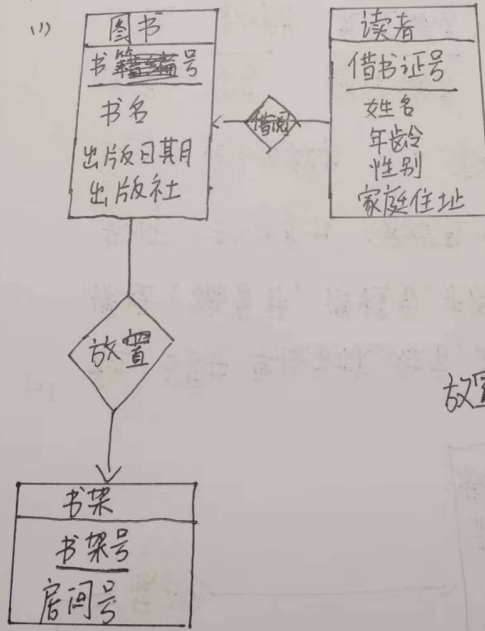
(5)

```
select DISTINCT Title  
from Book  
where B# in (  
    select B#  
    from Borrow  
    where Sno# in (  
        select Sno#  
        from Student  
        where Sdept = 'CS'  
    )  
    group by B#  
    having count(DISTINCT Sno#) > 5  
)
```

7.

7.

(1)



(2)

图书 (书籍号#, 书名, 出版日期, 出版社)

读者 (借书证号#, 姓名, 年龄, 性别, 家庭住址)

书架 (书架号#, 房间号)

借书 (书籍号#, 借书证号#, 借书日期, 还书日期)

放置 (书籍号, 书架号)

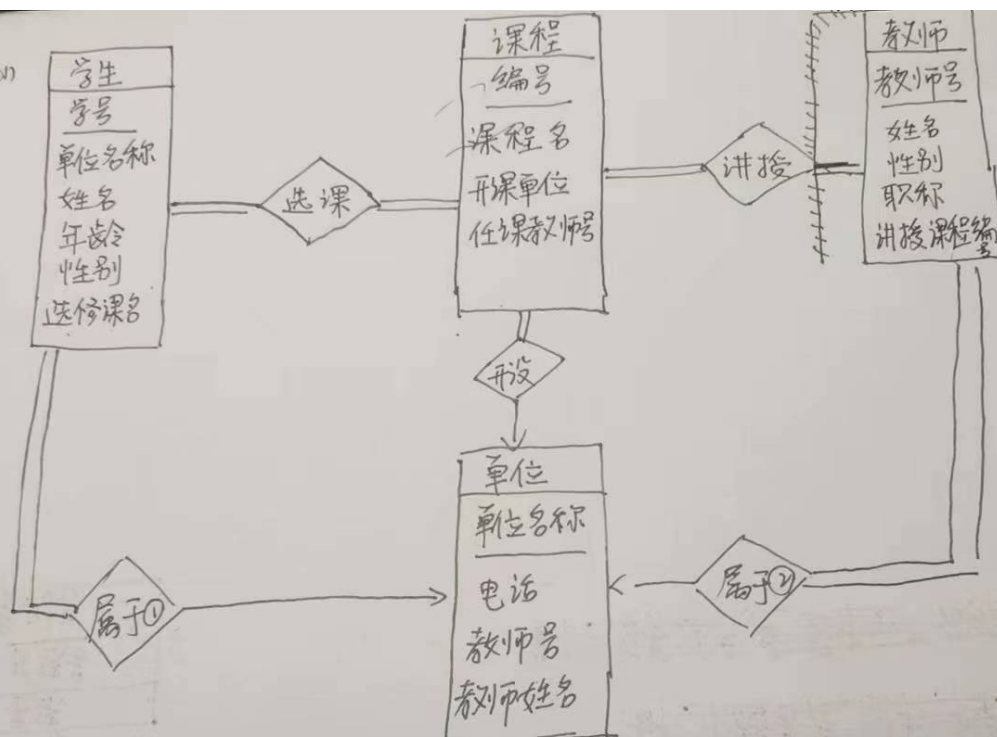
~~借书. 书籍号是图书. 书籍号的外键~~

~~借书. 借书证号是读者. 借书证号的外键~~

8.

8.

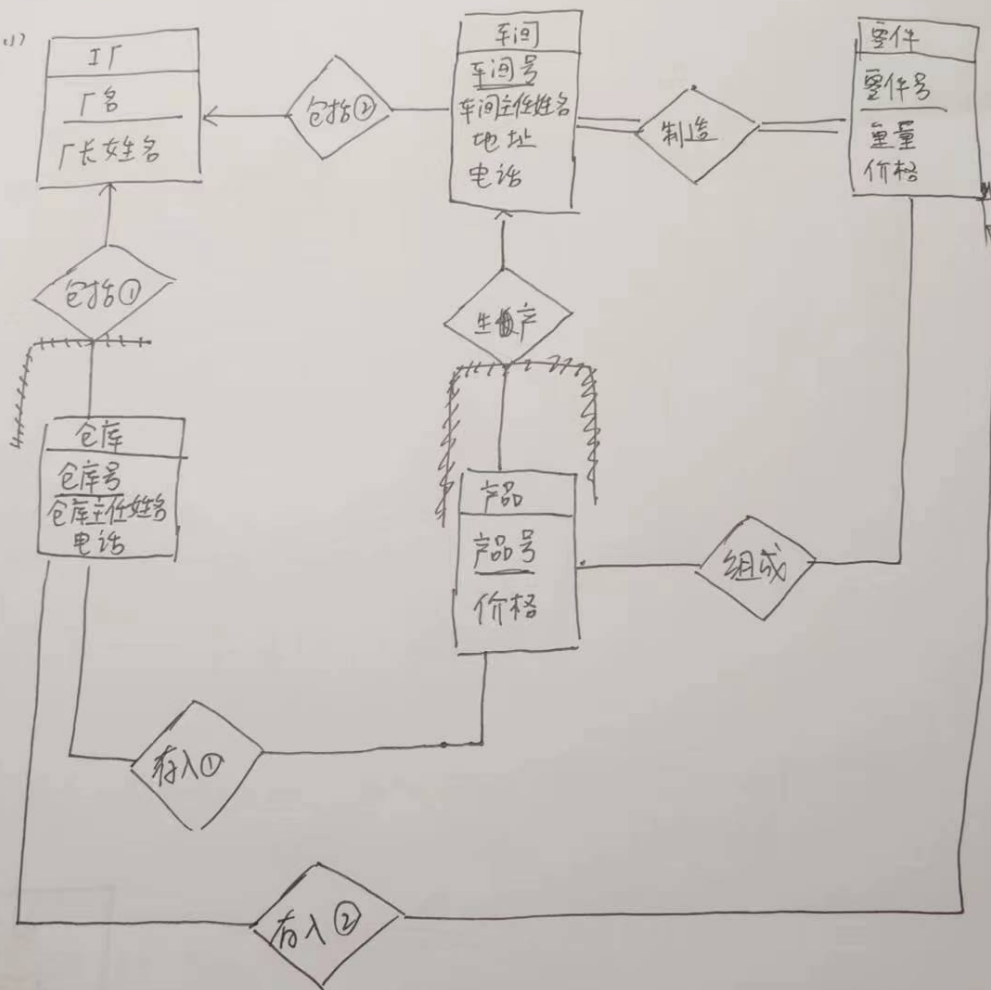
17)



- 17) 学生 (学号, 单位名称, 姓名, 年龄, 姓名, 性别, 选修课名)  
 课程 (编号, 课程名, 开课单位, 任课教师号)  
 教师 (教师号, ~~课程名~~, 姓名, 性别, 职称, 讲授课程编号)  
 单位 (单位名称, 电话, 教师号, 教师姓名)  
 选课 (学号, 课程编号)  
 讲授 (教师号, 课程编号)  
 属于① (学号, 单位名称)  
 属于② (教师号, 单位名称)

9.

9. 11



工厂 (厂名#, 厂长姓名)

仓库 (仓库号#, 仓库主任姓名, 电话)

车间 (车间号#, 车间主任姓名, 地址, 电话)

产品 (产品号#, 价格)

零件 (零件号#, 重量, 价格)

包括① (仓库号#, 厂名#)

包括② (车间号#, 厂名#)

存入① (产品号#, 仓库号#)

存入② (零件号#, 仓库号#)

生产 (车间号#, 产品号#)

制造 (车间号#, 零件号#)

组成 (产品号#, 零件号#)