1. (1) Select Course.cid, title from Student, Course, Enroll
Where name='Elsa' and Student.sid=Enroll.sid and Enroll.cid=Course.cid

$\Pi_{cid,title}(\sigma_{name='Elsa'}(S \bowtie Enroll \bowtie Course))$

(2) Select sid, Sum(credit) As S from Course Natural Join Enroll
Group by sid Having Sum(credit)<120

temp← $\Pi_{sid,credit}$(Course ⋈ Enroll)

$\sigma_{sum\_credit<120}$(sid $\gamma_{sid,sum(credit)\ as\ sum\_credit}$(temp))

(3) Select sid from Enroll, Course Where Enroll.cid=Course.cid and title='Data Mining'
and sid not In (Select sid from Enroll, Course where Enroll.cid=Course.cid and title='Database Systems')

$\Pi_{sid}(\sigma_{title='Data\ Mining'}(Course \bowtie Enroll)) - \Pi_{sid}(\sigma_{title='Database\ System'}(Course \bowtie Enroll))$

(4) Create View Unqulified (cid, title, cnt) As
Select cid, title, count(*) As cnt from Course Natural Join Enroll
Where score<60
Group by cid, title;

(5) 不能. 视图含有聚集还要

(6) Select count(*) From Student As S1, Student As S2,
Where S1.email=S2.email and S1.sid≠S2.eid

返回0则满足依赖

2. (1) 由Armstong: A→A
由 A→B, B→D 知 A→D, 从而 A→AD, 又 AD→EG, 知 A→EG.

L: A, H
R: C, E
N:
LR: B, D, G

(2) {ABDEG}

(3) AH. 1NF

(4) A→B ✓
B→D ✓
AD→E A→E ✓
AD→G A→G ✓
~~AGH→C~~ AH→C

(5) S: $A \to B$

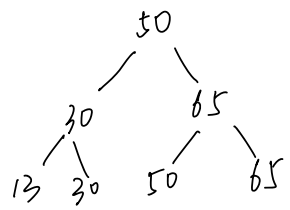
T: $A \to E$, $A \to G$

U:

$AH \to C$ 丢失.

4-1 $\frac{519B \sim 522B \quad \times 3000}{8KB}$ 约200个.

4-2



4-3 (1) $1000 + 1500 < 31^2$ 说明 $\exists N \leq M$, 使 R, S 共有 N 个归并段且每段长不超过 N.

(2) $3 \times (1000 + 1500) = 7500$

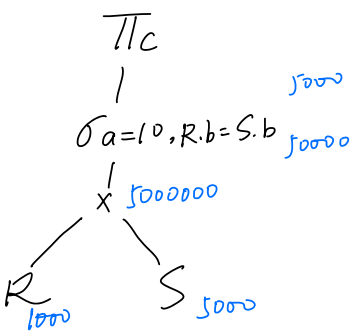
建立归并段时写入 $B(R) + B(S)$

写回磁盘 $B(R) + B(S)$

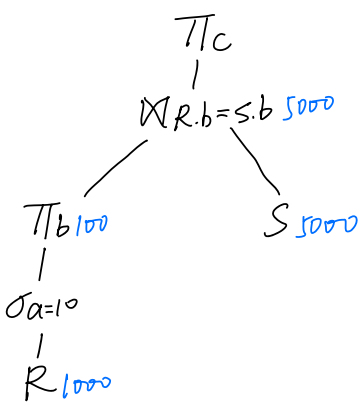
执行连接时写入 $B(R) + B(S)$. 共计 $3[B(R) + B(S)]$

4-4 (1)

?



(2)



(3) 在关系 R 的 a 属性建立索引或哈希表

4-5 (1) r(C)、w(C) 可与 r(A)、r(B) 交换

(2)

T_1	T_2
Lock-S(B)	
Lock-X(A)	
Lock-X(C)	
r(B)	
Unlock(B)	
r(A)	
w(A)	
Unlock(A)	
	Lock-X(A)
	Lock-X(B)
	r(A)
	r(B)
r(C)	
w(C)	
Unlock(C)	
	w(B)
	w(A)
	Unlock(B)
	Unlock(A)

(3) 存在问题：死锁　若调度为

T_1	T_2
Lock-S(B)	
	Lock-X(A)
	Lock-X(B)
Lock-X(A)	

级连中止：若 T_1 回滚，T_2 在 T_1 的 w(A) 操作后执行 r(A)，则 T_2 也要回滚。

4-6 (1) $<T_2, commit>$　10行检查点正在执行的事务只有 T_3，说明 T_2 已提交。

(2) redo：无　undo：T_3

(3) A=111，B=222，C=3