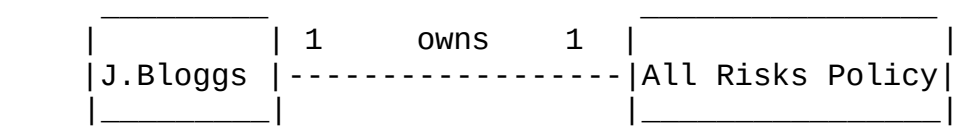
Solutions to Computer Science 2 Test - Database, Third Term 2002.

Max Mark : 45.

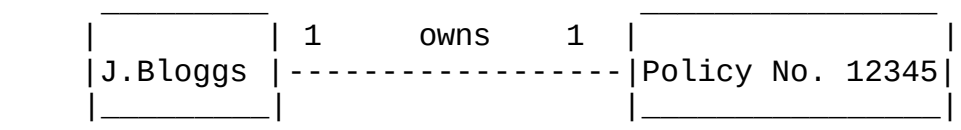
Q1.[3,3=6] (a) Cannot have a policy without a holder.

Cannot have a holder without a policy.

(b)



OR :



OR :

"J. Bloggs owns policy number 12345, and Policy number 12345 is owned by J.Bloggs"

Q2. [3,3=6] (a) (1) A --> C (2) D --> E (3) C --> A (4) E --> B (5) E --> A (6) C --> B (7) B --> D

1,2,4

(b) This is the first part of a JOIN, which is a (Cartesian) Product, hence :

15 cols (5+5+5) and 160 rows (4*10*4)

Q3 [4,2=6]. (a) Inheritance, Traversal (or any synonym for "path-traversal").

(b) Yes, there is a problem of referential integrity. The foreign key Vend_Code in Product_table does not have matching values (for the same field name) in the Vendor_table.

Q4 [9]. Start with : Products(Prodnum, Desc, Macnum, Setup, Prorate, Igd, Amt).

Prodnum was defined as being unique so it is an obvious key :

Products(<u>Prodnum</u>, Desc, Macnum, Setup, Prorate, Igd, Amt).

Remove the first repeating group of Macnum, Setup, and Prorate, as follows :

(a1) Settings(Prodnum, Macnum, Setup, Prorate).
We are told what the key for this relation has to be (the given dependencies).

Now remove the second repeating group of Igd and Amt :

(a2) Ingredients(Prodnum, Igd, Amt).
We are told what the key for this relation has to be (dependencies given).

Removing these two repeating groups (a1) and (a2) leaves :

(a3) Products(Prodnum, Desc).

2NF.

For both (a1) and (a2), the non-key fields are dependent on the whole compound key (we are told this in the dependencies given). (a3) does not have a compound key, so 2NF is not applicable.

3NF.

This step applies only to (a1), as this is the only relation which could have dependencies between non-key fields. However the dependencies given indicate that setup and prorate are not dependent upon one another, so 3NF is not applicable.

Hence the relations (a1), (a2) and (a3) are now in 3NF. ANSWER.

Q5 [8]
```
(a) select ename, sal from emp where sal >
(select sal from emp where deptno = 20)
order by ename desc;
```

This code will give an error message, because the expression within the brackets will try to return many values, but only one is required by the ">" sign.

```
(b) select ename, sal from emp where sal < any
(select sal from emp where deptno = 30)
order by ename;

ename   sal

adams  1100
allen  1600
clark  2450
james   950
martin 1250
miller 1300
smith   800
turner 1500
ward   1250
```

```
(c) select ename, sal from emp where sal < all
(select sal from emp where deptno = 30)
order by ename;

ename    sal

smith    800

(d) select ename, sal from emp where sal > all
(select sal from emp where deptno = 30)
order by ename desc ;

ename   sal

scott  3000
king   5000
jones  2975
ford   3000
```

Q6 [2 each]. (a) select cname, clabfee from course where cdept = 'PHIL' order by cname desc;

(b) select * from course where cred = 3 and (clabfee < 100 or clabfee > 300);

(c) select * from staff where ename like 'MA%';

(d) select count (*), sum (clabfee) from course where cdept = 'MATHS';

(e) select dhodsno from department, course
where dept=cdept and cname = 'SOLIPSISM';