

Ronny Bull  
 CS541  
 Problems 6.23 & 6.26

6.23)

a)

$\Pi$  Serial#,Manufacturer,Sale\_price ( $\sigma$  Name="Jane Doe"( SALESPERSON  $\bowtie$  Salesperson\_id = Salesperson\_id SALE)(SALE  $\bowtie$  Serial\_no=Serial\_no CAR))

b)

$\Pi$  Serial#, Model( $\sigma$  Option\_name="NULL"(OPTION  $\bowtie$  Serial\_no=Serial\_no CAR))

c)

Salesperson and Sale would have a natural join on Salesperson\_id since they both use the same name for the value. A left outer join on these tables would match all of the values from Salesperson with the corresponding matches in Sales based on the Salesperson\_id column in both tables. All of the values from the Salesperson table would remain and would match to the Sales table as well as include NULL values for anyone in the Salesperson table that did not sell a car. For example say we have three sales people Bob, Harry, & Sue, and we want to produce a table that lists all of their recorded sales using a left outer join off of the natural join. Say Bob & Sue sold cars but Harry did not the table could look like this:

Name	Serial_no	Date	Price
Bob	12345	1-1-11	1000.00
Bob	13242	1-2-11	1500.00
Bob	13553	1-3-11	2000.00
Sue	42112	1-4-11	2200.00
Sue	51231	1-5-11	1500.00
Harry	NULL	NULL	NULL

d)

Show a list of salespeople who have not sold a car

ALL  $\leftarrow$   $\Pi$  Salesperson\_id (SALESPERSON)  
 WITH\_SALES  $\leftarrow$   $\Pi$  Salesperson\_id (SALES)  
 WITHOUT\_SALES  $\leftarrow$  (ALL - WITH\_SALES)  
 RESULT  $\leftarrow$   $\Pi$  Salesperson\_id, name (WITHOUT\_SALES \* SALESPERSON)

2.26)

c)

**Tuple Version:**

{*b*.Name | BORROWER(*b*) AND (∃*l*)(BOOK\_LOANS(*l*) AND *l*.Book\_id=NULL AND *b*.Card\_no = *l*.Card\_no)}

**Domain Version:**

{ N | BORROWER(C,N,A,P) AND BOOK\_LOANS(B,BR,C,DO,NULL) }

d)

**Tuple Version:**

{*b*.title, *p*.Name, *p*.Address | BOOK(*b*) AND BORROWER(*p*) AND (∃*b*) (LIBRARY\_BRANCH(*lb*) AND *lb*.Branch\_name="Sharpstown") AND (∃*l*)(BOOK\_LOANS(*l*) AND *l*.Due\_date="today") AND (∃*b*)(BOOK(*b*) AND *b*.Book\_id=*l*.Book\_id)}

**Domain Version:**

{ T, N, A | BOOK(B,T,PN) AND BORROWER(C,N,A,P) AND LIBRARY\_BRANCH(ID,'Sharpstown',AD) AND BOOK\_LOANS(B,ID,C,DO,'today') }

f)

**Tuple Version:**

{*b*.COUNT(\*), *p*.Name, *p*.Address | BOOK\_LOANS(*l*) AND BORROWER(*p*) AND *b*.COUNT > 5}

**Domain Version:**

{ N, A, COUNT | BOOK\_LOANS(B,ID,C,DO,CI) AND BORROWER(C,N,A,P) AND (COUNT(B) < 5) }