CS348 - Midterm Sample solutions – Q2

Part a)

SQL-solution1)

```
select distinct cnum, cname
from customer c, pickup p, dropoff d
where  c.cnum = p.cnum and
       p.rnum = d.rnum
group by cnum, cname
having count(*) >1
```

SQL-solution2)

```
select distinct cnum, cname
from customer c, pickup p1, dropoff d1, pickup p2, dropoff d2
where  c.cnum = p1.cnum and
       c.cnum = p2.cnum and
       p1.rnum = d1.rnum and
       p2.rnum = d2.rnum and
       p1.rnum <> p2.rnum
```

relational algebra)

PD1:= pickup ⋈ dropoff

PD2 := pickup ⋈ dropoff

C := customer

Result := $\pi_{\text{C.cnum, C.cname}}$ ($\sigma_{\text{PD1.cnum=C.cnum and PD2.cnum=C.cnum and PD1.rnum<>PD2.rnum}}$ (PD1 × PD2 × C))

Part b)

SQL)

```
Select distinct cnum, cname
from customer c, car ca, pickup p
where  c.city = waterloo and
       ca.make = "Ford" and
       ca.year = 2007 and
       c.cnum = p.cnum and
       p.licence = ca.licence and
       p.rnum not in (select rnum from dropoff)
```

relational algebra)

CurrentRentals:= π_{rnum} (pickup) - π_{rnum} (dropoff)

C := $\sigma_{\text{city=waterloo}}$ (customer)

Ca := $\sigma_{\text{year=2007 and make="Ford"}}$ (car)

P := pickup

Result := $\pi_{\text{C.cnum, C.cnamer}}$ (C ⋈ Ca ⋈ P ⋈ CurrentRentals)

c)
SQL)

```
select distinct license, make, model, sum(fee) as "total
revenue"
from car C, pickup P, dropoff D
where  C.license = P.license and
       D.rnum = P.rnum
group by license, make, model
order by make ASC, model ASC
```