CPSC 304 - Tutorial 6 Datalog

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Question 1

(a) Express the following query in Datalog. "Find the details (i.e., all attributes) of the customers who have a rating higher than 6 and earn less than $125,000."

```
Ans(cid, cname, rating, salary) :- customer(cid, cname, rating, salary), rating > 5, salary < 125000
```

(b)Express the following query in Datalog. "Find the various item names and their types."

```
Ans(iname, type) :- item(_, iname, type, _)
```

(c) What is the Datalog query equivalent to each of the following RA queries?

```
Ans(cid,cname,rating,salary) :- customer(cid,cname,rating,salary),rating>5
Ans(cid,cname,rating,salary) :- customer(cid,cname,rating,salary),salary>100000
```

```
Ans(iid,iname,type,price) :- item(iid,iname,type,price),type!='customer electronics'
Ans(iid,iname,type,price) :- item(iid,iname,type,price),price<=50
```

(d) Suppose... Explain your answer.

Since there are 950 unique names in items and types can be determined solely from the item name, that means there will be exactly 950 `N,T` tuples returned by that query.

(e)Express the following query in Datalog. "Find the type and name of those items, whose price is at most $100 OR which were ordered by the customer with cid=123."

```
Ans(type,iname) :- item(_,iname,type,price),price<=100
Ans(type,iname) :- item(iid,iname,type,_),order(cid,iid,_,_),cid=123
```

(f) Express the following query in Datalog. "Find the names of customers who did not order any laptop, i.e., did not order any item of type laptop".

```
orderedLaptop(cid,cname,rating,salary) :- customer(cid,cname,rating,salary),order(cid,iid,_,_),item(iid,_,'lapto
Ans(cname) :- customer(cid,cname,rating,salary) NOT orderedLaptop(cid,cname,rating,salary)
```

Question 2

(a) Find the names of sailors who have reserved at least two different boats with the same color.

```
Ans(sname) :- sailors(sid,sname,_,_),boats(bid1,_,color1),reserved(sid,bid1,_),boats(bid2,_,color2),reserved(sid
```

(b) Find the names of sailors who have reserved all red boats.

```
reservedRed(sid,sname) :- sailors(sid,sname,_,_),reserved(sid,bid,_),boats(bid,_,'red')
Ans(sname) :- sailors(sid,sname,_,_),NOT reservedRed(sid,sname)
```

(c) Find the name and color of boats which are reserved by all sailors rated above 7.

```
Ans(bname,color) :- sailors(sid,_,rating,_),rating>7,reserved(sid,bid,_),boats(bid,bname,color)
```

(d) Find the name(s) of sailors with the lowest rating.

```
better(sid,sname) :- sailors(sid,sname,rating1,_),sailors(_,_,rating2,_),rating1>rating2
Ans(sname) :- sailors(sid,sname,_,_), NOT better(sid,sname)
```

(e) Find the name and rating of the oldest sailor(s).

```
older(sid,sname,age1) :- sailors(sid,sname,_,age1),sailors(_,_,_,age2),age1<age2
Ans(sname,age) :- sailors(sid,sname,_,age), NOT older(sid,sname,age)
```

(f) Find the names of sailors who have reserved every boat reserved by those with a lower rating.

```
boatRating(rating,bid) :- sailors(sid,_,rating,_),reserved(sid,bid,_)
boatsReserved(sid,bid) :- reserved(sid,bid,_)
needReserved(sid,bid) :- sailors(sid,_,rating,_),boatRating(rating2,bid),rating2<rating
haventReservedAllLower(sid) :- needReserved(sid,bid), NOT boatsReserved(sid,bid)
Ans(sname) :- sailors(sid,sname,_,_),NOT haventReservedAllLower(sid)
```