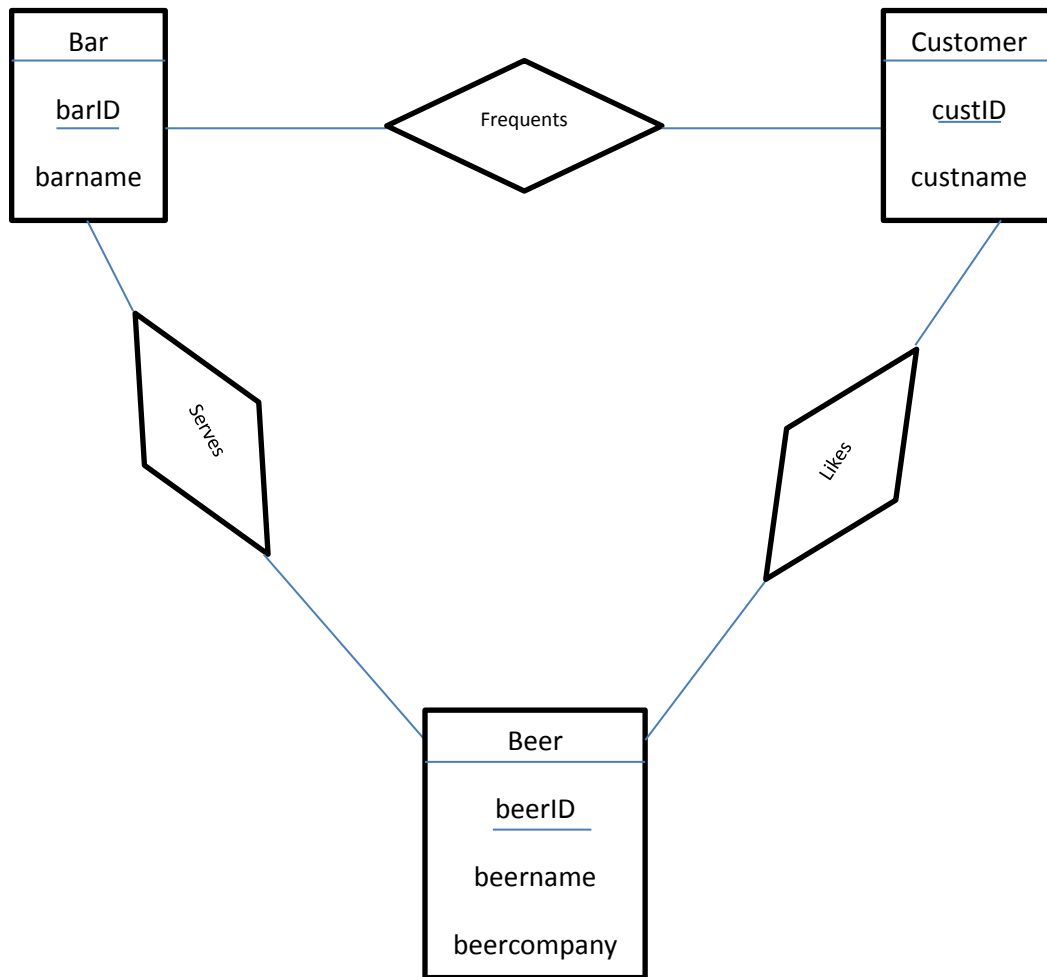


Midterm Sample Solution

Problem 1.

Part A.



Part B.

(1)

SELECT custID

FROM Likes JOIN Beer

WHERE beercompany = 'Brooklyn Brewery'

(2)

(SELECT custID, BarID FROM Frequent)

EXCEPT

(SELECT custID, BarID FROM Likes JOIN Serves JOIN Frequent)

(3)

SELECT BarID

FROM Serves JOIN Beer

WHERE beercompany = 'Brooklyn Brewery'

GROUPBY BarID

HAVING COUNT(*) = (SELECT COUNT(*) FROM Beer WHERE beercompany = 'Brooklyn, Brewery')

(4)

SELECT beername, COUNT(*)

FROM Beer LEFT OUTERJOIN Serves

GROUPBY BeerID, beername

Part C.

(1)

$\Pi_{custID} \sigma_{beercompany='Brooklyn\ Brewery'}(Likes \bowtie Beer)$

(2)

$T \leftarrow \Pi_{barID, custID} (Likes \bowtie Serves)$

result = $\Pi_{custID} (Frequent - T)$

(3)

$T \leftarrow \prod_{beerID} \sigma_{beercompany='Brooklyn Brewery'} Beer$

$result = Serves \div T$

(4)

$T1 \leftarrow Beer \bowtie Serves$

$T2 \leftarrow beerID, beername \text{ g count-distinct (barID) as barNum}(T1)$

$Result = \prod_{beername, barNum}(T2)$

Part D.

(1)

$\{t \mid \exists l \in Likes(l[custID] = t[custID] \wedge \exists b \in Beer(b[beerID] = l[beerID] \wedge b[beercompany] = 'Brooklyn Brewery'))\}$

(2)

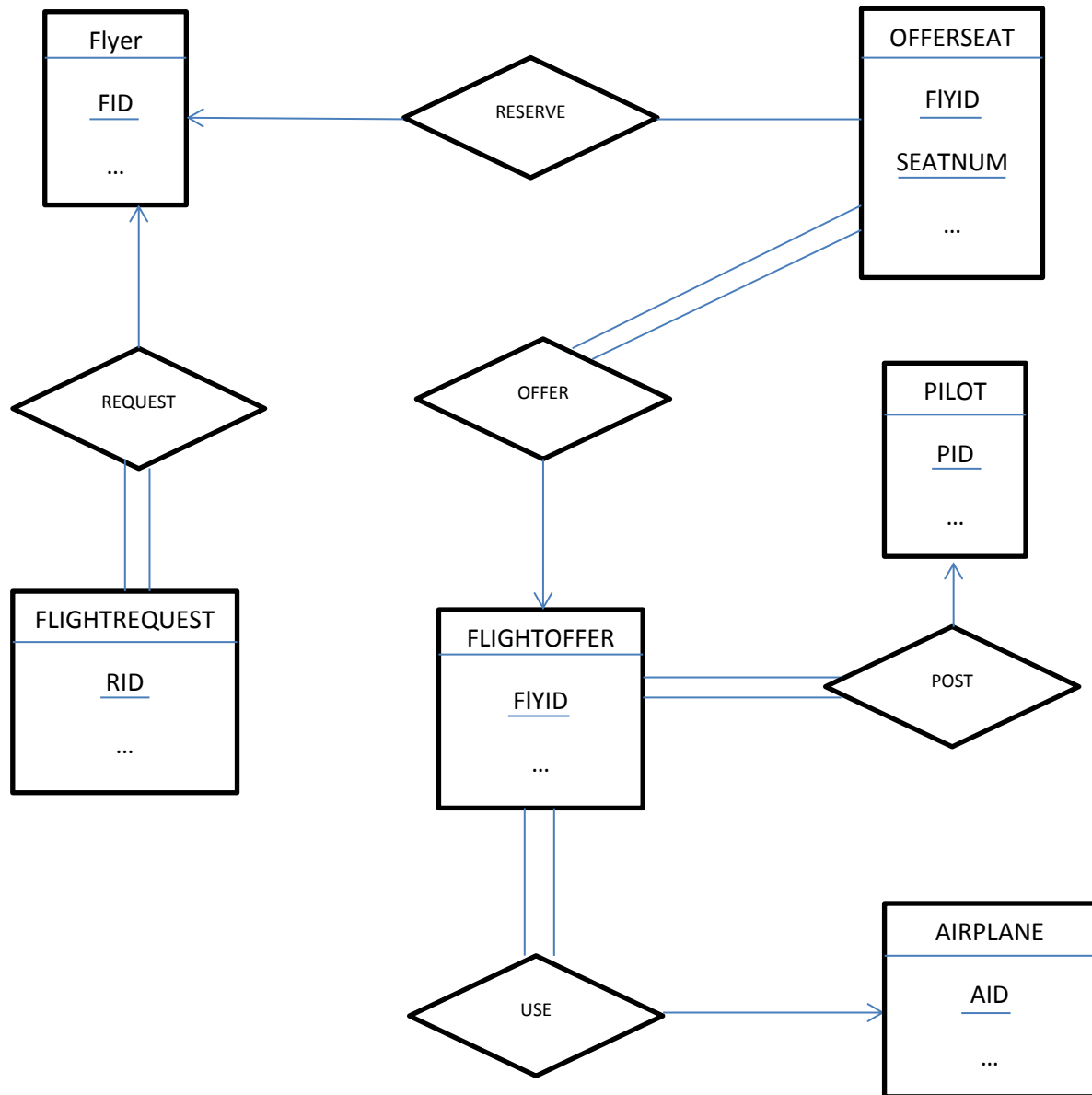
$\left\{ t \mid \begin{array}{l} \exists f \in Frequent(f[custID] = t[custID] \wedge \exists s \in Serves(s[barID] = f[barID] \wedge \neg \exists l \in Likes(l[custID] = t[custID] \\ \wedge l[beerID] = S[beerID]))) \end{array} \right\}$

(3)

$\left\{ t \mid \begin{array}{l} \forall b \in Beer(b[beercompany] = 'Brooklyn Brewery' \Rightarrow \\ \exists s \in Serves(s[barID] = t[barID] \wedge s[beerID] = b[beerID])) \end{array} \right\}$

Problem 2

Part.A



Part.B

FLYER (FID, FNAME, FCITY, FEMAIL)

PILOT (PID, PNAME, PCITY, PEMAIL)

AIRPLANE (AID, ANAME, AMODEL, AYEAR, ADESCRIPTION)

FLIGHTREQUEST (RID, FID, ORIGIN, DEST, FLIGHTDATE, DEPTIME_FROM, DEPTIME_TO, ARRTIME_FROM, ARRTIME_TO, MAXPRICE)

//time here is a range, since the problem description mentioned that flyer could choose “flight departs in the morning and arrives by 6pm”

FLIGHTOFFER (FLYID, PID, AID, STATUS, ORIGIN, DEST, FLIGHTDATE, ACTUALDEP, ACTUALARR, ARRTIME_FROM, ARRTIME_TO, DEPTIME_FROM, DEPTIME_TO)

OFFERSEAT (FLYID, SEATNUM, FID, DESCRIPTION, SUGGRPRICE, RESULTPRICE, FINALPRICE)

//SUGGRPRICE is proposed by pilot, RESULTPRICE is after contact is done, FINALPRICE is after the trip, note the penalty for delay and cancel could be reflect here.

(FID) is FK from FLIGHTREQUEST referencing FLYER

(AID) is FK from FLIGHTOFFER referencing AIRPLANE

(PID) is FK from FLIGHTOFFER referencing PILOT

(FLYID) is FK from OFFERSEAT referencing FLIGHTOFFER

(FID) is FK from OFFERSEAT referencing FLYER

Part.C

(1)

SELECT FLYID, SEATNUM

FROM OFFERSEAT NATURAL JOIN FLIGHTOFFER

WHERE STATUS ≠ CANCELLED AND FID = NULL AND ORIGIN = 'JFK' AND DEST = 'LAX'

AND FLIGHTDATE = 'NOV 10, 2015' AND ARRTIME_TO ≤ 6PM AND SUGGRPRICE ≤ 1000

(2)

SELECT FLIGHTDATE, COUNT(DISTINCT FID)

FROM FLIGHTREQUEST

WHERE MONTH(FLIGHTDATE) = NOV 2015 AND MAXPRICE > 800

GROUP BY FLIGHTDATE

(3)

```
SELECT P.PNAME SUM(FINALPRICE)
FROM OFFERSEAT JOIN FLIGHTOFFER JOIN PILOT
WHERE FLIGHTDATE = OCT 2014
GROUP BY P.PNAME
HAVING SUM(FINALPRICE) < 0
```

(4)

```
WITH CANCELEDFLIGHT AS
    SELECT P.PID, P.PNAME, FLYID, COUNT(*) AS RES
    FROM OFFERSEAT JOIN FLIGHTOFFER JOIN PILOT
    WHERE FLIGHTDATE IN 2014
    GROUP BY P.PID, P.PNAME, FLYID
```

```
SELECT P.PNAME
FROM CANCELEDFLIGHT
WHERE RES >= 5
GROUP BY P.PID, P.PNAME
HAVING COUNT(*) > 3
```