Section 4 – Relational Algebra

CSE 414

Question 1

Consider the following database schema:

Neighbors(name1, name2, duration)

Colleagues(name1, name2, duration)

Write a Relational Algebra Plan for the SQL query:

```
SELECT DISTINCT C1.name1, C2.name2
FROM Colleagues C1, Neighbors N, Colleagues C2
WHERE C1.name2 = N.name1
AND N.name2 = C2.name1
AND C1.duration < 10
AND C2.duration < 10
AND N.duration > 100
```

Question 2

Consider the following database schema:

R(A, B)

S(C, D, E)

T(F, H, G)

Write a Relational Algebra Plan for the SQL query:

```
SELECT R.B, S.E, SUM(T.G) AS sumG
FROM R, S, T
WHERE R.A = S.C
AND S.D = T.F
AND T.H > 55
GROUP BY R.B, S.E
```

Question 3

Consider the following database schema:

Users(uid, name)

Comment(uid, pid, score, txt)

Picture(pid, uid, img)

Part a

Write a Relational Algebra Plan for the SQL query:

```
SELECT DISTINCT U.uid
FROM Users U, Picture P, Comment C
WHERE U.uid = P.uid
AND P.pid = C.pid
AND C.score > 8
GROUP BY U.uid, P.pid
HAVING COUNT(*) > 10
```

Part b

Write a Relational Algebra Plan for the SQL query:

```
SELECT P.pid
FROM Picture P
WHERE NOT EXISTS
  (SELECT *
   FROM Comment C
   WHERE P.pid = C.pid
   AND C.score < 5)
```

Part c

Write an equivalent SQL query. Bonus: do it without using a subquery!

$$\Pi_{uid}$$

$$\sigma_{s>20}$$

$$\Upsilon_{U.uid,\ SUM(cnt)\to s}$$

$$\bowtie_{U.uid=C.uid}$$

Users U

$$\Upsilon_{C.uid,\ COUNT(*)\to cnt}$$

$$\sigma_{C.score\ <\ 3}$$

Comment C