Section 4 – Relational Algebra (Solutions)

Clinic(cid, name, street, state)
Equipment(eid, type, model)
Assignment(cid, eid)

Write a Relational Algebra expression in the form of a logical query plan (i.e., draw a tree) that is equivalent to the SQL query below:

SELECT COUNT(*) FROM Clinic C
WHERE NOT EXISTS (
    SELECT * FROM Assignment A, Equipment E
    WHERE C.cid = A.cid
    AND A.eid = E.eid
    AND E.type = 'Fridge'
    AND E.model = 1004
);

\[
\begin{array}{c}
\text{Clinic C} \\
\text{Assignment A} \\
\text{Equipment E}
\end{array}
\]

\[
\begin{array}{c}
\text{\(\pi_{C.cid}\)} \\
\text{\(\pi_{A.eid}\)} \\
\text{\(\sigma_{E.type='Fridge'\ and\ E.model=1004}\)} \\
\text{\(\pi_{A.eid=E.eid}\)} \\
\text{\(\_\text{count}(\_\)} \\
\text{\(\_)\)}
\end{array}
\]
Write a Relational Algebra expression in the form of a logical query plan that is equivalent to the SQL query below.

SELECT O1.category, MAX(ABS(O1.price - O2.price))
FROM Gift G1, Gift G2, Item O1, Item O2
WHERE G1.pid = G2.rid
AND G2.pid = G1.rid
AND O1.oid = G1.oid
AND O2.oid = G2.oid
AND O1.category = O2.category
GROUP BY O1.category
HAVING count(*) > 5;