Brandon Patton

Queries: relational algebra + SQL

Problem 1.

1. $\pi_{g.Name} \sigma_{hcity='NYC' \wedge year=2019 \wedge fromDate \leq 'Jan31'}$ (Guest $\bowtie$ Booking $\bowtie$ Hotel)

2. $\pi_{g.Name} \sigma_{hcity='NYC' \wedge type='suite' \wedge noofDays>10}$ (Guest $\bowtie$ Booking $\bowtie$ Hotel $\bowtie_{Hotel.hId=Room.hId}$ (Room))

3. $\pi_{g.Name}$ (Guest)
$- \pi_{g.Name} \sigma_{noofDays>5}$ (Guest $\bowtie$ Booking)

4. $\pi_{hId} \sigma_{hcity='NYC'}$ (Hotel) $- \pi_{hId} \sigma_{year=2018}$ (Booking)

5. $\pi_{g.Id}$ (Guest $\bowtie$ ($\pi_{g.Id, Room.hId}$ (Booking $\bowtie$ Hotel $\bowtie$
Hotel.hId=Room.hId ($\sigma_{type='suite'}$ (Room))) /
$\sigma_{hcity='NYC'}$ (Hotel))

Problem 2.

1. SELECT ename, age
   FROM Emp E NATURAL JOIN Works W
      NATURAL JOIN Dept D
   WHERE dname='Hardware' AND
      E.eid = ANY(SELECT E1.eid
                  FROM Emp E1 NATURAL JOIN
                     Works W NATURAL JOIN
                     Dept D
                  WHERE dname='Software');

```
2. SELECT managerid
   FROM Dept D
   WHERE SUM(budget) >= ALL
                (SELECT SUM(D1.budget),
                        D1.managerid
                 FROM Dept D1
                 GROUP BY managerid);


3. SELECT managerid
   FROM Dept D
   WHERE budget >= 1000000.00;


4. SELECT ename
   FROM Emp E NATURAL JOIN
        Works W NATURAL JOIN
        Dept D
   WHERE Salary > ALL(SELECT D1.budget
                      FROM Emp E1
                           NATURAL JOIN
                           WORK W1
                           NATURAL JOIN
                           Dept D1
                      WHERE E1.eid = E.eid);
```

5. SELECT ename
   FROM Emp E NATURAL JOIN
        works w NATURAL JOIN
        Dept D
   WHERE budget >= ALL (SELECT
                          D1. budget
                        FROM
                          Dept D1);

problem 3.
  1A. $\pi_{id, address, asking\_price, selling\_price}$
         $\sigma_{selling\_price \geq asking\_price}$ (House $\bowtie$ Sold)

  B. π_{name} ($\pi_{name, id}$ Buyer $- \pi_{name, id}$
                    (Buyer $\bowtie$ Sold))

  2A. SELECT H.postal_code, AVG(Selling_price) As AP.
      FROM House H, sold S
      WHERE H.id = S.house_id
      GROUP BY H.postal_code
      HAVING COUNT (house_id) >= 3;

```sql
2B. SELECT DISTINCT H.address, H.asking_price
    FROM House H
    WHERE H.beds >= 4
        AND
        H.baths >= 2
        AND
        NOT EXISTS (SELECT house_id
                    FROM Sold S
                    WHERE S.house_id = H.id)
```

I pledge my honor that I have abided by
the Stevens Honor System.
                        Brandon Patton