CS240A Homework 5

Author: Sneha Shankar

Q1) Solve the coalesce problem in SQL 2003 (Extra credit if you test your solution on DB2 or any SQL DBMS supporting recursion)

```
WITH coalesce(Name, Salary, starting, ending, counter) AS
(
   (SELECT Name, Salary, starting, ending,0
    FROM ehist)
   UNION ALL
   (Select e.Name, e.Salary,
    CASE WHEN e.starting < c.starting THEN e.starting ELSE c.starting END,
    CASE WHEN e.ending > c.ending then e.ending ELSE c.ending END,
    counter+1
    FROM coalesce c, ehist e
   WHERE e.Name = c.Name  AND counter<(SELECT count(*) from ehist) AND e.Salary = c.Salary AND
e.starting <= c.ending AND c.starting <= e.ending
)
)

SELECT DISTINCT c.Name, c.Salary, c.starting, c.ending
FROM coalesce c
WHERE NOT EXISTS (
   SELECT * FROM coalesce c1
   WHERE c.Name = c1.Name AND c.Salary = c1.Salary AND
   ((c1.starting < c.starting AND c1.ending >= c.ending) OR (c1.starting <= c.starting AND c1.ending >
c.ending))
   )
```

Testing:
I tested this in an oracle DB to get the following result. Table was created as given on page 102 of ADS textbook.

	NAME	SALARY	STARTING	ENDING
1	Bob	70000	06.01.1995 00:00:00	01.01.1997 00:00:00
2	Bob	60000	01.01.1995 00:00:00	06.01.1995 00:00:00

Q2) Now EHist(Eno, Sal, Title, From, To) is a concrete view that stores the transaction time history for the relation EMP(Eno, Sal, Title). The concrete view must be maintained by active DB2 rules. Please write those rules (testing on actual DBMS is not required)

```
CREATE TRIGGER delete_emp
AFTER DELETE ON EMP
FOR EACH ROW
UPDATE EHist AS E
```

```
SET E.To = CURRENT_DATE
WHERE E.Eno = OLD.Eno AND E.Sal = OLD.Sal AND E.Title = OLD.Title


CREATE TRIGGER insert_emp
AFTER INSERT ON EMP
FOR EACH ROW
INSERT INTO EHist (Eno, Sal, Title, From, To)
VALUES(NEW.Eno, NEW.Sal, NEW.Title, CURRENT_DATE, NULL)

CREATE TRIGGER update_emp
AFTER UPDATE ON EMP
FOR EACH ROW
BEGIN
UPDATE EHist
SET To=CURRENT_DATE
WHERE To=NULL AND Eno=NEW.Eno AND Sal = OLD.Sal AND Title = OLD.Title
INSERT INTO EHist (Eno, Sal, Title, From, To)
VALUES (NEW.Eno, NEW.Sal, NEW.Title, CURRENT_DATE, NULL)
END
```

Q3) Study Chapter 11 of ADS textbook till page 285 (Sections 11.1 and 11.2). Do problem 11.2 from the ADS textbook.

The pixel (11,00) has an x-value of 11 and a y-value of 00. Let this pixel be called as A. Therefore, x_A = 11 and y_A = 00. The z-value i.e. z_A can be obtained by interleaving the bits. So, we shuffle the bits in the order "1,2,1,2" where "1" corresponds to the x-coordinate and "2" corresponds to the y-coordinate. Therefore, z_A can be computed as follows:

z_A = Shuffle("1,2,1,2", x,y)

z_A = Shuffle("1,2,1,2", 11, 00)

$z_A = 1010 = (10)_{10}$

The Hilbert value of the same pixel can be obtained by mapping the pixel to the Hilbert curve of order 2. Thus, by observing Figure 11.4 and H2 of 11.6, we can conclude that the **Hilbert value of the pixel (11, 00) is 15**.