

CS 631: DATA MANAGEMENT SYSTEMS DESIGN

ASSIGNMENT 3

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EXERCISE 1 (Constraints in SQL)

1. No faculty member from department number 5 can teach more than four courses

```
CREATE ASSERTION F5COURSE4_CONST
CHECK( NOT EXISTS
  (SELECT F.FID COUNT(*)
   FROM CLASS C, FACULTY F
   WHERE C.FID = F.FID AND F.FID = 5
   GROUP BY C.FID
   HAVING COUNT(*) > 4));
```

2. The number of CS majors must be more than the number of math majors.

```
CREATE ASSERTION NUMOFMAJOR_CONST
CHECK( (SELECT COUNT(*)
  FROM STUDENT S
  WHERE S.MAJOR = 'CS')
  >
  (SELECT COUNT(*)
  FROM STUDENT SS
  WHERE SS.MAJOR = 'MATH'));
```

3. No student should enroll in more than 2 classes offered by the same faculty.

```
CREATE ASSERTION ENROLLCLASS_CONST
CHECK(SELECT SNUM, COUNT(*)
  FROM STUDENT S, CLASS C, ENROLLED E
  WHERE S.SNUM = E.SNUM AND C.NAME = E.CNAME
  GROUP BY S.SNUM, C.FID
  HAVING COUNT(*) <= 2);
```

EXERCISE 2 (Triggers)

(a) an SQL row level trigger that maintain the value of attribute NO_OF_RED every time a reservation is made.

```
CREATE TRIGGER ON_OF_RED_TRIROW
AFTER INSERT ON RESERVES
FOR EACH ROW
WHEN((SELECT COLOR
      FROM BOATS
      WHERE BID = NEW.BID) = 'RED')
UPDATE SAILORS
SET NO_OF_RED = NO_OF_RED + 1
WHERE SID = NEW.SID;
```

(b) an SQL statement level trigger that maintain the value of attribute NO_OF_RED every time a reservation is made.

```
CREATE TRIGGER ON_OF_RED_TRISTAT
AFTER INSERT ON RESERVES
REFERENCING NEW TABLE AS I
FOR EACH STATEMENT
WHEN EXISTS((SELECT *
             FROM BOATS B, I
             WHEN B.BID = I.BID AND B.COLOR = 'RED'))
UPDATE SAILORS S
SET NO_OF_RED = NO_OF_RED +
               (SELECT COUNT(*)
                FROM BOATS BB, I
                WHERE BB.BID = I.BID AND BB.COLOR = 'RED AND I.SID = S.SID)
WHERE S.SID IN (SELECT DINSTICT I.SID
               FROM BOATS B1, I
               WHERE B1.BID = I.BID AND B1.COLOR = 'RED');
```