1 STUDENTS (SNUM: integer, SNAME : string, MAJOR : string, LEVEL : string, AGE : integer)
CLASS (NAME : string, MEETS_AT : time, ROOM : string, FID : integer)
ENROLLED (SNUM : integer, CNAME : string)
FACULTY (FID : integer, FNAME : string, DEPTID : integer)
Express each of the following integrity constraints in SQL unless it is implied by the primary and foreign key constraint; if the constraint cannot be expressed in SQL, say so.

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

```
CREATE ASSERTION DFive_Faculty_MAXFourCourses
CHECK (
    NOT EXISTS (
        SELECT  F.FID
        FROM FACULTY F
        JOIN CLASS C ON F.FID = C.FID
        WHERE F.DEPTID = 5
        GROUP BY F.FID
        HAVING COUNT (*) > 4)
);
```

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

```
CREATE ASSERTION CsMoreThanMath
CHECK ((SELECT COUNT(*)
        FROM STUDENTS S
        WHERE MAJOR = 'CS')
        >
        (SELECT COUNT(*)
         FROM STUDENTS S
         WHERE MAJOR = 'MATH'));
```

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

```
CREATE ASSERTION StudentFacultyLessThan3
CHECK (
    NOT EXISTS (
        SELECT E.SNUM, C.FID
        FROM ENROLLED E
        JOIN CLASS C ON E.CNAME = C.NAME
        GROUP BY E.SNUM, C.FID
        HAVING COUNT(*) > 2)
);
```

2 SAILORS (SID: integer, SNAME: string, RATING: integer, AGE: integer, NO_OF_RED: integer)
RESERVES (SID: integer, BID: integer, DAY: date)
BOATS (BID: integer, BNAME: string, COLOR: string)
Write triggers that maintain the value of attribute NO_OF_RED every time a reservation is made.

2.a Write an SQL row level trigger

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

2.b Write an SQL statement level trigger.

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