**Quiz 4**                                            **Score (out of 9) _____**

**Taken by: Name_____ Student ID_____**

**Graded by: Name_____ Student ID_____**

Each question is worth one point.

Suppose that a pharmacy uses a database with two tables as defined below. Example tuples are **Drug**('abc', 'Advil', 300) and **Supplier**('Pfizer', 'Advil', 10.9).

> **Drug** (did CHAR(3), dname VARCHAR(10), qty INTEGER, PRIMARY KEY(id))
> **Supplier** (sname VARCHAR(10), dname VARCHAR(10), price REAL, primary key (sname, dname), foreign key (dname) REFERENCES Drug(dname))

## Question 1: Relational Algebra

1. If the quantity for a drug is lesser than 10, it needs to be restocked. Write a relational algebra expression to find names of drugs that need to be restocked. Call this resulting relation **Ra**.

   $$Ra = \pi_{DNAME} ( \sigma_{QTY<10} (Drug) )$$

2. Write a relational algebra expression to find names of suppliers for drugs whose quantity is between 11 and 20 (both inclusive).

   $$\pi_{SNAME} (( \sigma_{QTY>=11 \text{ and } QTY <=20} (Drug)) \bowtie Supplier)$$

3. Give a relational algebra expression to compute names of suppliers that make all the drugs that need to be restocked. You are allowed to use the results **Ra** from question (1).

   $$(\pi_{SNAME,DNAME} (Supplier))/Ra$$

4. Are Supplier and Drug relations union-compatible?   **No**

5. What is the degree of "Drug X Supplier" (cross product)?   **6**

6. While computing Drug X Supplier, we see these two relations have an attribute with the same name. What operation could you use to resolve this conflict?   **Renaming**

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**Question 2: SQL**

1.  Write a SELECT SQL query to find names of drugs whose quantity is 30.
    **SELECT dname FROM Drug WHERE qty = 30**

2.  Write a SQL query to find all distinct drugs with a name of at least 4 characters and starting and ending with 'M'. Name the result column 'MCPD'.
    **SELECT DISTINCT D.DNAME as MCPD**
    **FROM DRUG D**
    **WHERE D.DNAME LIKE 'M_%_M'**

3.  Write a SQL query to find the names of suppliers for those drugs which have quantity between 11 and 20 (inclusive).
    **Query 1:**
    **(nested queries solution) SELECT S.SNAME**
    **FROM SUPPLIER S**
    **WHERE S.DNAME IN (SELECT D.DNAME**
    **FROM DRUG D**
    **WHERE D.QTY>= 11 AND D.QTY<=20)**

    **Query 2:**
    **(natural join solution) SELECT S.SNAME**
    **FROM SUPPLIER S, DRUG D**
    **WHERE S.DNAME = D.DNAME AND D.QTY>= 11 AND D.QTY<=20**