IDS 521 – Spring 2020

Assignment #2

Assigned date: January 25, 2020 **Due date: post your solution file to Blackboard by 11:59pm on February 8, 2020**

For this second assignment, you can form a group of up to two students per group. Submit only one copy of your solution file per group. Be sure to list each team member name in your solution file.

To answer the following six questions, you need to consult the relational schema on the last page of this document as well as the NewPVF database that contains some sample data.

1. (10%) State what the following query computes:

   $\pi_{Customer\ Name}(\pi_{Customer\ ID}(\pi_{Order\ ID}(Order\_Line\_t \bowtie \sigma_{Produc\ Name='Computer\ Desk'}Product\_t) \bowtie Order\_t) \bowtie Customer\_t)$

2. (15%) The purchasing manager of the Pine Value Furniture (PVF) Company would like to know every vendor who supplies *all* raw materials with material description = 'Red Oak'. Using a division operation concept, compose a relational algebra expression that would find these vendors.

3. (10%) Compose a SQL statement that is equivalent to Question 1 above. Note, you might want to try and execute this SQL statement against the NewPVF database in SQL Server 2014 to see if it works as intended.

4. (17.5%) Compose a SQL statement that is equivalent to Question 2 above. Note, you might want to try and execute this SQL statement against the NewPVF database in SQL Server 2014 to see if it works as intended *[hint: use a correlated subquery]*.

5. (15%) Compose a query that would find the customer who had the highest total dollars amount of purchases in year 2011. Show customer name and total dollars amount of the purchases in the result table.

6. (17.5%) Compose an SQL statement to generate a list of two least expensive vendors (suppliers) for each raw material. In the result table, show the following columns: material ID, material description, vendor ID, vendor name, and the supplier's unit price. Sort the result table by material ID and supplier's unit price in ascending order. Note: If a raw material has only one vendor (supplier), that supplier and its unit price for the raw material should also be in the result (output) table *[hint: use a correlated subquery]*.

7. (15%) In the previous assignment (Assignment #1), you were asked to design a data model for a database that would store patients information, HCC codes, patient assigned HCC codes, and HCC code business rules. Based on that database design, I have created a physical database (named HccDB) with some sample data for each table. After Assignment #1 due date, I plan to upload a backup file of HccDB to the Blackboard; and you should be able to download it from the Blackboard and restore it on your computer. This database include the following (hypothetical) short list of HCC codes: 8, 9, 10, 11, 12, 17, 18, 19, 50, and 51. Moreover, the following business rules for HCC codes are also included in the database:
    a. Code 8 dominates codes 9, 10, 11, and 12. Code 9 dominates codes 10, 11, and 12. Code 10 dominates codes 11 and 12. Code 11 dominates code 12.
    b. Code 17 dominates codes 18 and 19. Code 18 dominates code 19.
    c. Code 50 dominates code 51.

   For this question, using the restored HccDB database, your task is to compose a query so that if a patient is assigned one or more HCC codes, the resulting query shows only the patient's relevant dominant HCC code(s) plus any of the patient's assigned HCC codes that has no corresponding dominant code. For examples:

   a. Assume that based on John Doe's medical conditions, he is assigned 8, 9, and 11 HCC codes. The resulting query for John Doe should display his patient id, his name, and his relevant HCC code, which is 8 in this simple example.
   b. Assume that based on Jane Public's medical conditions, she is assigned 9, 11, 12, 17, 18, and 19 HCC codes. The resulting query for Jane Public should display her patient id, her name, and her relevant HCC codes, which are 9 and 17.
   c. Assume that based on Dave Plumber's medical conditions, he is assigned 12, 18, 19, and 51 HCC codes. The resulting query for Dave Plumber should display his patient id, his name, and his relevant HCC codes, which are 12, 18, and 51.
   d. Assume that Ms. Healthie has no medical conditions; thus, she is NOT assigned any HCC code. The resulting query should NOT display Ms. Healthie.
   e. Putting the four examples above together, your query should display a result similar to this table:

Patient_ID	Patient_Name	Relevant_HccCode
1	John Doe	8
2	Jane Public	9
2	Jane Public	17
3	Dave Plumber	12
3	Dave Plumber	18
3	Dave Plumber	51

Relationships for PVFCh7-Ch9-Queries