The University of the West Indies
Department of Computing & Information Technology

COMP2700 – Database Management Systems I

INFO2415 – Enterprise Database Systems

Worksheet 2

A global shipping company, Package Express, offers package delivery services worldwide. A part of the database schema for its Package Delivery System is given below. Each package received for delivery from a customer is given a unique tracking number and the recipient information is recorded in the Package table (DateDelivered is left NULL). The package is moved from one shipping center to another on its way to the delivery address. When the package arrives at a shipping center, an entry is made in the PackageDelivery table recording the arrival date/time and the delivery status. The delivery status is 'on route' until the package gets to the final Shipping center. When the package is delivered to the delivery address, the DeliveryStatus is updated to 'Delivered' and the DateDelivered in the Package table is updated.

Package (TrackingNumber, CustomerId, DeliveryAddress, RecipientName, RecipientPhone, DateReceived, DateDelivered)

Customer (CustomerId, CustomerName, Phone, Address, CustomerType)

PackageDelivery (TrackingNumber, ShippingCenterId, ArrivalDate, DeliveryStatus, Comment)

ShippingCenter (ShippingCenterId, CenterLocation, Country)

1. Write SQL ***Create Table*** statements to create the PackageDelivery table. Make reasonable assumptions about data types and constraints.
2. Give SQL ***Insert*** statements to add the following rows to the Shipping Centre and Customer tables;

   Shipping Centre: PS44, Port-of-Spain, Trinidad
   Customer: C102, People Enterpise Limited, 18686259933, Main Road, Chaguanas, Company

   Populate each of the Customer and Shipping Centre tables with atleast 5 rows of reasonable data.

3. Give SQL ***insert*** statements for the Package and Package delivery tables which corresponds to the following scenarios;

   A package from the customer with customer id ='C526' was received on the 26th March, 2016 to be sent to Mary James who lives at Smith Street, Longdonville. Mary James' telephone contact is 18686654718. This package was assigned the tracking number 'JAM258'.

Package ‘JAM258’ arrived in Trinidad at shipping center ‘CG222’ on the 28th March,2016. The package’s status is set to ‘ON ROUTE’. This package arrived damaged.

Populate the Package and Package tables with at least 10 other rows of reasonable data.

4. Give an SQL ***update*** statement to reflect the fact that package ‘JAM258’ which is currently at shipping centre ‘CG222’ was delivered.

5. Write SQL queries to do the following;

    a. For package ‘GUY233’, list the CenterLocation and ArrivalDate of each leg of its delivery journey; order by Arrivaldate.
    b. For each customer, list the CustomerId and the number of packages received from that customer during 2015.

6. Write one other useful query on the Package Express Database. It should contain a group by clause.

7. Write SQL statements for the following
    a. Write an SQL create view statement which would create a view “ChaguanasUndelivered” which lists all the packages at shipping centre ‘CG222’ which were returned. (hint STATUS=’RETURNED’).
    b. Write an SQL select statement which would display the contents of the above view

8. Describe the relations that would be produced by the following relational algebra expressions. Give the corresponding SQL Select statements; describe the intermediate relation that is formed, then the final output.

    a) $\Pi_{\text{CustomerName, Address}} (\sigma_{\text{CustomerType = Company}} (\text{Customer}))$

    b) $\Pi_{\text{CentrerLocation, DeliveryStatus}} (\text{ShippingCenter} \bowtie_{\text{ShippingCenterId}} \text{PackageDelivery})$

    c) Explain using one of the above the concept of ‘closure’ of relational operations

    d) Write a relational algebra expression equivalent to the following SQL statement.

```
Select RecipientName, DeliveryStatus
From Package, PackageDelivery
Where Package.TrackingNumber = PackageDelivery.TrackingNumber
And Status= ‘ON ROUTE’
And RecipientName = ‘MARY KING’;
```