Assignment 1; COMP2605; Date Due: 03-Oct-2018; Submit on myElearning

What to Submit?: **Written answers with ID number on each page (staple please) to DCIT COMP 2605 Assignment Box.**

Question 1

Hospital Associates owns three private hospitals at different locations across the country. It has a centralized database for tracking patients' admissions and billing. The database schema contains the following tables:

Patients (PatientId, PatientName, Address, DOB)
Admissions (AdmissionId, PatientId, RoomId, AdmitDate, DischargeDate)
AdmitDetails (AdmissionId, TreatmentDescription, TreatmentCost, Comment)
Rooms (RoomId, RoomType, CostPerNight,)

When patients are admitted they are assigned to a room. The DischargeDate is initially set to Null. This is updated when the patient is discharged. The charge to the patient includes the room cost as well as treatment cost. The room cost is the cost per night times the number of nights (DischargeDate – AdmitDate).

(a) Write an SQL CREATE TABLE statement to create the Admissions table.

[4 marks]

(b) Give an SQL INSERT statement to add the following data to the Admissions table:
AdmissionId '130' is for patient 'HR245' who is admitted to room 'R311'on 12th May, 2009.

[2 marks]

(c) Explain how the referential Integrity constraints that you have specified in your create table statement in (a) would be applied when the insert statement in (b) is executed.

[4 marks]

(e) Patient 'HR245' is discharged on 15th May, 2009. Write an SQL Update statement to update the DischargeDate of his admissions record. Write an SQL Select statement to calculate his room cost.

[5 marks]

[15 marks]

Question 2

An online auction company "**I-BASIN**" allows their members to place items for sale through auctions. Their members can also bid on the various auctions hosted by "**I-BASIN**" but it is not necessary that all members are both owners and bidders. The following relational schema represents a portion of their database.

Member (MemberId, FirstName, LastName, DateRegistered, Ranking)

Item (ItemId, MemberId, BasePrice, DateAdded, DateSold, PriceSold)

Auction (AuctionId, ItemId, DateStarted, DateEnded, AuctionSuccessful)

Bid (BidId, AuctionId, MemberId, BidAmount, BidDate)

Each time a member joins the company, an entry is made into the Member table. When a member posts an item for sale, an entry is made in the Item table and a base Price must be specified by the owner. For each Item, "**I-BASIN**" may have many auctions since an item may not be sold during its first auction. Finally the bids made on the various auctions by members are recorded in the Bid table.

Suppose a script containing the following SQL statements was executed. Which statements do you expect to give an error message and why. DO NOT CONSIDER SYNTAX ERRORS.

1. *Insert into Member values ('M102', 'John','Smith','01-Jun-2010', 1);*
2. *Insert into Member values ('M103', 'Jane','Ali','01-Jan-2008', 1);*
3. *Insert into Item values ('I100','M102', 34.50,'02-Jun-2010', null, null);*
4. *Insert into Item values ('I101','M103', 34.50,'02-Jun-2010', null, null);*
5. *Insert into Item values ('I100','M103', 34.50,'02-Jun-2010', null, null);*

6. *Insert into Item(DateSold, ItemId, MemberId,BasePrice, DateAdded, DateSold, PriceSold) values(null,'I200','M102',45.00,'03-Jun-2010',null);*
7. *Insert into Auction values (null,'I101','04-Jun-2010', null, null);*
8. *Insert into Auction values ('A145','I101','06-Jun-2010', null, null);*
9. *Insert into Bid(BidId, AuctionId,MemberId,BidAmount,BidDate) values (12,'A123','M102', 35.00,'07-Jun-2010');*
10. *Insert into Bid(AuctionId, BidId, Memberid,BidAmount,BidDate) values('A145',null,'M103',37.00,'12-Jun-2010');*

[10 marks]

Question 3

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)*

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';
```

[25 marks]