21 July, 2020

Online Tests for CSE 4307: Database Management Systems

Note: This test is *open-book* and time-bound. Total Duration: 45 Minutes (including processing time)

1. (*Marks: 10*) Mr. Bob is a database designer. He designs the back-end (relational database) structure of Human Resource Management for his company ABC Co. He has codes for 2 entities as follows:

```
create table emp (
Name varchar2(20),
DOB date,
ContactNo varchar2(20),
Salary number(10,2),
Performance varchar2(20),
constraints pk_emp primary key(Name,DOB)
);
```

```
create table purchased_items
(item_id number primary key,
  name varchar2(20),
  price number not null,
  date_of_purchase date,
  used_by varchar2(20)
  );
```

Now he creates two views to hide some information of these entities as follows:

```
--view 1:
 create or replace view emp_view
 as
 select Name,ContactNo from emp;

 --view 2:
 create or repalce view items_view
 as
 select item_id id, name, date_of_purchase from purchased_items
 order by name;
```

After that he is willing to insert data through `emp_view` and `items_view`. Your task is to analyze the solution presented by Mr. Bob and clearly identify problems (if any) and suggest how to solve it.

2. (*Marks: 20*) Read the following description carefully and then answer the subsequent questions: (Necessary entities are **bold** faced.)

   ABC Co. Ltd: It is big company that has a few hundreds of employees. An **employee** must have an ID, Name, Date of Birth, Contact No. He may have blood group, blood group should be one of the values (A+,A-ve, B+,B-ve,AB+,AB-ve). Additionally he may have passport number which must be unique. Each employee must be connected to a department. There are 3 departments such as HR, Marketing and Administration. To maintain their stock they store **items** information that include ItemID, Name of item and description of the item. After collecting items they sale it. **Sales** information include ItemID, person involved in the sales, Date and time of sales, Quantity. Remember many items are sold and different people may be involved in different sales.

   Your tasks are as follows:

   (a) Create the DDL for the above scenario maintaining all mentioned constraints.

(b) Now the company is growing very fast, number of department is increasing very fast (10 departments are added every 1 year). Will your presented solution for **employee** entity work? Justify, if you need to redesign , show it.

(c) In **Sales** entity there is no information about money or amount(both unit price and total price). How can you accommodate it? Explain it.

(d) Write an SQL statement to top 3 items sold only in weekends (i.e. Friday and Saturday) (items sold on other days will not be considered). Number one item is chosen which is sold in **the higher number of quantity**.

3. (*Marks: 10*) There are two systems (Assume `sys_owner` is the owner of the original system in both cases):

   (1) Mr. Small: It involves only 2 entities and values are rarely updated. (2) Mr. Large: It involves n (n is a big number) connected entities. Data insertion and update are very fast in this system. And new entities may be added as system grows.

   In both systems, we need a mechanism for read-only access for all entities. Mr. DB is a database engineer and proposed to ensure read-only access to different users (two users have been shown here for explanation, it may be more for Mr. Large system while for Mr. Small system number of such user is only one) in a direct method as follows:

```
-- for user1

grant select on entity1 to user1;
grant select on entity2 to user1;
--- ---- --
grant select on entityn to user1;


--- for user2

grant select on entity1 to user2;
grant select on entity2 to user2;
--- ---- --
grant select on entityn to user2;
```

   For Mr.Small system it needs only 2 statements since there is only 2 entities for one user, while for Mr. Large system n statements are needed as there are n entities in the system per user.

   Your task is to criticize both solutions with your recommendations to improve the systems.