Database Management Systems

CENG 356

Midterm Spring 2013

Name:

Student ID:

1. Give the definitions of the followings:
   a. Relation
   b. Schema
   c. Foreign key
   d. Entity

2. The following question considers a company which is selling some products to its customers.
   a. Write SQL queries to create tables for customers and products of the company. The customer table should have ID, name, address, phone fields. The product table should include ProductID, name, type, and price fields. Your tables should have primary keys. For each field determine the "null" constraint too.
   b. Assume orders from customers for different products are received by the company. Besides, assume each order can include several items of only one product type. The number of items ordered and the order date should also be stored. Explain how the order can be added to your database. Write necessary SQL commands.

CREATE TABLE Product

(ProductID Integer PRIMARY KEY,

   PName   varchar NOT NULL,

   PType   varchar NOT NULL,

   Price   real

)

CREATE TABLE customer

(CID Integer PRIMARY KEY,

  CName   varcahr NOT NULL,

 CAddress varchar,

CPhone   varchar

)

Order will be a table with two foreign keys referring to customer and product tables. The number of items ordered and the date of order is also given in the order table.

CREATE TABLE Order

(OID   Integer PRIMARY KEY,

   ODate   DATE NOT NULL,

   Customer Integer REFERENCES customer.CID ,

   Product Integer REFERENCES Product.ProductID,

   Items   Integer NOT NULL

)

3. Write a relation algebra expression to find the names and surnames of employees who work in '*Administration*' department. Assume Employee relation is defined as below:

Employee<name, surname, department, city, salary>

$$\pi_{Name, Surname}(\sigma_{department = 'Administration'})$$

4. The following relations are available. Write a relational algebra expression to give the Student name, and the name of the courses he/she took in year 2012 if his/her Student ID is '12345'

Student : <StudentID, Student Name, Department>
Course: <CourseCode, CourseName , Credit>
TakenCourses: <CourseCode, StudentID, year, Grade>

$$\pi_{StudentName, CourseName}(\sigma_{StudentID = '12345'}(Student | >< | TakenCourses | >< | Course)$$

Note (|><| represents join operation)

5. Write a SQL query to

   a. Create a table Student<name, surname, dept>
      CREATE TABLE Student
      (name char(30),
        Surname char(30),
        Dept Integer
       Primary Key (name,surname)
)

   b. Create a table Department<DeptID, DeptName, Location>
      CREATE TABLE Department
      (DeptID Integer PRIMARY KEY,
        DeptName char(30)
        Location char(30)
)

   c. Insert one record into each table
      INSERT INTO Student values ('Hasan', 'Alioglu', 11)
      INSERT INTO Department values (11, 'CENG', 'Balgat')

   d. Find and print the name of all students who study in a department located in 'Ankara'
      (In creating the tables, consider all necessary constraints)
      SELECT Name, Surname
      FROM Student
      WHERE Dept = Department.DeptID AND Department.Location = 'Ankara'