University of Wollongong

SCSSE
School of Computer Science and Software Engineering

Student to complete:	
Family name	
Other names	
Student number	
Table number	

CSCI235
Databases
Wollongong Campus

Supplementary Examination Paper
Autumn Session 2013

Exam duration	3 hours
Items permitted by examiner	Nil
Aids supplied	Nil
Directions to students	7 questions to be answered. This paper is worth 60% of the total marks for the subject

This exam paper must not be removed from the exam venue

QUESTION 1 (10 marks)

Management of a large retail store would like to have a database to track of its sales activities. The database should contain information about customers, products, and sales persons.
Each customer is described by his/her name, address and optionally by a name of organization he/she belongs to. Customers place their orders for the products being stored in the retail store. A customer may place many orders, and each order may be related to many products. Orders are uniquely identified by their numbers and each one of them is described by date of order and the total number of units. Products offered by the retail store are identified by a unique bar code and each one of them has a name, retail price, the total number of its units available in the retail store, and optionally a name of its manufacturer. Note that because of the limited size of the retail store the total number of units of any product cannot be greater than 500. A product may be ordered by many customers. The customers' orders are processed by sales persons working at the store. Each order is handled by exactly one sales person who may handle many orders. The database should keep information on who handled each order. Sales persons are described by their names, ranks, dates of birth and salaries. Note that each sales person is uniquely identified by name and date of birth. All order constraints are up to you.

(1) Analysis the requirements given above and construct the UML diagram for the retail store database.

Your diagram of conceptual schema **must** be consistent with a graphical notation of simplified UML class diagrams explained to you during the lecture classes in a subject CSCI235 Databases. **Application of another conceptual modeling notation will result in no marks awarded for this task!**

(6 marks)

(2) Translate your UML diagram into a collection of relational schemas and write CREATE TABLE commands which we are needed to implement the database.

(4 marks)

THE QUESTIONS 2, 3, 4, AND 5 REFER TO THE RELATIONAL TABLES LISTED BELOW

The database contains information about the real estate properties offered for sale (PROPERTY table) by their owners (OWNER table). Information related to potential buyers is kept in a separate relational table BUYER. A buyer may specify one or more preferences stored in a relational table PREFERENCE. Records of the real estate properties inspected by the potential buyers are kept in a relational table INSPECTION.

The schemas of relational tables, meanings of their attributes and specifications of primary, candidate, and foreign keys are given below.

PROPERTY

P#	property number
CITY	city part of its address
STREET	street part of its address
HOUSE#	house number part of its address
OPHONE#	owner's telephone number
PRICE	price asked by its owner

primary key = (p#)
candidate key=(CITY, STREET, HOUSE#)
foreign key = (OPHONE#) references OWNER(OPHONE#)

OWNER

OPHONE#	telephone number of property owner
ONAME	name of property owner

primary key = (OPHONE#)

BUYER

BPHONE#	telephone number of potential buyer
BNAME	name of potential buyer
BCITY	city part of buyer's address
BSTREET	street part of buyer's address
HOUSE#	house number part of buyer's address

primary key = (BPHONE#)
candidate key = (CITY, STREET, HOUSE#)

PREFERENCE

BPHONE#	telephone number of potential buyer
PCITY	city part of preferred address
PTREET	street part of preferred address
MAXPRICE	maximum acceptable price
MINPRICE	minimum acceptable price
PDATE	date when preference was recorded

primary key = (BPEONE#, PDATE)
foreign key = (BPHONE#) references BUYER(BPHONE#)

INSPECTION

BPHONE#	telephone number of potential buyer
P#	property number
IDATE	inspection date

primary key = (BPHONE#, P#, IDATE)
foreign key = (BPHONE#) references BUYER(BPBONE#)
foreign key = (P#) references PROPERTY(P#)

QUESTION 2 **(10 marks)**

Each of the following questions worth 2.5 marks.

Implement the following queries as SELECT statements of SQL. An implementation technique, like for instance join queries, nested queries, group by, having etc is up to you.

(1) Find the names and addresses of all real estate properties inspected by at least one potential buyer whose preferred price range is between $300,000 and $350,000.

(2) Find the names of all buyers such that there is no real estate property on the market that matches their preferences. A real estate property matches a buyer's preferences when the values of attribute CITY and STREET are identical in the property and the buyer's preferences.

(3) Find the names of all owners asking the highest price for their property.

(4) Find the addresses of all properties that have been inspected at 1east 5 times by potential buyers living in Sydney.

QUESTION 3 **(10 marks)**

Implement in SQL data definition statements to perform the following structural modifications to the sample database.

(1) Add an attribute TOTINSPECTED NUMBER (2) NULL, to a relational table BUYER. For each buyer the value of attribute TOTINSPECTED determines the total number of inspections done by the buyer. Use the contents of INSPECTION table to set the values of attribute TOTINSPECTED for each buyer. Correctly handle all buyers who have done no inspections so far.

(3 mark)

(2) Property number 1234 (p# = 1234), has been bought by a buyer 987654321 (BPHONE#=987654321). Update your database. Remember the buyer who bought the property may become a new owner.

(2 marks)

(3) Create a relational table LATESTPREF(BPHONE#, PCITY, PSTREET) that contains the latest preferences, i.e. with latest value of PDATE attribute, of each one of the potential buyers. Load the contents of LATESTPREF from PREFERENCE table.

(3 marks)

(4) Create a view MOSTPREFERENCE (BPHONE#, P#) that contains buyers' phone# and prefer property's number if a real estate property matches a buyer's preferences when the values of attribute CITY and STREET are identical in the property and the buyer's preferences, and the price of the property is between the buyer's minimum and maximum price.

(2 marks)

QUESTION 4 **(8 marks)**

Implement in SQL data manipulations and access control on the sample database. You are not allowed to suspend, delete, and modify any consistency constraints in the sample database.

(1) Grant to all users the right to read the relational table PROPERTY.

(1 mark)

(2) Grant *UPDATE and INSERT* permissions to *smith* for the relational table BUYER.

(1 mark)

(3) Grant to a user *john* the rights to read rows in the relational table INSPECTION, and *john* also has the right to grant the read permission to other users.

(2 marks)

(4) Grant to a user *john* the right to refer to the primary key of relational table PREFERENCE.

(1 mark)

(5) Remove a user *john's* grant right that grant to other users the rights read rows in the relational table INSPECTION. But john still has the rights to read rows in the relational table INSPECTION.

(2 marks)

(6) Remove a user *smith's* right to update in the relational table BUYER.

(1 mark)

QUESTION 5 **(12 marks)**

(1) Implement a PL/SQL stored procedure ADDINSPECT(phone#, p#, idate) that insert a new row in the table INSPECTION, and verifies the following consistency constraint each time when a property is inspected by a buyer. "A buyer never inspects the same property more than one time on the same day".

(6 marks)

(2) Implement a PL/SQL stored procedure NOPRFERED that display all properties' information that have not been preferred or inspected by potential buyers in a month recently.

(6 marks)

QUESTION 6 **(4 marks)**

Each of the following questions worth 2 marks.

Consider the relational schemas given below and the respective sets of functional dependencies valid in the schemas. For each one of the relational schemas identify its highest normal form. Remember that identification of a normal form requires analysis of the valid functional dependencies and the minimal keys. **Provide justification of each answer. A solution with no comprehensive justification scores no marks**!

(1) `UNI(building#, campus, department, lecturer)`

The values of attributes of a relational table UNI satisfy the following properties:
- a lecturer belongs to only one department,
- a department is located in one building,
- a building host many departments,
- a department is located at one campus,
- a campus hosts many departments.

(2) FLIGHT(passenger, phone#, flight#, seat#, departure-place, departure-time)

The values of attributes of a relational table FLIGHT satisfy the following properties:
- a passenger has one phone number,
- a passenger books seats on many different flights,
- the attributes flight#, seat#, and departure place uniquely identify each passenger,
- only one flight takes of from a given departure place at a given departure time.

QUESTION 7 **(6 marks)**

(1) Implement a SQL SELECT statement to find all tables and views that created by a user Bob.
(1 mark)

(2) What are the names of three phenomenons in the transactions?
(1 mark)

(3) Describe briefly what is a transaction by using an example?
(2 mark)

(4) Describe briefly "A view may be dropped because a SELECT privilege is revoked from the user who created the view".
(2 marks)

End of Examination