EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Mid Term I Assessment (Online), Fall 2020 Semester

Course: CSE 302 Database Systems
Instructor: Mohammad Rezwanul Huq, PhD, Associate Professor, CSE Department
Full Marks: 40 (15 will be counted for final grading)
Time: 1 Hour and 30 Minutes (including answer uploading time)

Note: There are **5** (**FIVE**) questions, answer ALL of them. Course Outcome (CO), Cognitive Level and Mark of each question are mentioned at the right margin.

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1. Assume that you are the owner of a very popular online grocery store. Every day, your store has thousands of transactions and therefore, inserting a lot of data into your database. Among this data, some are very sensitive which must not be accessible by all employees of your store. [CO1, C3, Mark: 5]

How can you provide this security by hiding some part of the database? Justify your answer briefly by using relevant terms.

2. **a)** Consider the following database schema. [CO1, C3, Mark: 6]

```
Hotel (hotelId, hotelName, hotelCity)
Room (roomNo, hotelId, type, price)
Guest (guestNo, guestName, guestAddr)
Booking (guestId, roomNo, hotelId, checkIn, checkOut)
```

The Booking relation contains booking information such as guest id, room number, hotel id, check-in date and check-out date from the hotel. A guest is not allowed to book the same hotel room with the same check-in date, but she can book the same hotel room with different check-in date.

Draw the schema diagram of the given database. You must identify primary keys and foreign keys appropriately.

b) Consider the following relations r and s. [CO1, C3, Mark: 4]

Relation r

A	B	C	D
a1	b1	c1	d1
a2	b1	c2	d3
a3	b3	c2	d1
a4	b3	c3	d2

Relation s

D	E	F
d1	e1	f1
d2	e1	f2
d4	e2	f2

Find the output of the following expression.

r ⟖ s (right outer join)

3. Consider the following Product relation. [CO2, C3, Mark: 5]
Product (productID, productName, supplyDate, quantity, unitPrice)

Write SQL Statements to perform the following operations.

i) Add a constraint specifying that the unit price of products must be positive values.
ii) Update the unitPrice by increasing 10% of the current price for the products having id = 'P-101' which was supplied on '02-Nov-20'.

4. **Formulate Relational algebra expressions** for the following queries based on the 'MyHome' database schema as given in Appendix. [CO1, C3, Mark: 10]

a) Find client names (both first and last) who can afford more than 500 as maxRent and registerd in Branch 'B003'.
b) Find the property with the minimum rent. Display propertyNo, postcode and type. You must use RENAME operator.
c) Find client names (both first and last) who have 'Flat' preference (prefType) and viewed (visited) some properties. You must use appropriate set operator.
d) How many staffs are female?
e) Find the number of customers registered at each branch. Display branch city as well.

5. **Write SQL Statements** for the following queries based on the 'MyHome' database schema as given in Appendix. [CO2, C3, Mark: 10]

a) Find property details (propertyNo, street and city) which are 'House' type and rent is less than 650.
b) Find client names (both first and last) and the staff names (both first and last) who are assigned to those clients.
c) Find branchNo and city which have no registered customers. You must use appropriate set operator.
d) Find staff names (both first and last) who are managers and their first name starts with 'J' and has exactly four characters.
e) Find the number of properties and average rent of properties for each city. Sort the result based on average rent in ascending order. Rename the column heading of the result relation appropriately.

Appendix

MyHome Database

MyHome is a housing agent in UK like Bikroy.com in Bangladesh that publishes advertisements of properties that can be rented. MyHome manages the following database schema which is used in question 3 and 5.

Branch	(branchNo, street, city postcode)
Staff	(staffNo, fName, lName, position, sex, DOB, salary, branchNo)
Client	(clientNo, fName, lName, telNo, prefType, maxRent, eMail)
PrivateOwner	(ownerNo, fName, lName, address, telNo, eMail, password)
PropertyForRent	(propertyNo, street, city, postcode, type, rooms, rent, ownerNo, staffNo, branchNo)
Viewing	(clientNo, propertyNo, viewDate, comment)
Registration	(clientNo, branchNo, staffNo, dateJoined)

MyHome has many branches throughout the country. The relation **Branch** stores branch related information.

The relation **Staff** holds staff related data and the *branch number* a staff is working on.

The relation **Client** holds client related data including their preferred accommodation type and the maximum rent they can afford.

The relation **PrivateOwner** stores property owners' data.

The relation **PropertyForRent** stores property related data about the location of the property, number of available rooms and rent amount along with the *owner number*, *branch number* under which the property is registered and the *staff number* who is the contact person for that property.

The relation **Viewing** stores data on each client's visit on a property. A client can visit a property multiple times, but not twice in a day. A client can make some comments about the property during his/her visit.

The relation **Registration** contains data on clients' registration including the *client number*, *branch number* in which the client is registered, *staff number* who is the contact person for that client and the date when the client registered. A client can register at multiple branches.

A sample dataset on the above-mentioned schema is given for better understanding.

Branch

branchNo	street	city	postcode
B005	22 Deer Rd	London	SW1 4EH
B007	16 Argyll St	Aberdeen	AB2 3SU
B003	163 Main St	Glasgow	G11 9QX
B004	32 Manse Rd	Bristol	BS99 1NZ
B002	56 Clover Dr	London	NW10 6EU

Staff

staffNo	fName	lName	position	sex	DOB	salary	branchNo
SL21	John	White	Manager	M	1-Oct-45	30000	B005
SG37	Ann	Beech	Assistant	F	10-Nov-60	12000	B003
SG14	David	Ford	Supervisor	M	24-Mar-58	18000	B003
SA9	Mary	Howe	Assistant	F	19-Feb-70	9000	B007
SG5	Susan	Brand	Manager	F	3-Jun-40	24000	B003
SL41	Julie	Lee	Assistant	F	13-Jun-65	9000	B005

PropertyForRent

propertyNo	street	city	postcode	type	rooms	rent	ownerNo	staffNo	branchNo
PA14	16 Holhead	Aberdeen	AB7 5SU	House	6	650	CO46	SA9	B007
PL94	6 Argyll St	London	NW2	Flat	4	400	CO87	SL41	B005
PG4	6 Lawrence St	Glasgow	G11 9QX	Flat	3	350	CO40		B003
PG36	2 Manor Rd	Glasgow	G32 4QX	Flat	3	375	CO93	SG37	B003
PG21	18 Dale Rd	Glasgow	G12	House	5	600	CO87	SG37	B003
PG16	5 Novar Dr	Glasgow	G12 9AX	Flat	4	450	CO93	SG14	B003

Client

clientNo	fName	lName	telNo	prefType	maxRent	eMail
CR76	John	Kay	0207-774-5632	Flat	425	john.kay@gmail.com
CR56	Aline	Stewart	0141-848-1825	Flat	350	astewart@hotmail.com
CR74	Mike	Ritchie	01475-392178	House	750	mritchie01@yahoo.co.uk
CR62	Mary	Tregear	01224-196720	Flat	600	maryt@hotmail.co.uk

PrivateOwner

ownerNo	fName	lName	address	telNo	eMail	password
CO46	Joe	Keogh	2 Fergus Dr, Aberdeen AB2 7SX	01224-861212	jkeogh@lhh.com	********
CO87	Carol	Farrel	6 Achray St, Glasgow G32 9DX	0141-357-7419	cfarrel@gmail.com	********
CO40	Tina	Murphy	63 Well St, Glasgow G42	0141-943-1728	tinam@hotmail.com	********
CO93	Tony	Shaw	12 Park Pl, Glasgow G4 0QR	0141-225-7025	tony.shaw@ark.com	********

Viewing

clientNo	propertyNo	viewDate	comment
CR56	PA14	24-May-13	too small
CR76	PG4	20-Apr-13	too remote
CR56	PG4	26-May-13	
CR62	PA14	14-May-13	no dining room
CR56	PG36	28-Apr-13	

Registration

clientNo	branchNo	staffNo	dateJoined
CR76	B005	SL41	2-Jan-13
CR56	B003	SG37	11-Apr-12
CR74	B003	SG37	16-Nov-11
CR62	B007	SA9	7-Mar-12