King Saud University

College of Computer and Information Sciences

Department of Information Systems

Introduction to Database System (IS230)

Second Semester 1436/1437 (Fall 2015)

Dr. Ahmed Emam

Midterm Exam – Study Guide

Facts about the Exam :

- The exam scheduled to on November 10, 2015 at 6:30 p.m.
- Exam is CLOSED BOOK.
- Exam is non-cumulative and a guide to studying for the exam is given below.

Study Guide for the Exam :

The following topics will be covered in the exam:

1. Chapter 1
2. Chapter 2
3. Chapter 3
4. Chapter 4
5. Chapter 7

Here are sample question:

Multiple Choice Questions (MCQ) :

Q1) A database is an organized collection of _____ related data
a) badly
b) physically
c) loosely
d) logically

Q2) Which of the following types of data can be stored in a database?
a) Numbers
b) Letters
c) Voice
d) All of the above

Q3) Data processed in a way that increases a user's knowledge is:
a) information.
b) graphics.
c) hyperlink.
d) text.

Q4) Data that describe the properties of other data are:
a) physical.
b) relationships.
c) logical.
d) none of the above.

Q5) One disadvantage of file processing systems is:
a) enforcement of integrity constraints.
b) reduced data duplication.
c) program-data independence.
d) limited data sharing.

Q5) Program-data dependence is caused by
a) data descriptions being stored on a server.
b) data cohabiting with programs.
c) data descriptions being written into programming code.
d) file descriptors being stored in each application.

Q6) A centralized knowledge base of all data definitions, data relationships, screen and report formats, and other system components is called a(n):
a) repository.
b) index.
c) database management system.
d) data warehouse.

Q7) Which of the following decisions must be made when developing a personal computer database?
a) Who is responsible for data accuracy?
b) Buy or make?
c) Database design
d) All of the above

Q8) In addition to the decisions regarding a PC database, which of the following questions are important to workgroup databases?
a) With a large number of users, how can the database be optimized?
b) How can members use the database easily?
c) Which processes should be performed on the server and which on the client?
d) All of the above

Q9) Which of the following is an integrated decision support database with content derived from various operational databases?
a) Data warehouse
b) Client-server system
c) Relational DBMS
d) Corporate data structure

Q10) One problem with Web-enabled databases is:
a) managing a large volume of data.
b) security.
c) data quality.
d) all of the above.

Q11) The SDLC phase in which functional data specifications and processing rules are created is the _____ phase.
a) analysis
b) planning
c) implementation
d) design

Q12) The SDLC phase in which database processing programs are created is the _____ phase.
a) analysis
b) planning
c) implementation
d) design

Q13) The SDLC phase in which the detailed conceptual data model is created is the _____ phase.
a) planning
b) implementation

c)	design
d)	analysis

Q14)	Organizing the database in computer disk storage is done in the _____ phase.
a)	implementation
b)	design
c)	maintenance
d)	analysis

Q15) Software that provides automated support for some phases of the SDLC is called:
a) CAD.
b) CASE.
c) RAD.
d) MST.

Q16)	The three-schema approach includes which of the following schemas?
a)	Dissecting
b)	Logical
c)	Internal
d)	Cross-functional

Q17) The definition of the database that provides all the specifications to the specific database management system is contained in a(n):
a) database technical system.
b) physical schema.
c) conceptual schema.
d) data definition specification.

Q18)	A logical description of some portion of the enterprise database is called a(n):
a)	user view.
b)	external schema.
c)	conceptual schema.
d)	physical schema.

Q19) The detailed, technology independent specification of the overall structure of the database is called the:
a) conceptual schema.
b) external schema.
c) user view.
d) physical schema.

Q20)	The user interface is managed by the:
a)	lower tier.
b)	client tier.
c)	process services tier.

d) application tier.

Q21) Which of the following is NOT a reason for using client/server architecture?
a) Network traffic is reduced and response time increased.
b) Client technologies can be mixed and common data can be shared.
c) It is possible to take advantage of the best data processing features of each computer platform.
d) Open system standards are not encouraged.

Q22) Which of the following allows access to databases in a predetermined format based on a single database record?
a) Query
b) Form
c) Report
d) Client

Q23)A rule that states that each foreign key value must match a primary key value in the other relation is called the:
a) referential integrity constraint.
b) foreign/primary match rule
c) entity key group rule
d) key match rule

Q25) A candidate key must satisfy all of the following conditions EXCEPT:
A) each nonkey attribute is functionally dependent upon it.
B) the key must be nonredundant.
C) the key must uniquely identify the row.
D) the key must indicate the row's position in the table.

Q26)The _____ is the structure that contains descriptions of objects such as tables and views created by users.
A) master view
B) schema
C) catalog
D) SQL

Q27) DDL is typically used during which phases of the development process?
A) Physical design
B) Analysis
C) Implementation
D) All of the above

Q28) The entity integrity rule states that:
a) no primary key attribute can be null
b) each entity must have a primary key

c) a primary key must have only one attribute
d) referential integrity must be maintained across all entities

Q29) A primary key whose value is unique across all relations is called a(n):
A) foreign global key.
B) global primary key.
C) enterprise key.
D) inter-table primary key.

Q30) _____ is a set of commands used to control a database, which includes security.
A) DCL
B) DPL
C) DML
D) DDL

Q31) _____ is a set of commands used to update and query a database.
A) DPL
B) DCL
C) DML
D) DDL

Q32) The first in a series of steps to follow when creating a table is to:
A) identify columns that must be null.
B) identify each attribute and its characteristics.
C) identify columns that must be unique.
D) create an index.

Q33) A business rule:
a) defines or constrains some aspect of the business.
b) controls or influences the behavior of the business.
c) asserts business structure.
d) all of the above.

Q34) The common types of entities are:
a) strong entities.
b) associative entities.
c) weak entities.
d) all of the above.

Q35) Customers, cars, and parts are examples of :
a) entities.
b) cardinals.
c) attributes.

d) relationships.

Q36) An entity type whose existence depends on another entity type is called a(n) _____ entity.
a) codependent
b) strong
c) weak
d) variant

Q37) An attribute that must have a value for every entity (or relationship) instance is a(n):
a) composite attribute.
b) optional attribute.
c) required attribute.
d) multivalued attribute.

Q38) A person's name, birthday, and social security number are all examples of :
a) descriptors.
b) attributes.
c) relationships.
d) entities.

Q39) An attribute of an entity that must have a value for each entity instance is a(n):
a) required attribute.
b) fuzzy attribute.
c) composite attribute.
d) optional attribute.

Q40) An attribute that can be calculated from related attribute values is called a(n) _____ attribute.
a) simple
b) composite
c) derived
d) multivalued

Q41) A(n) _____ is the relationship between a weak entity type and its owner.
a) chain link
b) member chain
c) jump path
d) identifying relationship

Q42) The total quiz points for a student for an entire semester is a(n) _____ attribute.
a) addressed
b) mixed

c)	derived
d)	stored

Q43) The number of entity types that participate in a relationship is called the:	
a)	identifying characteristic.
b)	counter.
c)	degree.
d)	number.

Q44) A relationship between the instances of a single entity type is called a(n) _____ relationship.	
a)	binary
b)	primary
c)	unary
d)	ternary

Q45) A student can attend five classes, each with a different professor. Each professor has 30 students. The relationship of students to professors is a _____ relationship.	
a)	one-to-one
b)	strong
c)	one-to-many
d)	many-to-many

Q46) A simultaneous relationship among the instances of three entity types is called a(n) _____ relationship.	
a)	tertiary
b)	primary
c)	binary
d)	ternary

Q47) A(n) _____ specifies the number of instances of one entity that can be associated with each instance of another entity.	
a)	limit
b)	counter constraint
c)	cardinality constraint
d)	degree

Q48) A relationship where the minimum and maximum cardinality are both one is a(n) _____ relationship.	
a)	optional
b)	unidirectional
c)	mandatory one
d)	mandatory link

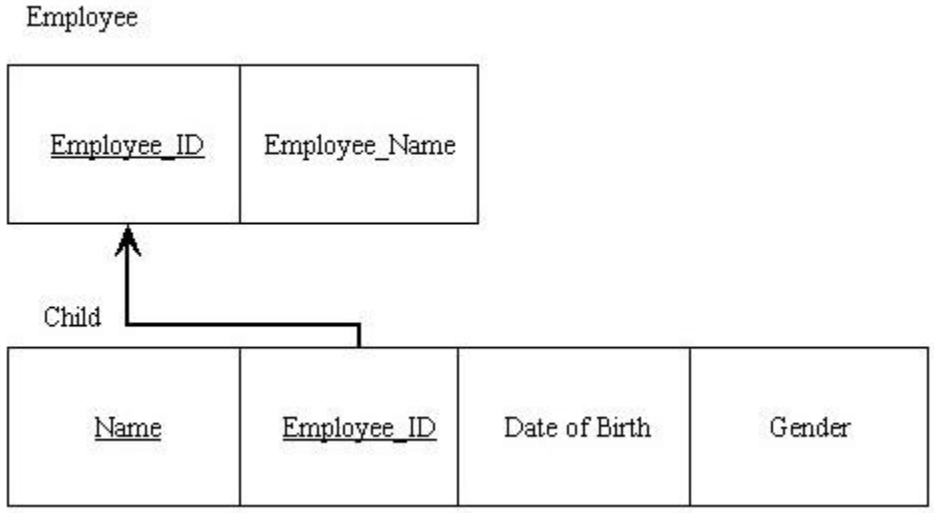
Q49) A person's name, birthday, and social security number are all examples of

a) descriptors
b) attributes
c) relationships
d) entities

Q50) A student can attend five classes, each with a different professor. Each professor has 30 students. The relationship of students to professors is a _____ relationship.
a) One-to-one
b) Strong
c) One-to-many
D) Many-to-many

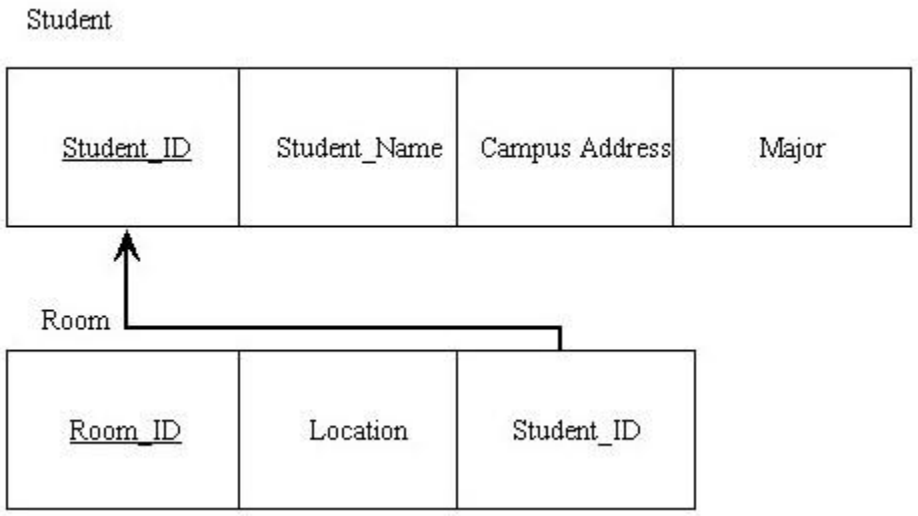
Q51) Referential integrity constraint can be violated when
a) Tuples are inserted
b) Tuples are deleted
c) Foreign key or Primary key value is modified
d) Other, Specify

Q52) In the following figure, what type of relationship do the relations depict?



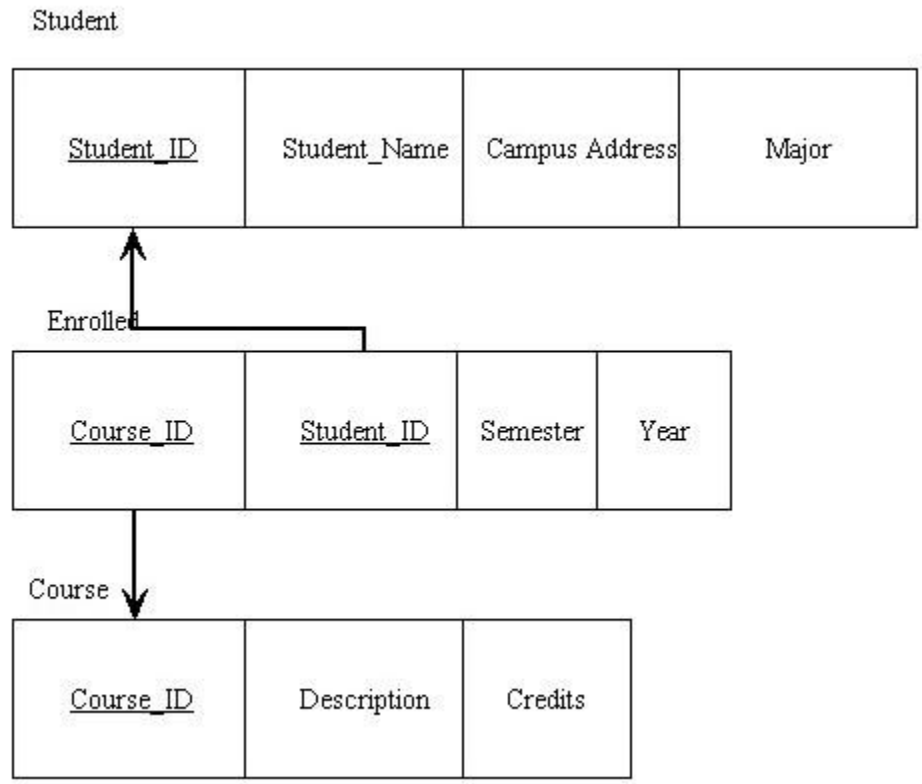
a) One-to-many
b) Multivalued
c) Strong entity/weak entity
d) Composite foreign key

Q53) In the following figure, what type of relationship do the relations depict?



a) One-to-many
b) Many-to-many
c) Strong entity/weak entity
d) Ternary

Q 54)In the following figure, what type of relationship is depicted?



a) Many-to-many
b) Unary
c) One-to-one
d) One-to-many

Q55) A constraint between two attributes is called a(n):
a) Attribute dependency
b) Functional relation
c) Functional relation constraint
d) Functional dependency.

Q56) A candidate key must satisfy all of the following conditions EXCEPT:
A) each nonkey attribute is functionally dependent upon it.
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Q60) A primary key whose value is unique across all relations is called a(n):
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Q62) The first in a series of steps to follow when creating a table is to:
A) identify columns that must be null.
B) identify each attribute and its characteristics.
C) identify columns that must be unique.
D) create an index.

Q63) The SQL command _____ adds one or more new columns to a table
A) create table
B) create relationship
C) create view
D) alter table

Q64) In an SQL statement, which of the following parts states the conditions for row selection?
A) Select
B) Group By
C) From
D) Where

Q65) What does the following SQL statement do? Delete from Customer_T where state = 'HI';
A) Deletes all records from the customer_t table
B) Removes the customer_t table from the database
C) Deletes all records from customer_t where the state is equal to HI
D) None of the above

Q66) What does the following SQL statement do? Update Product_T Set Unit_Price = 775 Where Product_ID = 7
A) Changes the unit price of Product 7 to 775
B) Changes the price of a unit called Product_T to 7
C) Updates the Product_T table to have a unit price of 775
D) Changes the length of the Unit_Price field to 775

Q67) What does the following SQL statement do? Select * From Customer Where Cust_Type = "Best"
A) Selects fields with a "*" in them from the Customer table

B) Selects all the fields from the Customer table for each row with a customer labeled "*"
C) Selects the "*" field from the Customer table for each row with a customer labeled "best"
D) Selects all the fields from the Customer table for each row with a customer labeled "best"

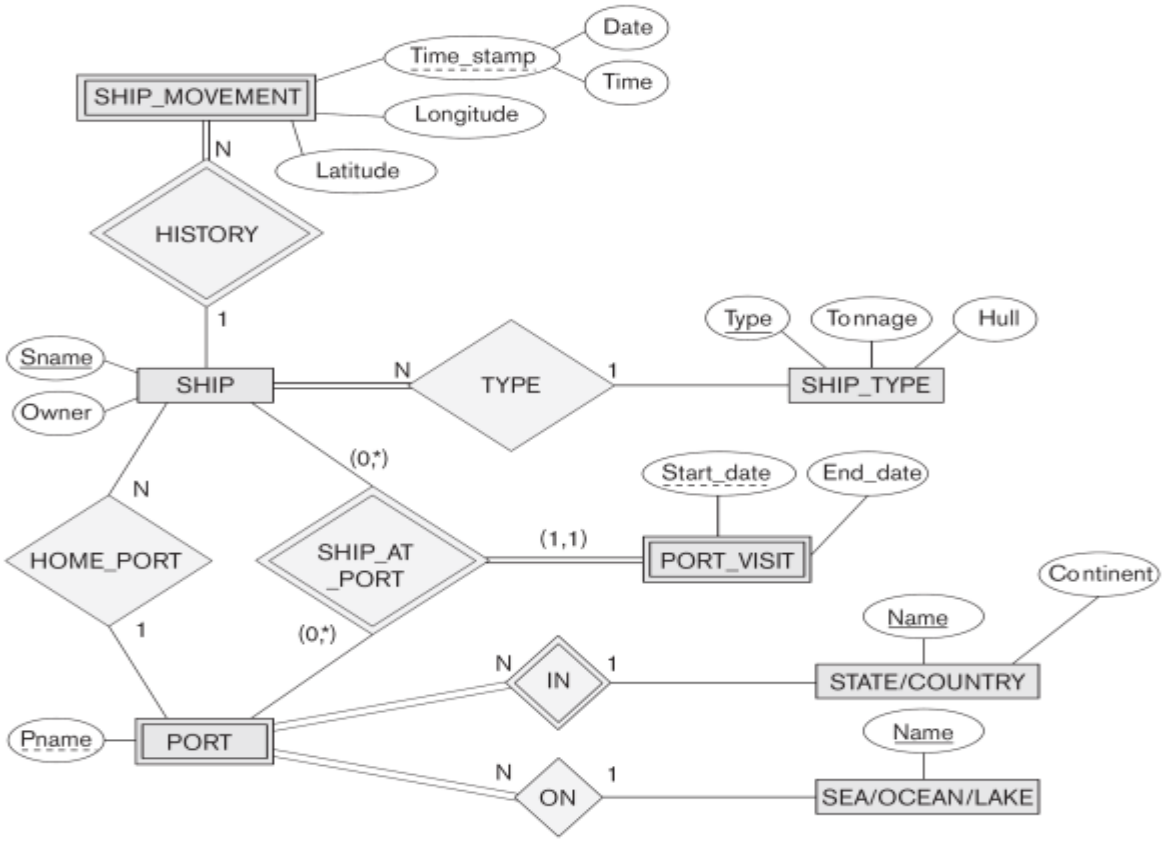
Q68) Which of the following questions is answered by the SQL statement? Select Count (Product_Description) from Product_T;
A) How many characters are in the field name "Product_Description"?
B) How many different columns named "product Description" are there in table Product_T?
C) How many products are in the Product Table?
D) How many products have product descriptions in the Product Table?

Q69) What results will be produced by the following SQL query? Select sum(standard_price) as total_price from product_v where product_type = 'WOOD';
A) The total price of all products
B) The standard_price of any wood product in the table
C) The total price of all products that are of type wood
D) The standard_price of the first wood product in the table

Q70) Which of the following counts ONLY rows that contain a value?
A) Tally(*)
B) Count
C) Checknum
D) Count(*)

Problem Section :

Q1) Given the blow an ER diagram for Ship Tracking database, apply the mapping rules to create the corresponding database schema?



Q2) A General Hospital consists of a number of specialized departments. Each department hosts a number of patients, who were admitted on the recommendation of their own General Practice physician and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient (such as name, address, telephone number, and number). Each patient may be examined by a doctor (number, name, address, telephone number, etc). Doctors are specialists in some branch of medicine. Design and draw ER diagram and specify key attributes of each entity type and structural constraints on each relationship type.

Q3) The Given the following narrative of user requirements for a database that will keep track of customers' orders in online marketing company. The company has a record for each customer containing his name, id, phone and address. It also has a file for its delivery team containing employee name, id, nationality and phone number. The company has a list of all available itmes which includes item number, name, price. When a customer visits the company website to view the item and place his order, the customer service registers order data which includes order id, customer information, list of choosen items, date and time of the order and also assigns one of

the delivery team to this order. After delivering the order to a customer, the delivery team member registers delivery time and note. Suggest an ER model for the above narrative. State clearly any assumptions you may need in your design.

Q4) Suppose each of the following update operations is applied directly to the following database. Discuss all integrity constraints violated by each operation, if any, and the different ways of enforcing these constraints:

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

(a) Insert < 'ProductA', 4, 'Bellaire', 2 > into PROJECT.

(b) Insert < 'Production', 4, '943775543', '01-OCT-88' > into DEPARTMENT.

(c) Insert < '453453453', 'John', M, '12-DEC-60', 'SPOUSE' > into DEPENDENT.

(d) Delete the PROJECT tuple with PNAME= 'ProductX'.

(e) Modify the SUPERSSN attribute of the EMPLOYEE tuple with SSN= '999887777' to '943775543'.

ecause Dnumber "2" is not

Q5) Consider the following database about patients visiting doctors. A record is added into the table *visits* whenever a patient visits a doctor. Primary keys are underlined.

patients (pnum, pname, age)

doctors (dnum, dname, rank, salary)

visits (pnum, dnum, date, diagnosis)

Write an SQL statement for the following queries:

1. List the doctors with rank starting with the letter 'P'.
2. List the patients' names and ages from the oldest to the youngest.
3. List the patients who visited Dr. Ahmed and remove duplicates.
4. Delete all patients with age between 12 and 20 years.
5. Increase the salary of all doctors with rank 'P3' with 10%.
6. Write the create table statement of the table *visits*, specify the primary key, foreign keys and any constraint.

Q6) The following tables form part of a database held in a relational DBMS.

Hotel	(HotelNo, name, address, phone)
Room	(RoomNo, HotelNo, type, price)
Booking	(HotelNo, GuestNo, DateFrom, DateTo, RoomNo)
Guest	(GuestNo, name, address, cellphone)

Where Hotel contains hotel details and HotelNo is the primary key. Room contains room details for each hotel and RoomNo, HotelNo forms the primary key. Booking contains details of the bookings and the primary key comprises HotelNo, GuestNo and DateFrom. Guest contains guest details and GuestNo is the primary key. List relational algebra statements that corresponding to the following queries..

1. List full details of all hotels.
2. List the price and type of all rooms at the Damam Inn hotel.
3. List all double or family rooms with a price below 40.00 per night, in ascending order of price.
4. What is the average price of a room in Riyadh Inn hotel ?
5. List the names and addresses of all guests from Macca and booked only single room?