Umm Al-Qura University
Collage of Computer Science and Information Systems.
Computer Science Dept

Midterm Exam
Data base
Sem1 of Academic Year 1439-1440

الاسم: ---------- الرقم الجامعي: ----------

Q1 (9 marks)	Q2 (11 marks)	Q3 (5 marks)	Total (25 marks)

Question 1: General Questions (Multiple choices) [9 Marks]

1. In the database development life cycle, the top-down and bottom-up are Strategies Design of:
   a) Conceptual design
   b) Logical design
   c) Internal design
   d) All of these

2. In the database development life cycle, mapping the entity-relationship diagrams is done in the _____ phase
   a) Logical database design
   b) Physical database design
   c) Database implementation
   d) None of these

3. The restrictions placed on the data in the relational database is called_____
   a) Business rules
   b) Constraints
   c) Relationships
   d) All of these

4. The outcome of the conceptual design is: ____
   a) DBMS
   b) Data flow diagram
   c) Entity relationship diagram
   d) None of these

5. The set of allowable values for one or more attributes: ____
   a) Domain of attribute
   b) Degree of relation
   c) Tuple
   d) None of these

6. The _____ is an entity type whose instances cannot exist without being linked with instances of some other entity type
   a) Strong entity
   b) Independent entity
   c) Weak entity
   d) Both b & c

7. A collection of tables with distinct names for each table is called: ____
   a) Relational database
   b) Relation schema
   c) Relation data model
   d) None of these

8. The connections and interactions between the entities instances are: ____
   a) Relationships
   b) Relations
   c) Both A and B
   d) None of these

9. The number of instances of one entity type that may be associated with each instance of the other entity type: ____
   a) Cardinality of relationship
   b) Ternary relationship
   c) Binary relationship
   d) None of these

Question 2: (1) What is the difference between each TWO of the following with examples **[4 Marks]**

a) Simple attribute vs Composite attribute

Simple Attribute : Attribute that hold a atomic/ single value.
Composite Attribute : Attribute value not atomic. It is attribute that can further subdivided

b) Single valued attribute vs Multi-valued attribute

Single Valued Attribute: is an attribute that can have only a single value.
Multi Valued Attribute: Attribute that hold multiple values.

c) Stored attribute vs Derived attribute

Stored Attribute: An attribute that supplies a value to the related attribute.
Derived Attribute: An attribute that's value is derived from a stored attribute.

d) Primary Key vs Foreign Key

A key which is used to uniquely identify a record in a table(relation) is called primary key
A foreign key is an attribute or set of attributes in a relation whose values match a primary key in another relation.

Each one (1/2 mark)

(2) Define the database development process steps and the output **[4.5 Marks]**

1. Requirements Analysis (1/2 mark)

Collect and Analyze the requirements of the users. e.g., business rules (1/2 mark)

2. Conceptual Design (1/2 mark)

Design a conceptual model (schema), e.g., ER model (1/2 mark)

3. Logical Design (1/2 mark)

Translate the ER model into the relational model (schema) (1/2 mark)
Normalization (1/2 mark)

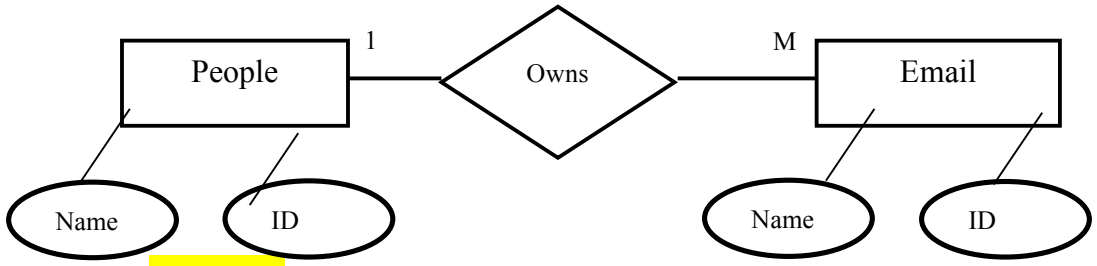
4. Database Building (Physical Design) (1/2 mark)

Build the database and write application programs (1/2 mark)

5. Operation, Maintenance, & Tuning (1/2 mark)

(3) Draw an ER diagram based on the following:

Suppose we have two entity sets, Person and Email. Suppose we also use a relationship Owns, which connects these two entities. A person may own multiple email accounts, but an email account can only be owned by a single person. Draw also at least two attributes for the entities from your mind. **[2.5 Marks]**



Each entity (1/2 mark) =1

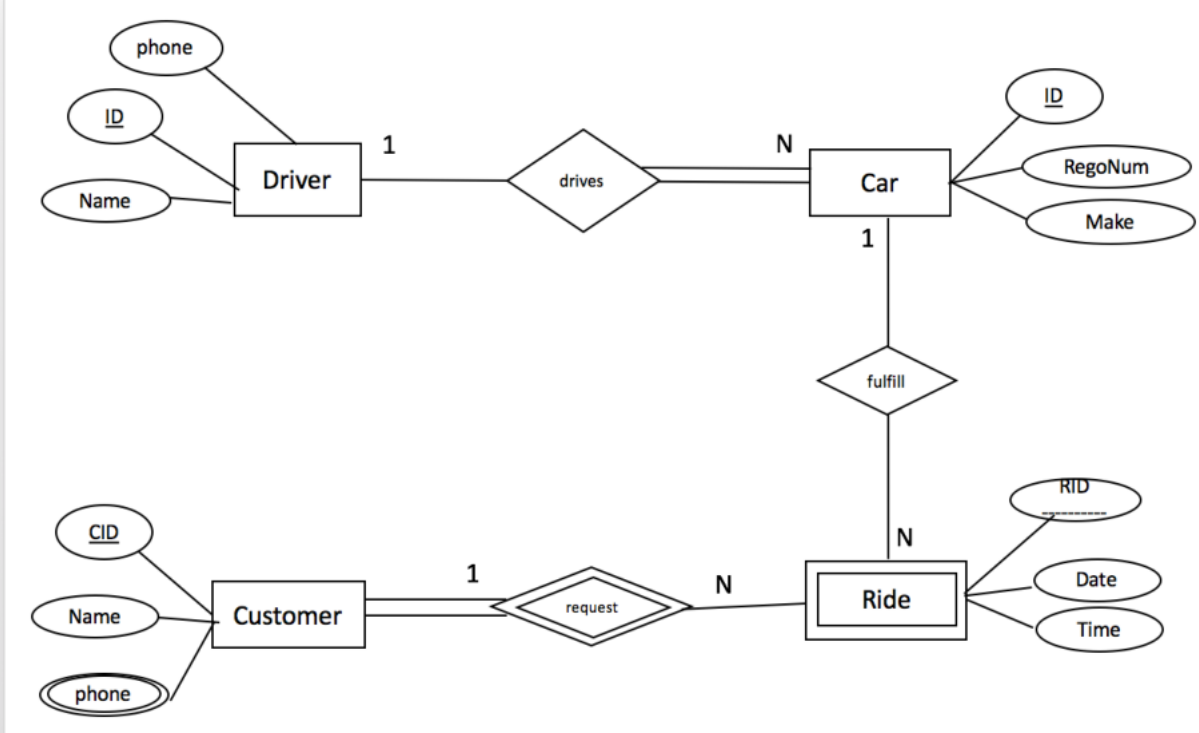
The relation (1/2 mark) =1.5

The cardinality (1/4 mark) each = 2

The attribute2 (1/4 mark) each 2.5

Question 3: Mapping to Relational Model [5 Marks]

(1) Convert the following ERD into Relations using the relational model approach.
Note: The entity Ride is owned by the Customer entity



Driver { DriverID, Name, phone}

Car { CarID, RegoName, Make , DrID}

Customer { ID, Name}

Ride {RID, CustumerID, date, time, CarID}

CustomerPhones {customerID, phone}

Strong entities : (1\2 mark each) = 1.5
Week entity : (1 mark)
One to many relationships (1\2 mark each) = 1.5
New Relation for Multivalued (1 mark)

Bonus : Convert the Chen's notation in (1) to the UML notation **[2 Marks]**

End exam.