# King Saud University

College of Computer and Information Sciences

Computer Science Department

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| Course Code: | CS380 |
| Course Title: | Fundamentals of Database Systems |
| Semester: | Fall 21 22 |
| Exercises Cover Sheet: | |

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| Student Name: | |
| Student ID: | |
| Student Serial: | |
| Student Section No. | |

| Tick the Relevant | Computer Science B.Sc. Program ABET Student Outcomes | Question No. Relevant Is Hyperlinked | Covering % |
|---|---|---|---|
| ✓ | a) Apply knowledge of computing and mathematics appropriate to the computer science; | VI | |
| ✓ | b) Analyze a problem, and identify and define the computing requirements appropriate to its solution | V | |
| ✓ | c) Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs; | | |
| | d) Function effectively on teams to accomplish a common goal; | | |
| | e) Understanding of professional, ethical, legal, security, and social issues and responsibilities; | | |
| | f) Communicate effectively with a range of audiences; | | |
| | g) Analyze the local and global impact of computing on individuals, organizations and society; | | |
| | h) Recognition of the need for, and an ability to engage in, continuing professional development; | | |
| | i) Use current techniques, skills, and tools necessary for computing practices. | | |
| | j) Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices; | | |
| | k) Apply design and development principles in the construction of software systems of varying complexity; | | |

| Result | | | | | |
|---|---|---|---|---|---|
| Question No. | Relevant Student Outcome | SO is Covered by % | Full Mark | Student Mark | Assessor's Feedback |
| I | a | | 1.5 | | |
| II | a | | 2.5 | | |
| III | a | | 1.5 | | |
| IV | c | | 4.5 | | |
| V | b | | 5 | | |
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| Totals | | | 15 | | |

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| I certify that the work contained within this assignment is all my own work and referenced where required.<br><br>Student Signature:<br>Date: | | Feedback Received:<br><br>Student Signature:<br>Date: |

# Question I

**Fill in the blanks with the proper text to make each statement a valid one:** ***(****1.5 points)*

1. DBMS is an abbreviation for _Database Management System__.

2. Weak entity types can only be identified by being related to other entity type(s) known as the __owner__ entity type(s) through a(n) ___weak/identifying___ relationship.

3. The _____Primary__ key attributes of a relation schema *R* cannot have *null* values, while ____Foreign___ key attributes may have a value of *null*.

# Question II

**State whether each of the following statements is true (T) or false (F). If false, underline the false part and correct it to make the sentence a valid one.** ***(****2.5 points)*

1. **(** F__ **)** A super-key is considered to be a minimal key because the removal of an attribute from it would result in a set of attributes that is not a key.
   *Correction (if any):* _ _ _ _ _ _ _key, superkey _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

2. **(** T_____ **)** A relationship type can have any number of attributes.
   *Correction (if any):* _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

3. **(** _T____ **)** A *many-to-one* relationship is a *one-to-many* relationship read in the opposite direction.
   *Correction (if any):* _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

4. **(** _F____ **)** The degree of a relationship refers to its number of attributes.
   *Correction (if any):* _ _ _ _ _ Relation_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

5. **(** _T____ **)** Derived attributes are represented in an ER diagram by a dotted oval.
   *Correction (if any):* _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

# Question III

**For each statement there is a list of options. Choose the option (only one) that would be the most suitable to make the statement a valid one.** *(1.5 points)*

1. A database schema is …
   a) a description of the database using a specific model
   b) the state of the database
   c) the content of the database
   d) a collection of related data

2. When a database is first defined, the database state would be …
   a) initial state
   b) empty state
   c) null state
   d) database schema

3. Updating a tuple in a relational model …
   a) would never cause any violations
   b) may cause violations of domain and key constraints only
   c) may cause violations of domain, key and entity integrity constraints only
   d) may cause violations of domain, key, entity integrity, and referential integrity constraints.

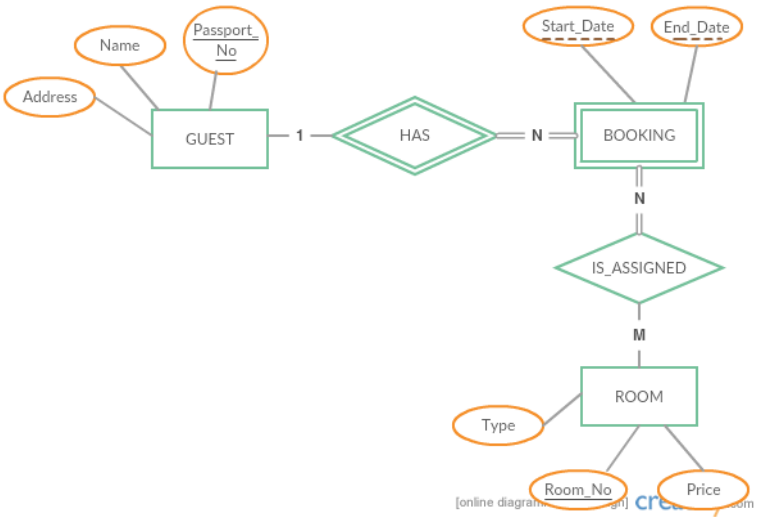
# Question IV

**You have been asked to create a conceptual model of the data requirements for a *hotel reservation system* database.** *(4.5 points)*

The hotel has several rooms. Each **ROOM** is uniquely identified by a room number, type and price. A **GUEST** is identified by a passport number, name and address. Each **BOOKING** in the agency is defined for a **GUEST** using the start date for the guest's booking and the end date for the booking. A **GUEST** can make several bookings through the agency but note that the booking start date is unique for each **GUEST** (i.e. a **GUEST** cannot make more than one **BOOKING** with the same start date). Every **BOOKING** must be associated with at least one **ROOM**.

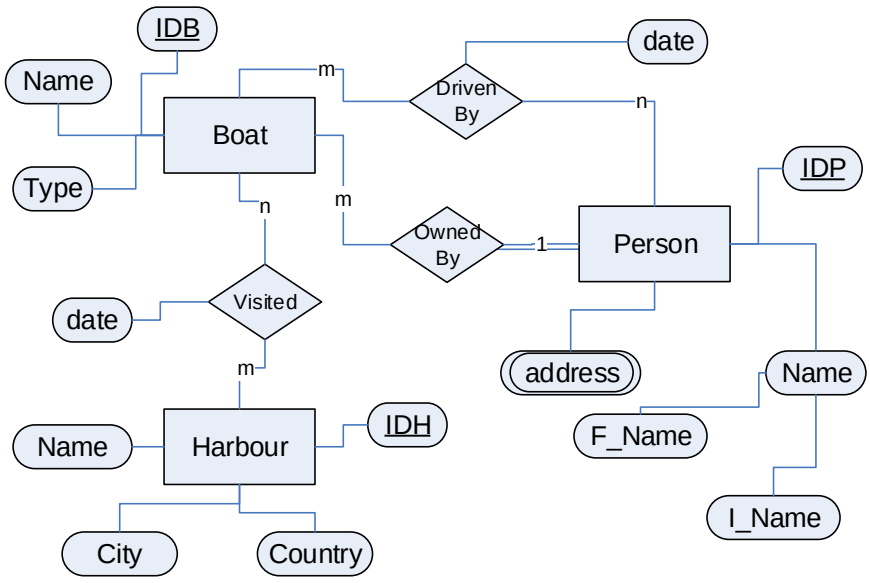
Draw an ER diagram to represent the data requirements for this database. Make assumptions as necessary.

**Answer**



# Question VI

**Map the following ER diagram into a relational model schema diagram. Don't forget to use arrows to indicate references.** ***(****5 points)*




**Answer**

Boat(**Idb**, name, type, idpOwner)  idpOwner not null fk reference person(idp)
Person (**idp**, f_name, I_name)
Address(**idp, address**)  idp fk reference person(idp)
Harbour(**idh**, name, city, country)
Visited(**idh, idb, date**)  idh fk reference Harbour(idh), idb fk reference boat(idb)
DrivenBy(**idb, idp, date**)  idp fk reference Person(idp), idb fk reference boat(idb)