UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

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IT2305- Database Systems I

Multiple Choice Question Paper

27th July, 2014
(TWO HOURS)

Important Instructions :

- The duration of the paper is **2 (two) hours.**
- The medium of instruction and questions is English.
- The paper has **40 questions** and **14 pages.**
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 (*All the incorrect choices are marked & no correct choices marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

1. Following are the three main steps in designing a new database.

   I Create a logical design that can be expressed in a data model implemented in a commercial DBMS.

   II Requirement Specifications and Analysis.

   III Create the physical design during which, further specifications are provided for storing and accessing database.

   Which of the following answers depict the correct order in designing a new database?

(a) I, II, III	(b) II, III, I	(c) I, III, II
(d) III, I, II	(e) II, I, III	

2. Which of the following are true with respect to a Database Management System (DBMS)?

   (a) A DBMS is a collection of programmes that enables users to create and maintain a database.
   (b) It is a general purpose software system which facilitates the process of defining, constructing, manipulating and sharing databases among various users and applications.
   (c) It is absolutely necessary to use a general purpose DBMS software to implement a computerized database.
   (d) A DBMS allows to protect the database and maintain it over a long period of time.
   (e) DBMS applications are also likely to be less robust than similar stand-alone applications due to the important tasks handled by the DBMS.

3. Which of the following typical drawbacks are present in a file oriented system?

   (a) Limited data manipulation capabilities due to lack of strong connections between data in different files
   (b) Inconsistent changes made by different users accessing the data concurrently
   (c) Not sufficiently flexible to enforce security policies in which different users have permission to access different subsets of data
   (d) Ensuring that the data is restored to a consistent state during a system crash while changes are being made to the data
   (e) Understanding of design complexity of database systems

4. Which of the following scenarios can be addressed by enforcing a referential integrity constraint?

   (a) All phone numbers must include the area code.
   (b) Certain fields are required (such as the email address or phone number) before the record is accepted.
   (c) Information on the customer must be known before anything can be sold to that customer.
   (d) When entering an order quantity, the user must input a number and not some text (i.e., 12 rather than ‘a dozen’).
   (e) The department of the employee should exist while adding an employee.

5. The data in a DBMS is described at three levels of abstraction and the database description consists of a schema at each of these three levels of abstraction: the conceptual, physical and external. Which of the following are true with respect to database schema?

(a) The external schema specifies additional storage details.
(b) A sub schema data definition language (SDDL) or data definition language (DDL) is used to define the external and conceptual schemas.
(c) The physical schema summarizes how the relations described in the conceptual schema are actually stored on secondary storage devices such as disks and tapes.
(d) Each external schema consists of a collection of one or more views and relations from the physical schema.
(e) External schemas allow data access to be customized at the level of individual users or groups of users.

6. The entity integrity rule requires that,

(a) all primary key entries are not unique.
(b) a part of the key may be null.
(c) foreign key values do not make reference to primary key values.
(d) duplicate object values are allowed.
(e) all primary key entries are unique.

7. Consider the following relations with bold primary keys.

Product(**P_code**, Description, Stocking_date, QtyOnHand, MinQty, Price, Discount, V_code)

Vendor(**V_code**, Name, Address, Phone)

Here a vendor can supply more than one product but a product is supplied by only one vendor.

Which of the following SQL query will list the Name, Address and Phone of the vendors who are currently **not** supplying any product?

(a)
```
SELECT Name, Address, Phone FROM Vendor WHERE V_code
NOT IN (SELECT V_code FROM Vendor);
```
(b)
```
SELECT Name, Address, Phone FROM Vendor WHERE V_code !=
Product;
```
(c)
```
SELECT * FROM Vendor WHERE V_code != P_code;
```
(d)
```
SELECT Name, Address, Phone FROM Vendor WHERE V_code
NOT IN (SELECT V_code FROM Product);
```
(e)
```
LIST Name, Address, Phone FROM Vendor WHERE V_code NOT
IN (SELECT V_code FROM Product);
```

8. The data levels defined by ANSI/SPARC architecture are

(a) Conceptual, physical and internal.
(b) Conceptual, view and external.
(c) Logical, physical and internal.
(d) Conceptual, logical and view.
(e) Conceptual, internal and external.

9. Which of the following statements is/are true?

(a) In the relational model, relationships between relations or tables are created by using a foreign key.
(b) A functional dependency is a relationship between or among the attributes.
(c) The primary key in a relation does not need to be underlined.
(d) Normalization is a formal process for deciding which attributes should be grouped together in a relation.
(e) Weak entities do not get mapped into a relation.

Answer the questions from 10 – 13 considering the following scenario.

A local harbour database contains the following tables: Sailor, Boat and Reservation.
Sailor (**sid**, sname, rating, age)
Where sid is Sailor ID and sname is Sailor name
Boat (**bid**, bname, colour)
Where bid is Boat ID and bname is Boat name
Reservation (**sid**, **bid**, date)

10. Which of the following relational algebra expression(s) can be used to find the colours of boats reserved by Gihan?

(a) $\pi_{\text{colour}}\ (\sigma_{\text{sname="Gihan"}}\ \text{Sailor})$
(b) $\pi_{\text{colour}}\ ((\sigma_{\text{sname="Gihan"}}\ \text{Sailor} \bowtie \text{Reservation} \bowtie \text{Boat}))$
(c) $\pi_{\text{sname="Gihan"}}((\sigma_{\text{colour}}\text{Boat}) \bowtie \text{Reservation})$
(d) $\pi_{\text{sname}}\ ((\sigma_{\text{colour}}\ \text{Boat}) \bowtie \pi_{\text{sid}}\ \text{Reservation} \bowtie \pi_{\text{sname="Gihan"}}\ \text{Sailor})$
(e) $\pi_{\text{colour}}\ ((\sigma_{\text{sname="Gihan"}}\ \text{Sailor}) \bowtie \text{Reservation} \bowtie \text{Boat})$

11. The following relational algebra expressions aim to find the sailor name who has reserved boat number 103.

(I). $\pi_{\text{sname}}\ ((\sigma_{\text{bid=103}}\ \text{Reservation}) \bowtie \text{Sailor})$

(II). $\pi_{sname}\ ((\sigma_{bid=103}\text{Boat}) \bowtie \text{Reservation} \bowtie \text{Sailor})$

(III). $\pi_{sname}(\sigma_{bid=103}(\text{Reservation} \bowtie \text{Sailor}))$

Which of the above is/are correct?

(a) Only (I) is correct.
(b) Only (II) is correct.
(c) Only (I) and (II) are correct.
(d) Only (I) and (III) are correct.
(e) All are correct.

12. Which of the following relational algebra expression(s) can be used to find all the sailor names who have reserved a "Red" boat?

(a) $\pi_{\text{sid}}\ (\sigma_{\text{colour="Red"}}\ \text{Boat}) \cup \pi_{\text{sname}}\ \text{Sailor}$
(b) $\pi_{\text{sname}}\ (\pi_{\text{sid}}((\pi_{\text{bid}}\sigma_{\text{colour="Red"}}\text{Boat}) \bowtie \text{Reservation}) \bowtie \text{Sailor})$
(c) $\pi_{\text{sname}}\ ((\sigma_{\text{colour="Red"}}\ \text{Boat}) \bowtie \pi_{\text{sid}}\ \text{Reservation} \bowtie \pi_{\text{sid}}\ \text{Sailor})$
(d) $\pi_{\text{sname}}\ ((\sigma_{\text{colour="Red}}\text{"}\ \text{Boat}) \bowtie \text{Reservation} \bowtie \text{Sailor})$
(e) $\pi_{\text{colour="Red"}}\ ((\sigma_{\text{sname}}\ \text{Sailor} \bowtie \text{Reservation} \bowtie \text{Boat})$

13. The following relational algebra expression

$$\pi_{sid}\ (\sigma_{rating>=8}\text{Sailor})\ \cup\ \pi_{sid}(\sigma_{bid=103}\text{Reservation})$$

is used

(a) to find the rating of boat 103.
(b) to find all the boats that have a rating greater than 8 or a boat ID of 103.
(c) to find all sailor IDs who have ratings greater than 8 or reserved boat ID 103.
(d) to find the boats except 103 that have ratings greater than 8.
(e) to find all sailor IDs who have reserved boat ID 103.

14. Which of the following equivalence(s) is/are correct regarding relational algebra?

(a) $A \times B \Leftrightarrow B \times A$
(b) $\pi_L(E_1 \cup E_2) \Leftrightarrow (\pi_L(E_1)) \cap (\pi_L(E_2))$
(c) $(E_1 \bowtie E_2) \bowtie E_3 \Leftrightarrow E_1 \bowtie (E_2 \bowtie E_3)$
(d) $\sigma_p (E_1 \cup E_2) \Leftrightarrow E_1 \bowtie_p E_2$
(e) $\sigma_{\theta_1}(\sigma_{\theta_2}(E)) = \sigma_{\theta_2}(\sigma_{\theta_1}(E))$

15. Which of the following statement(s) is/are true regarding relational algebra?

(a) The Projection (π) operation removes result duplicates.
(b) Associative laws do not apply to relational algebra.
(c) Equivalent expressions always give the same result.
(d) Relational algebra is non-procedural.
(e) Every query formulated in relational algebra can be formulated in SQL.

16. Which of the following commands can be used to create, modify and delete data views?

(a) DELETE (b) CREATE (c) DROP
(d) MODIFY (e) REPLACE

17. Consider the following statements regarding data views.

(I). Data views can aggregate tables and join multiple tables into a single virtual table.

(II). Data views can be used for data modification in the actual data tables.

(III). Data views hide query complexity

Which of the above is/are correct?

(a) Only (III) is correct
(b) Only (I) and (II) are correct
(c) Only (I) and (III) are correct
(d) Only (II) and (III) are correct
(e) All are correct

18. A view called **Supplier_orders** that contains three columns from the Supplier and Order tables: *sup_id*, *order_quantity* and *order_price* have been created. It is required to modify the view by filtering the order prices greater than 100000. Which of the following SQL statements would accomplish the task?

(a)
```
ALTER VIEW Supplier_orders AS order_price>100000 FROM
Order;
```
(b)
```
ALTER VIEW Supplier_orders WHERE order_price>100000;
```
(c)
```
CREATE OR REPLACE VIEW Supplier_orders AS SELECT
sup_id, order_quantity, order_price FROM Supplier,
Order WHERE Supplier.sup_id = Order.sup_id AND
order_price>100000;
```
(d)
```
ALTER OR REPLACE VIEW Supplier_orders AS SELECT sup_id,
order_quantity, order_price FROM Supplier, Order WHERE
Supplier.sup_id = Order.sup_id AND order_price>100000;
```
(e)
```
ALTER AND REPLACE VIEW Supplier_orders AS SELECT
sup_id, order_quantity, order_price FROM Supplier,
Order WHERE order_price>100000;
```

19. Given relations L(a,b) and M(c,d), the result of

```
SELECT  DISTINCT a, b
FROM  L, M;
```

is guaranteed to be same as L, if

(a) L and M have no duplicates.
(b) L has no duplicates and M is non-empty.
(c) M has no duplicates and L is non-empty.
(d) L and M have the same number of tuples.
(e) L and M are non-empty.

20. Consider the set of relations given below and the SQL query that follows.

Students (**Roll_number**, Name, Date_of_birth)
Courses (**Course_number**, Course_name, Instructor)
Grades (**Roll_number**, **Course_number**, Grade)

```
SELECT DISTINCT Name
FROM Students, Courses, Grades
WHERE Students.Roll_number = Grades.Roll_number
      AND Courses.Instructor =  'Kapila'
      AND Courses.Course_number = Grades.Course_number
      AND Grades.Grade = 'C';
```

Which of the following sets is computed by the above query?

(a) Names of students who have got a C grade in all courses taught by Kapila
(b) Names of students who have got a C grade in at least one of the courses taught by Kapila
(c) Names of students who have got a C grade in all courses
(d) Names of students who have got a C grade in at most one of the courses taught by Kapila
(e) Name of the instructor whose students have got C grades

21. User MALIK would like to insert a row into the **Employee** table, which has three columns: **EMPID**, **LASTNAME** and **SALARY**. The user would like to enter data for **EMPID** 59694, **LASTNAME** HARRIS, but no salary. Which statement(s) would work best?

(a) `INSERT INTO Employee VALUES (59694, 'HARRIS');`
(b) `INSERT INTO Employee (EMPID,LASTNAME,SALARY) VALUES (59694, 'HARRIS');`
(c) `INSERT INTO Employee VALUES (59694, 'HARRIS', NULL);`
(d) `INSERT INTO Employee (SELECT 59694 FROM HARRIS);`
(e) `INSERT INTO Employee (EMPID, LASTNAME, SALARY) VALUES (59694, 'HARRIS', NULL);`

22. Consider the tables given below.

Employees

last_name	department_id	salary
Kapila	10	3000
Brian	20	1500
Malik	20	2200
Isuru	30	5000
Fazeena		5000

Departments

department_id	department_name
10	Sales
20	Marketing
30	Accounts
40	Administration

Which of the following will retrieve all employees, whether or not they have matching departments in the departments table?

(a)
```
SELECT last_name, department_name FROM Employees e LEFT
OUTER JOIN Departments d ON (e.department_id =
d.department_id);
```

(b)
```
SELECT last_name, department_name FROM Employees e RIGHT
OUTER JOIN Departments d ON (e.department_id =
d.department_id);
```

(c)
```
SELECT last_name, department_name FROM Employees e FULL
OUTER JOIN Departments d ON (e.department_id =
d.department_id);
```

(d)
```
SELECT last_name, department_name FROM Employees e
NATURAL JOIN Departments d ON (e.department_id =
d.department_id);
```

(e)
```
SELECT last_name, department_name FROM Employees e
NATURAL FULL OUTER JOIN Departments d ON (e.department_id
= d.department_id);
```

23. In a SQL query that gets its data from two tables, using keywords FROM, WHERE, GROUP BY and HAVING, which operation is performed **last**?

(a) Restriction on WHERE conditions	(b) Cross product or join
(c) Restrictions on HAVING conditions	(d) Sort on GROUP BY
(e) Table selection by FROM	

The next two questions 24 – 25 are based on the following details about the tables CUSTOMER, RENTALS and RENTCOST.

CUSTOMER

CID	CNAME	AGE	RESID CITY	BIRTHPLACE
10	GIHAN	40	JAELA	JAFFNA
20	GREVIN	25	WATTALA	JAELA
30	KAPILA	30	KANDY	JAFFNA
40	MAHESH	35	KANDY	JAFFNA
50	ISURU	22	JAELA	JAELA
60	FAZEENA	60	WATTALA	WATTALA

In table **CUSTOMER**, CID is the primary key (Customer ID).

RENTALS

CID	MAKE	DATE_OUT	PICKUP	RETURNS	RTN
10	FORD	10-Oct-1994	WATTALA	WATTALA	1
10	BMW	01-Nov-1995	JAFFNA	WATTALA	2
10	FORD	01-Jan-1995	JAELA	JAELA	3
20	NISSAN	07-Jul-1994	JAFFNA	JAFFNA	4
30	FORD	01-Jul-1995	WATTALA	JAELA	5
30	BMW	01-Aug-1995	JAELA	JAELA	6
40	FORD	01-Aug-1994	WATTALA	JAELA	7
50	BMW	01-Sep-1995	JAELA	WATTALA	8
70	TOYOTA	02-Sep-1995	KURANA	KURANA	9

In the table **RENTALS**, RTN provides the rental number (the primary key), CID is the customer's unique id, PICKUP is the city where the car was picked up, and RETURNS is the city where the car was returned.

RENTCOST

MAKE	COST
FORD	30
BMW	40
NISSAN	30
TOYOTA	20
VOLVO	50

RENTCOST shows the base cost of renting a given MAKE for one day.

24. Consider the following query.

```
SELECT DISTINCT CID, CNAME
FROM CUSTOMER
WHERE CID IN
(SELECT CID FROM RENTALS WHERE RETURNS IN
(SELECT BIRTHPLACE FROM CUSTOMER));
```

The number of distinct CNAMEs shown by the execution of this query is

(a) 6.	(b) 5.	(c) 4.
(d) 3.	(e) 2.	

25. Consider the following query.

```
SELECT CID FROM RENTALS
GROUP BY CID
HAVING COUNT(DISTINCT MAKE) = (SELECT COUNT(*) FROM RENTCOST);
```

The result of the above is best described as

(a) "List the CID of all customers with one or more rentals in which the cost of each car make rented is the same".
(b) "List the CID of all customers who rent at least one car listed in RENTCOST".
(c) "List the CID of all customers renting the same number of cars".
(d) "List the CID of all customers who rent all cars listed in RENTCOST".
(e) "Error".

26. How does **excessive privilege abuse** differ from **legitimate privilege abuse**?

(a) Excessive privilege abuse occurs when users are granted database access privileges that exceed their task requirements while legitimate privilege abuse occurs when a user abuses legitimate database privileges for unauthorized purposes.

(b) Excessive privilege abuse occurs when a user abuses legitimate database privileges for unauthorized purposes while legitimate privilege abuse occurs when users are granted database access privileges that exceed their task requirements.

(c) They are just different names for the same type of privilege abuse.

(d) Excessive privilege abuse occurs when an attacker converts low-level access privileges to a database to high-level access privileges while legitimate privilege abuse occurs when a user abuses legitimate database privileges for unauthorized purposes.

(e) Excessive privilege abuse occurs when an attacker abuses his privileges while being a member of the top governing body of an institution and having unlimited access to a database, while legitimate privilege abuse occurs when an attacker abuses his privileges while being a low ranking officer who has restricted access to a database.

The following two questions 27 – 28 are based on the relation

Emps(empID, nicNo, name, mgrID)

given here for a set of employees; employee ID (assumed unique), national identity card number (also unique), the name (not necessarily unique) and the employee ID of the manager of each employee. Assume that the president is his/her own manager so that every employee has a unique manager. You may assume that there are no duplicate tuples in this relation.

27. Consider the following declaration for the relation `Emps`.

```
I.  CREATE TABLE Emps (
       empID INT,
       nicNo INT,
       name CHAR(50),
       mgrID INT,
       UNIQUE (empID),
       PRIMARY KEY (nicNo),
       FOREIGN KEY mgrID REFERENCES Emps (empID)
    );

II. CREATE TABLE Emps (
       empID INT PRIMARY KEY,
       nicNo INT UNIQUE,
       name CHAR(50),
       mgrID INT REFERENCES Emps (empID)
    );

III. CREATE TABLE Emps (
       empID INT PRIMARY KEY,
       nicNo INT UNIQUE,
       name CHAR(50),
       CHECK(IS_UNIQUE(mgrID)),
       FOREIGN KEY (mgrID) REFERENCES Emps (empID)
    );
```

Which, if any, of the three declarations above will correctly declare the relation **`Emps`**?

(a) Both I and II	(b) I only	(c) II only
(d) III only	(e) Neither I nor II nor III	

28. Suppose we wish to find the IDs of the employees who **<u>do not manage</u>** any employee named "Sally". Consider the following three possible queries.

```
 I. SELECT mgrID
    FROM Emps
    WHERE IN (SELECT * FROM Emps WHERE NAME != 'Sally');

II. SELECT mgrID
    FROM Emps
    WHERE NOT (empID = LIKE(SELECT EmpID FROM Emps WHERE name =
    'Sally'));

III. SELECT mgrID
     INTO Emps
     WHERE NOT IN (SELECT * FROM Emps WHERE NAME = 'Sally');
```

Which, if any, of the three queries above will correctly get the desired set of employee IDs?

(a) Both I and II	(b) I only	(c) II only
(d) III only	(e) Neither I nor II nor III	

29. Consider the following SQL query on the relation Q(M,N) that has no NULLs.

```
SELECT rr.M, rr.N, ss.M, ss.N
FROM Q as rr, Q as ss
WHERE rr.M = ss.M and rr.N = ss.N;
```

Suppose that *Q* has **n** tuples (not necessarily all distinct). Which of the above conditions is the most restrictive correct limitation on **m** denoting the number of tuples (again not necessarily all distinct) in the result?

(a) $0 \leq m \leq n$	(b) $n \leq m \leq 2n$	(c) $m = n$
(d) $n \leq m \leq n*n$	(e) $n \leq m \leq m*n$	

30. SQL Keyword EXTRACT gets a specified field from temporal data. EXTRACT (<field label> FROM <source>). EXTRACT returns a numeric value representing the field specified by <field label> from <source>.

The <source> is any expression returning a *datetime* or *interval*, and <field label> must be YEAR, MONTH, DAY, HOUR, MINUTE, SECOND, etc. If <source> or <field label> is NULL, EXTRACT returns NULL.

Consider the table given below:

Items

itemid	**name**	**price**	**dateadded**
CHKSD	Chicken Salad	2.85	1998-11-13
FRTSD	Fruit Salad	3.45	2000-05-06
GDNSD	Garden Salad	0.99	2001-03-02
MILSD	Millennium Salad	NULL	2002-08-16
SODA	Soda	0.99	2003-02-06
WATER	Water	0.00	2002-05-19
FRPLT	Fruit Plate	3.99	2000-09-02

Which SQL query given below will retrieve items (given in table above) added in 2001 or later in decreasing order of price?

(a)
```
SELECT itemid, price FROM Items WHERE dateadded>= 2001;
```

(b)
```
SELECT itemid, price FROM Items WHERE DATE '2001-01-01' -
dateadded>= 0 ORDER BY price DESC;
```

(c)
```
SELECT itemid, price FROM Items WHERE EXTRACT(YEAR FROM
dateadded) >= 2001 ORDER BY price DESC;
```

(d)
```
SELECT itemid, price FROM Items WHERE (YEAR '2001' -
EXTRACT(YEAR FROM dateadded) <= 0) ORDER BY price DESC;
```

(e)
```
SELECT itemid, price FROM Items WHERE dateadded>= '2001-
01-01' ORDER BY price DESC;
```

31. Which of the following SQL statements can be used as an access control statement for CUSTOMER table to user A?

(a) `GRANT DELETE ON CUSTOMER FROM A;`
(b) `SELECT MD5('password') FROM A;`
(c) `REVOKE SELECT ON CUSTOMER TO A;`
(d) `GRANT SELECT ON CUSTOMER TO A;`
(e) `GRANT ALL ON CUSTOMER TO A;`

32. Which of the following is the conceptual data model used by database designers?

(a) Normalization diagram
(b) An entity-relationship diagram
(c) A distributed-hierarchical diagram
(d) An entity-attributes diagram
(e) A database model

33. Consider the following incomplete sentence.

A ____ attribute is an attribute that can be further subdivided to yield additional attributes.

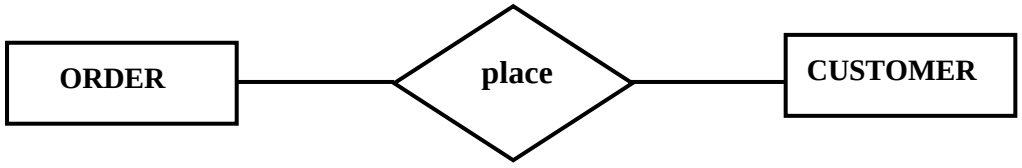
What is the best way of completing it?

(a) Composite
(b) Simple
(c) Single-Valued
(d) Multi-Valued
(e) Derived

34. Relationship cardinality is best described as the

(a) number of items in a relationship.
(b) number of relationships in which an entity can appear.
(c) number of items in an entity.
(d) number of entity sets which may be related to a given entity.
(e) number of rows in a table.

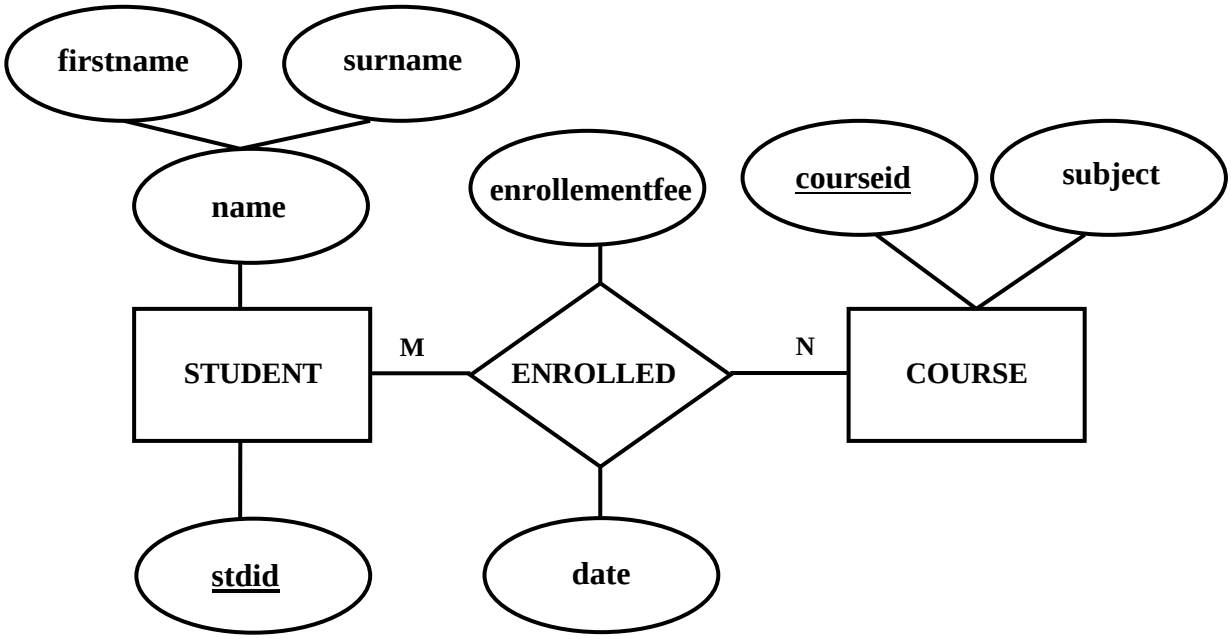
35. Consider the following an E-R diagram with two entities, ORDER and CUSTOMER, and the relationship '**place**'.



If a given customer can place many orders and a given order can be placed by at most one customer, which of the following best describes the relationship symbol between the two entities?

(a) 0:1
(b) 1:1
(c) 0:N
(d) 1:N
(e) N:M

Consider the following many to many relationship to answer questions 36 – 37.



36. What would one get when **STUDENT** in the above ER diagram is mapped to the corresponding relation?

(a) STUDENT(stdid, name)
(b) STUDENT(stdid, firstname, surname)
(c) STUDENT(stdid, name, courseid)
(d) STUDENT(stdid, firstname, surname, courseid)
(e) STUDENT(stdid, name, firstname, surname, courseid)

37. What would one get when **ENROLLED** in the above ER diagram is mapped to the corresponding relation?

(a) ENROLLED(enrolementfee, date)
(b) ENROLLED(enrolementfee, date, stdid, courseid)
(c) ENROLLED(enrolementfee, date, stdid, courseid)
(d) ENROLLED(enrolementfee, date, stdid, name, courseid, subject)
(e) No need to create a table called ENROLLED

38. Consider the following four statements. Normalization of a database is essential to

(i) avoid accidental deletion of required data when some data is deleted.
(ii) eliminate inconsistencies when a data item is modified in the database.
(iii) allows storage of data in a computer's disk.
(iv) use a database management system.

Which of the above is/are correct?

(a) (i) and (iii) (b) (i) and (ii) (c) (ii) and (iii)
(d) (ii) and (iv) (e) (i) only

39. Which of the following is **not true** about database de-normalization?

(a) It is the process of attempting to optimize the performance of a database.
(b) De-normalization is a technique to move from lower to higher normal forms of database modeling.
(c) It enhances the performance of a database.
(d) In de-normalization, it is required to add redundant data.
(e) Multi-valued attributes are supported with de-normalization.

40. A relation which is in a higher normal form

(a) implies that it also qualifies to be in lower normal form.
(b) does not necessarily satisfy the conditions of lower normal form.
(c) is always included in the lower normal form.
(d) is independent of lower normal forms.
(e) is included in the lower normal only between 1NF & 2NF.

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