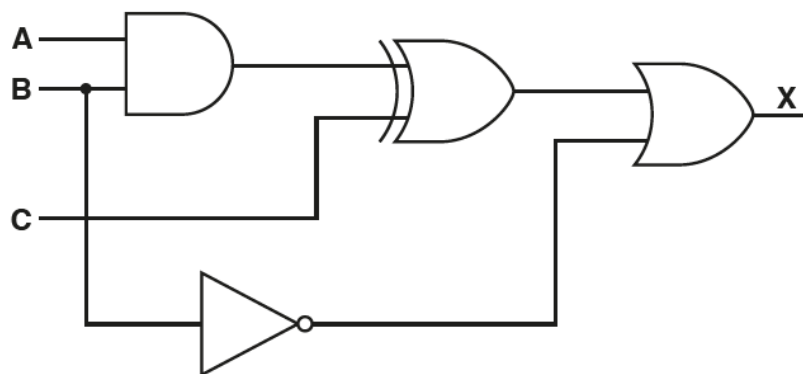


1. Nov/2021/Paper_11/No.3

A logic circuit is shown:



(a) Write the logic expression for the logic circuit.

.....
 [3]

(b) Complete the truth table for the given logic circuit.

A	B	C	Working space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[2]

- (c) Identify **one** logic gate **not** used in the given logic circuit. Draw the symbol for the logic gate **and** complete its truth table.

Logic gate:

Symbol:

Truth table:

A	B	Output
0	0	
0	1	
1	0	
1	1	

[3]

A shop sells plants to customers. The shop manager has a relational database to keep track of the sales.

The database, PLANTSALLES, has the following structure:

PLANT(PlantName, QuantityInStock, Cost)

CUSTOMER(CustomerID, FirstName, LastName, Address, Email)

PURCHASE(PurchaseID, CustomerID)

PURCHASE_ITEM(PurchaseID, PlantName, Quantity)

(a) The database is normalised.

(i) The table lists the following three stages of normalisation:

- The first stage is from a database that is not normalised (0NF) to First Normal Form (1NF).
- The second stage is from 1NF to Second Normal Form (2NF).
- The third stage is from 2NF to Third Normal Form (3NF).

Tick (✓) **one** box in each row to identify the appropriate stage for each task.

Task	Normalisation stage		
	0NF to 1NF	1NF to 2NF	2NF to 3NF
Remove any partial key dependencies			
Remove any repeating groups of attributes			
Remove any non-key dependencies			

[2]

(ii) Draw an entity-relationship (E-R) diagram for the database PLANTSALES.

PLANT

CUSTOMER

PURCHASE_ITEM

PURCHASE

[3]

(b) The shop manager uses a Database Management System (DBMS).

Describe the purpose **and** contents of the data dictionary in the DBMS.

.....

.....

.....

.....

.....

..... [3]

(c) The shop manager uses both Data Definition Language (DDL) and Data Manipulation Language (DML) statements to create and search the database.

(i) Complete the DML statements to return the total number of items purchased with the purchase ID of 3011A.

```
SELECT SUM(.....)

FROM .....

WHERE ..... = .....;

[4]
```

(ii) Write DDL statements to include a field in the table `PURCHASE` to store the date of the order.

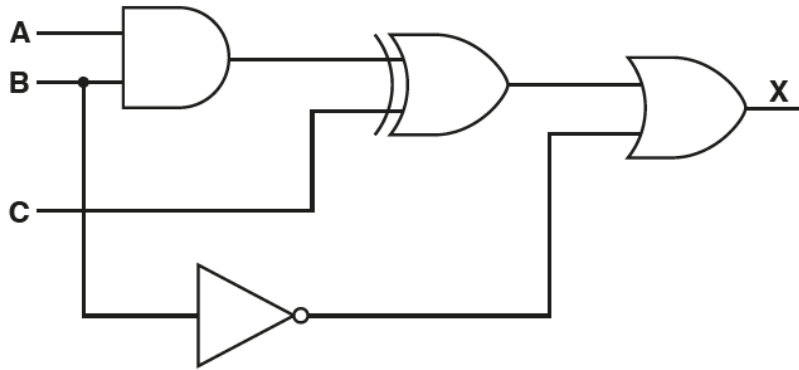
.....

.....

.....

..... [3]

A logic circuit is shown:



(a) Write the logic expression for the logic circuit.

.....
 [3]

(b) Complete the truth table for the given logic circuit.

A	B	C	Working space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[2]

- (c) Identify **one** logic gate **not** used in the given logic circuit. Draw the symbol for the logic gate **and** complete its truth table.

Logic gate:

Symbol:

Truth table:

A	B	Output
0	0	
0	1	
1	0	
1	1	

[3]

Bobby and Kim are discussing databases.

(a) Bobby tells Kim that a file-based approach is usually better than a relational database.

Explain why Bobby is incorrect.

.....

.....

.....

.....

.....

..... [3]

(b) Bobby has a shop that sells products to customers. His database will store data about his customers, their payment details, orders and the products he sells. Customers will have login details to access their accounts. The database will update customers' payment and login details without keeping any historical records.

(i) Give **one** example of each of the following relationships from Bobby's database.

one-to-one

.....

.....

one-to-many

.....

.....

many-to-many

.....

.....

[3]

(ii) Tick (✓) **one** box to identify the relationship that cannot be directly implemented in a normalised relational database.

Relationship	Tick (✓)
one-to-one	
one-to-many	
many-to-many	

[1]

(iii) Bobby wants to name his database `SHOPORDERS`.

Write a Data Definition Language (DDL) statement to define a new database with the name `SHOPORDERS`.

.....
..... [1]

(c) A database has a data dictionary.

Give **three** items that are stored in a data dictionary.

1
2
3 [3]

5. June/2021/Paper_12/No.1

Raj owns houses that other people rent from him. He has a database that stores details about the people who rent houses, and the houses they rent. The database, HOUSE_RENTALS, has the following structure:

CUSTOMER(CustomerID, FirstName, LastName, DateOfBirth, Email)

HOUSE(HouseID, HouseNumber, Road, Town, Bedrooms, Bathrooms)

RENTAL(RentalID, CustomerID, HouseID, MonthlyCost, DepositPaid)

- (a) Give the definition of the following database terms, using an example from the database HOUSE_RENTALS for each definition.

Term	Definition and example
Field	<p>.....</p> <p>.....</p> <p>.....</p>
Entity	<p>.....</p> <p>.....</p> <p>.....</p>
Foreign key	<p>.....</p> <p>.....</p> <p>.....</p>

[6]

- (b) Tick (✓) **one** box to identify whether the database `HOUSE_RENTALS` is in Third Normal Form (3NF) or not in 3NF.
Justify your choice using one or more examples from the database `HOUSE_RENTALS`.

In 3NF	
Not in 3NF	

Justification

.....

.....

..... [2]

(c) Example data from the table RENTAL are given:

RentalID	CustomerID	HouseID	MonthlyCost	DepositPaid
1	22	15B5L	1000.00	Yes
2	13	3F	687.00	No
3	1	12AB	550.00	Yes
4	3	37	444.50	Yes

- (i) Complete the following Data Definition Language (DDL) statement to define the table RENTAL.

```
CREATE ..... (
    RentalID INTEGER NOT NULL,
    CustomerID INTEGER NOT NULL,
    HouseID ..... (5) NOT NULL,
    MonthlyCost ..... NOT NULL,
    DepositPaid BOOLEAN NOT NULL,
    ..... (RentalID)
);
```

[4]

- (ii) Write a Data Manipulation Language (DML) script to return the first name and last name of all customers who have **not** paid their deposit.

```
.....
.....
.....
.....
.....
.....
```

[4]