

QUESTION 2 (15 MARKS)

a) Convert the Conceptual ERD in **Figure 2** to a Logical ERD.

(5 Marks)

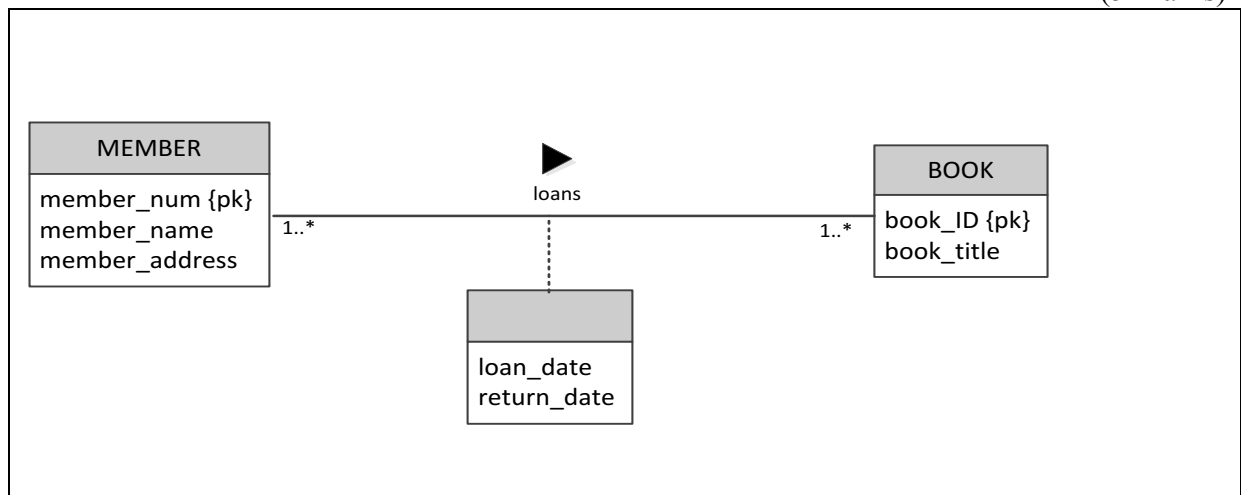


Figure 2: Conceptual ERD

b) Derive the relation schema from the ERD in **Figure 3**.

(10 Marks)

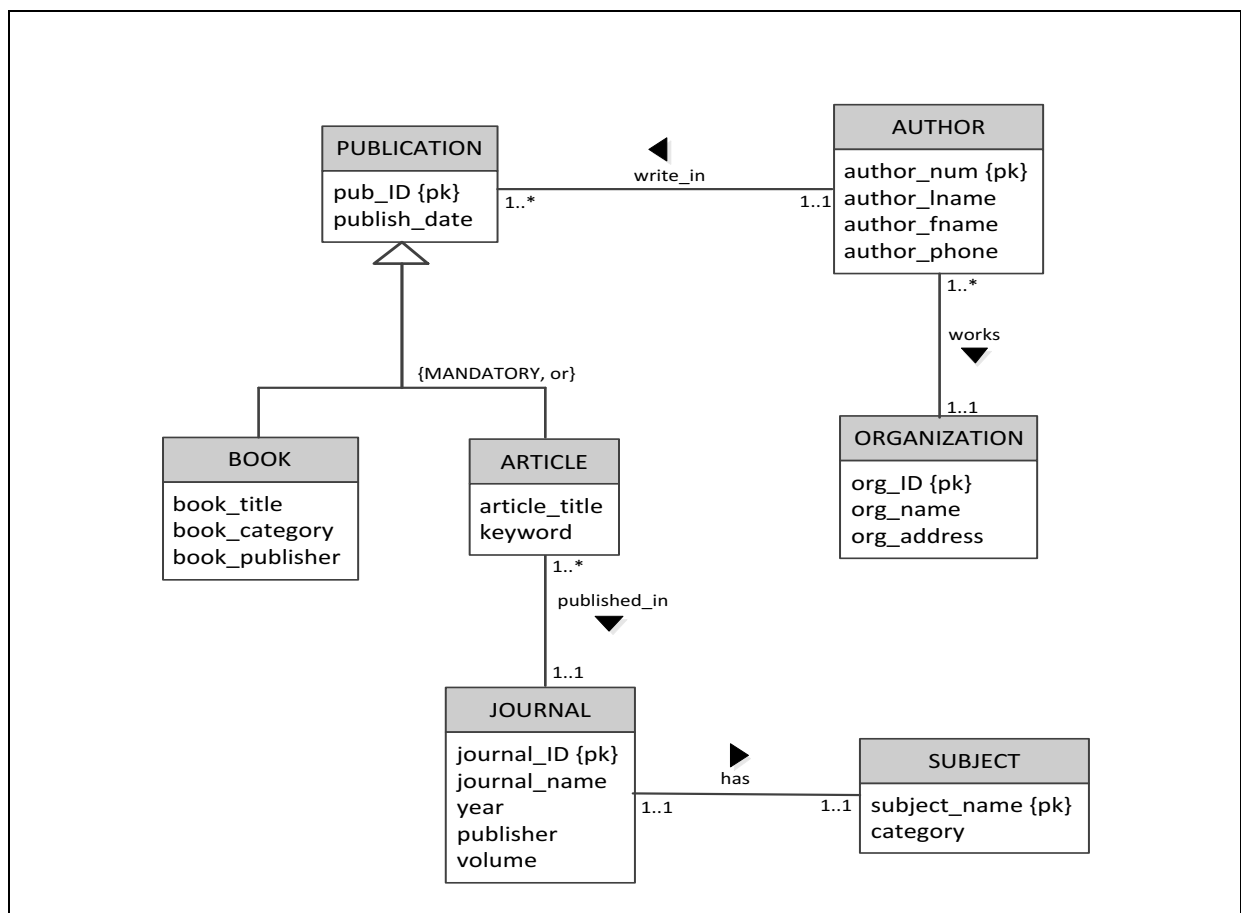


Figure 3: ERD

QUESTION 4**(20 MARKS)**

Table 4.1 lists patient appointment data with the dentists. A patient is given an appointment with a dentist at a specific time, date and a surgery room. On each day of patients' appointment, a dentist is allocated to a specific surgery room (i.e. column surgeryNo) for that day.

Table 4.1: Dentist/Patient Appointment Data

staffNo	dentistName	Patient No	PatientName	appointment Date	appointment Time	surgeryNo
S1011	Ahmad Zulhilmi	P101	Foon Yew	09 Nov 2014	8.30 am	S15
S1011	Ahmad Zulhilmi	P105	Saodah Hathim	09 Nov 2014	9.30 am	S15
S1022	Plevin Cruze	P108	Winstor Yee	09 Nov 2014	8.30 am	S10
S1022	Plevin Cruze	P108	Winstor Yee	11 Nov 2014	2.00 pm	S10
S1030	Mary Anne	P105	Saodah Hathim	11 Nov 2014	3.00 pm	S15
S1030	Mary Anne	P105	Siti Sabariah	12 Nov 2014	4.00 pm	S13

Based on the above explanation, answer the following questions:

- Table 4.1 is susceptible to update anomalies. Provide **ONE** example for each of insertion, deletion, and update anomalies.
(3 marks)
- Identify in what level of Normal Form the Table 4.1 is in. Justify your answer.
(2 Marks)
- Identify the Primary Key (PK) for Table 4.1.
(2 Marks)
- Identify all functional dependencies that can be derived from the Table 4.1.
(6 Marks)
- Illustrate the process of normalizing Table 4.1 up until Boyce Codd Normal Form (BCNF) level. State any assumptions you make about the data shown in the table.
(7 Marks)

g) Show the output of the following SQL statement:

(3 Marks)

```
SELECT MIN(salary) AS salaryMIN, MAX(salary) AS  
salaryMAX, AVG(salary) AS salaryAVG  
FROM Employee;
```

h) Produce the result of the following SQL statement:

(3 Marks)

```
SELECT branchNo, COUNT(EmployeeNo) AS myCount,  
SUM(salary) AS salarySUM  
FROM Employee  
GROUP BY branchNo  
HAVING COUNT(EmployeeNo) > 1  
ORDER BY branchNo;
```

QUESTION 3 (20 MARKS)

Answer the following questions based on the conceptual ERD of a project management system as shown in **Figure 3.1**.

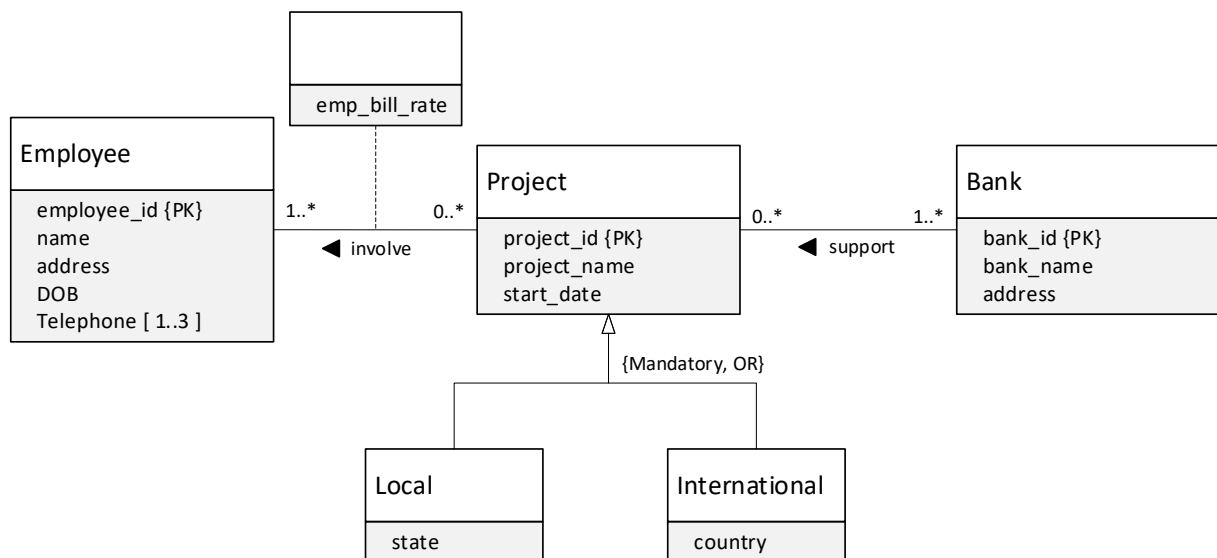


Figure 3.1: Conceptual ERD of a project management system.

a) Draw the logical ERD from the conceptual ERD shown in **Figure 3.1**.

(10 Marks)

QUESTION 2

Derive the relational schema for Conceptual Entity Relationship Diagram in Figure 2.1 below.

(15 marks)

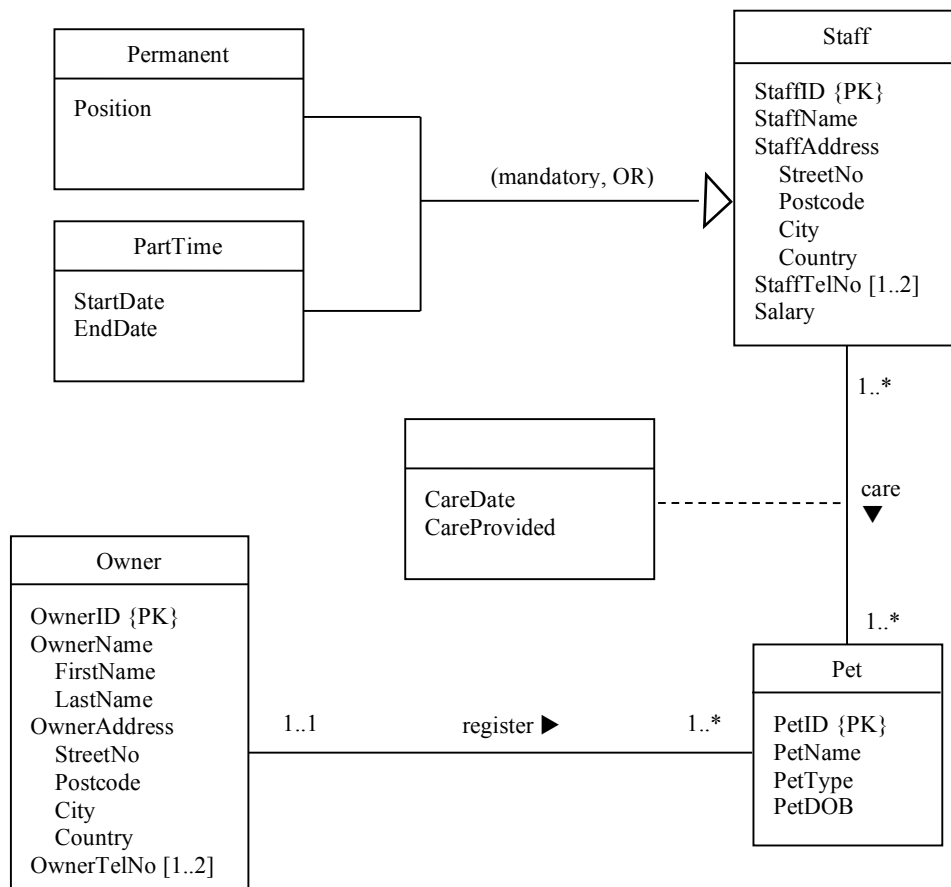
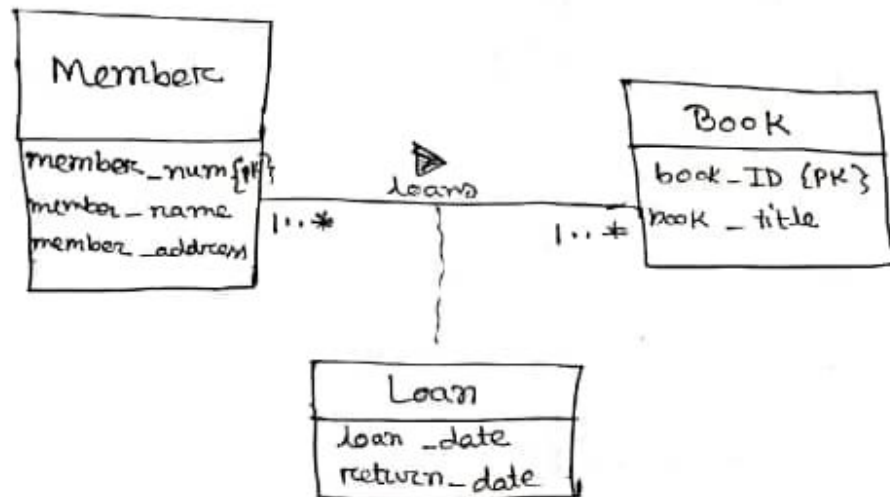


Figure 2.1: Conceptual Entity Relationship Diagram

Question-2

① Convert Conceptual ERD to Logical ERD



2 Primary keys.

② ERD to relation schema:

AUTHOR → strong entity set

ORGANIZATION → " " "

PUBLICATION → " " "

JOURNAL → " " "

SUBJECT → " " "

BOOK → weak " "

ARTICLE → weak " "

Write-in → one to one AUTHOR to one to many PUBLICATION

published-in → one to many ARTICLE to one to one JOURNAL

has → one to one JOURNAL to one to one SUBJECT.

Strong entity set "AUTHOR"

author-num \rightarrow Primary key

author-lname, author-fname, author-phone \rightarrow composite key

Strong entity set "ORGANIZATION"

org-ID \rightarrow Primary key

org-name, org-address \rightarrow composite key

Strong entity set "PUBLICATION"

pub-ID \rightarrow Primary key

publish-date \rightarrow composite key

Strong entity set "JOURNAL"

journal-ID \rightarrow Primary key

journal-name, year, publisher, volume \rightarrow composite key

Strong entity set "SUBJECT"

subject-name \rightarrow Primary key

category \rightarrow composite.

Weak entity set "BOOK"

book-title, book-category, book-publisher ~~disjoint~~

Weak entity set "ARTICLE"

article-title, keyword

AUTHOR (author-num, author-name, author-phone)

PUBLICATION (pub-ID, publish-date)

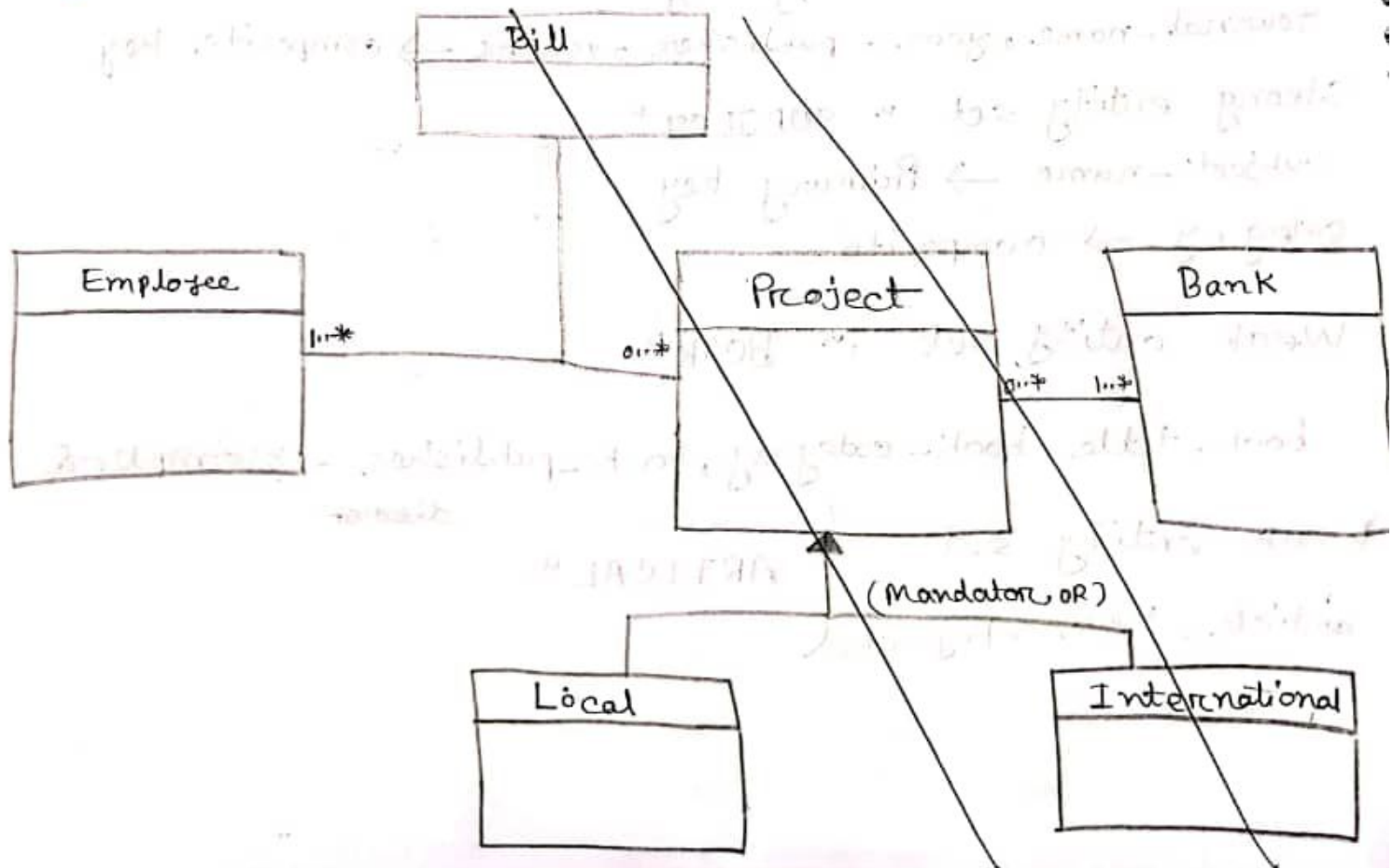
ORGANIZATION (org-ID, org-name, org-address)

JOURNAL (journal-ID, journal-name, year, publisher, volume)

SUBJECT (subject-name, category)

Question - 3

@ Conceptual ERD to Logical ERD draw:



Employee	
employee_id	int (10)
name	Varchar(50)
address	Varchar(50)
DOB	int (10)
Telephone	int (15)

Bill	
emp_bill_rate	int (10)

Project	
project_id	int (10)
project_name	Varchar(50)
start_date	int (10)

Bank	
bank_id	int (10)
bank_name	Varchar(50)
address	Varchar(50)

Local	
State	Varchar(50)

International	
Country	Varchar(50)

{Mandatory, OR}

1..*

inmate

0..*

0..*

support

1..*

Employee (employee-id , name, address, DOB, Telephone)
PK

Project (Project-id, project-name, start-date)
PK

Bank (bank-id , bank-name, address)
PK

Entity "Project" is relationship between Employee .

Zero ~~one~~ to many Project involve one to many Employee.

Entity "Bank" is relationship between Project .

one to many Bank support zero to many Project.

Super class → Project

Sub class → Local & International

So, Project add with Local

And another one,

Project add with International .

Question - 2

Pet Care case

Staff (staffID, staffName, staffAddress, ~~staff~~ Staff TelNo, salary)

Pet (PetID, PetName, PetType, PetDOB)

Owner (OwnerID, OwnerName, OwnerAddress, OwnerTelNo)

Staff \rightarrow superclass

& subclass is \rightarrow Permanent & Part time

So superclass add with subclass separately
Two table.

1 to many staff^{can} care 1 to many pet.

1 to one owner^{can} register 1 to many Pet

& pet care have .

staff take care pet that have care date & care provided.

FK \rightarrow telephone.

Create table for telephone & care date also

Care provide with add pet care part.