

Answer Script

Question No. 01

1. Give examples of primary key and composite primary key and foreign key.

Answer No. 01

Primary Key:

A primary key is a column or a combination of columns in a relational database table that uniquely identifies each row in the table. Each row in a table is given a unique ID using a special kind of key. Primary keys must be unique and cannot have null values.

Student Info

ID	Name	Age	Dept
101	Afsar	25	CSE
102	Tarek	19	CSE
103	Afsar	22	CSE

In the above, we have a Student info table. This table has four keys: ID, Name, Age, Dept. ID is the primary key for this table. Because we can identify a student by id. Two students don't have the same id in the same department.

Composite Primary Key:

A composite primary key is a primary key that is made up of two or more columns. It is called a composite key because it is a combination of two or more columns that together uniquely identify a row in a table.

University Student's Info

ID	Name	Department
505	Afsar	CSE
204	Tarek	CSE
505	Anwar	EEE

In the above, we have a University Student Info table. This table has three keys: ID, Name, Dept. ID is the primary key for this table. Because we can identify a student by id. Two students don't have the same id in the same department.

In the above table we have the same two id 505. If id is our only primary key then we could not identify any student for this 505 id. Because 505 id One student's name is "Afsar" and another student's name is "Anwar". They are two individual person but their id is the same. So, we need another primary key for identifying them. Name couldn't be the primary key, because Their names should also be the same. We can use Dept. as the another primary key for identify individual student. Because in the same department two student doesn't have the same id. So, here Dept. is the composite key. In the above table, both ID and Dept. is the composite primary key.

Foreign Key:

A foreign key is a field in one table that refers to the primary key in another table. Foreign keys are used to establish relationships between tables in a relational database.

Student		Student's Info		
ID	Name	ID	Age	Result
101	Afsar	103	23	5.00
102	Anwar	102	21	4.50
103	Afsar	101	22	4.75

The Student table has two keys: ID, Name. Name couldn't be the primary key, because two students can have the same name. But, two students couldn't have the same id. That's why here ID is the primary key.

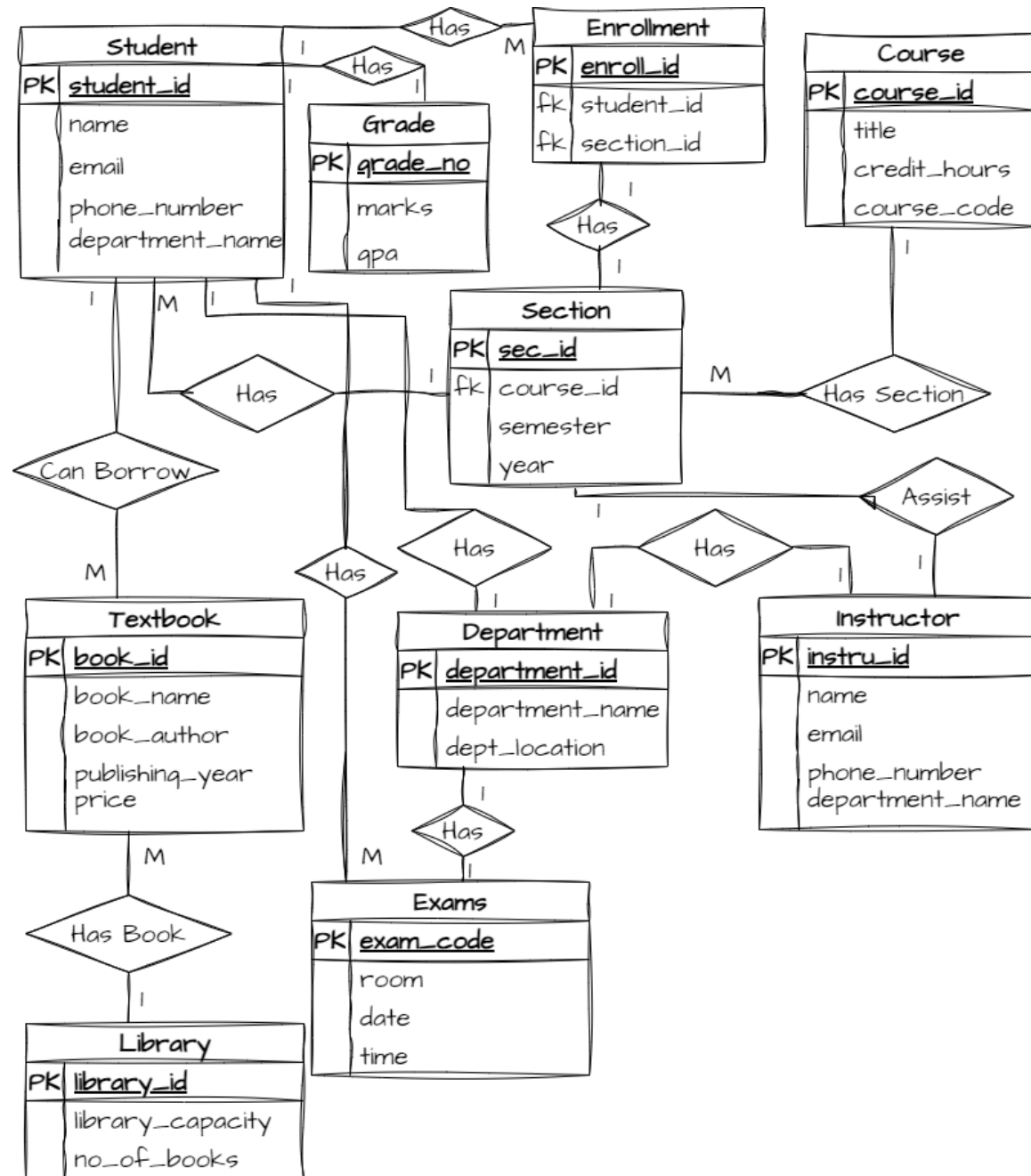
In the second table we have three keys: ID, Age, Result. If this table doesn't have the ID key then we cannot identify which student's age is 23 and which student's result is 4.50. For uniquely identify the age and result we must need a primary key. Here ID is the primary key. Because in the same department two students don't have the same ID. That's why in this table we can use ID as the primary key.

But we can see ID is already a primary key in the Student table. In the student's info table for uniquely identifying the age and result we use ID as primary key which is already a primary key Student table. In the foreign key definition we know if we use one table primary key into the other table then we can say this key is foreign key.

Question No. 02

2. Make an ERD of an University Management System.

Answer No. 02



Question No. 03

3. Make a table named User which will have the following fields

- a. Username
- b. Email
- c. First Name
- d. Last Name
- e. Phone No
- f. Address
- g. HSC Result
- h. Date of Birth
- i. Age
- j. password

Answer No. 03

SQL Query:

```
CREATE TABLE User(  
    Username VARCHAR(50),  
    Email VARCHAR(50),  
    FirstName VARCHAR(20),  
    LastName VARCHAR(20),  
    PhoneNo INT(11),  
    Address VARCHAR(40),  
    HSCResult FLOAT(4),  
    DateOfBirth DATE,  
    Age INT,  
    password VARCHAR(30)  
);
```

Question No. 04

4. Write proper constraints of question no 4 and create table.

Answer No. 04

SQL Query:

```
CREATE TABLE User(  
    Username VARCHAR(50) PRIMARY KEY NOT NULL,  
    Email VARCHAR(50) UNIQUE NOT NULL,  
    FirstName VARCHAR(20) NOT NULL,  
    LastName VARCHAR(20) NOT NULL,  
    PhoneNo INT(11) UNIQUE NOT NULL,  
    Address VARCHAR(40) NOT NULL,  
    HSCResult FLOAT(4) NOT NULL,  
    DateOfBirth DATE,  
    Age INT NOT NULL,  
    password VARCHAR(30) NOT NULL  
);
```

Question No. 05

5. Write the disadvantages of redundancy and incompleteness in database design.

Answer No. 05

The Disadvantages of Redundancy:

Redundancy:

Redundancy is the duplication of data in a database.

Wasted space:

More space is required in the database to hold duplicate data. In order to get the information it requires, the database will therefore have to sift through additional data, which can have an impact on performance.

Data integrity problems:

Redundant systems may potentially cause problems with data integrity. This means that internal consistency of the database's data is not possible.

Inconsistency:

If the information is not updated across all of the duplicated places, the database can become inconsistent. This suggests that the database's information may not be reliable.

Data Duplication:

Data duplication, or the storing of the same data more than once, is a byproduct of redundancy and can waste storage space and be difficult to maintain. This may lead to confusion and errors since separate copies of the data may have different values or be out of sync.

The Disadvantages of Incompleteness:**Incompleteness:**

Incompleteness is the lack of data in a database.

Inaccurate results:

If data is inadequate, questions may not have valid responses.

Lack of information:

If the data is incomplete, users might not be able to get the information they need.

Performance problems:

If the data is lacking, the database might not be able to process queries as efficiently.

Data Integrity Issues:

Incomplete database architecture may lead to issues with data integrity. If vital data is either absent or incomplete, it becomes impossible to guarantee the accuracy and reliability of the information contained in the database. Incompleteness can result in inaccurate analysis, reporting, and decision-making based on unreliable or suspect facts.

Question No. 06

6. From HR Database, Select the employee who has last name starts with "k" or ends with "k".

Answer No. 06**SQL Query:**

```
SELECT *  
FROM employees  
WHERE last_name LIKE "k%"  
OR last_name LIKE "%k";
```

Question No. 07

7. From HR Database Select the employee who gets more salary than his/her manager.

Answer No. 07

SQL Query:

```
SELECT *  
FROM employees e1  
INNER JOIN employees e2  
ON e1.manager_id = e2.employee_id  
WHERE e1.salary>e2.salary;
```

Question No. 08

8. From HR Database, print all the employee names along with department names.

Answer No. 08

SQL Query:

```
SELECT e.first_name, e.last_name, d.department_name  
FROM employees e INNER JOIN departments d  
USING (department_id)  
WHERE e.department_id=d.department_id;
```