

## Chapter 3: Introduction to Database

### Solutions

#### Summative Assessment

##### Multiple-Choice Questions (MCQs)

1. A ..... is a structured collection of data.
  - a. Data
  - b. Table
  - c. Traditional database
  - d. None of these

Ans. b

2. .... refers to the process of sharing a single piece of data among different users.
  - a. Data sharing
  - b. Data redundancy
  - c. Data inconsistency
  - d. None of these

Ans. a

3. The following is a type of database:
  - a. Flat-file database
  - b. Relational database
  - c. Distributed database
  - d. All of these

Ans. d

4. .... is the process of fetching information from the database.
  - a. Retrieving
  - b. Classifying
  - c. Summarizing
  - d. Sorting

Ans. a

##### Very Short Answer Questions

5. What do you understand by a record?

Ans. A record is a set of information usually stored in the rows and columns of a table..

6. Is it possible to completely remove data duplication from a database?

Ans. No, it is not possible to completely remove data duplication from a database.

7. What do you understand by a primary key?

Ans. A primary key refers to a key that helps in uniquely identifying a record in a table.

8. What do you mean by a foreign key?

Ans. Foreign key refers to a key that is a reference of a primary key in another table. This implies that the records in the primary key and foreign key columns are same in both the tables.

9. Can a primary key contain a NULL value?

Ans. No, a primary key column cannot contain a NULL value.

##### Short Answer Questions

10. What is Base?

Ans. BASE, also known as OpenOffice BASE or OO BASE, is a database application in the OpenOffice suite. BASE is a popular relational database management system or RDBMS. Using BASE, you can easily manage your data into a single zip file that stores all the related files. In BASE, a database file is stored with the .odb extension. The .odb implies OpenOffice database. A BASE database file contains data in four elements, namely table, form, query, and report.

11. Define DBMS and its functioning.

Ans. DBMS is a program that controls the creation, maintenance, and use of a database. In DBMS, data is stored centrally. This allows users to easily access and share data as a common resource. DBMS helps in the integration of stored data by preventing inconsistencies and duplicate data. In addition, accessing, retrieving, and modifying the stored data is easy. DBMS also allows multiple users to access the data at the same time. Moreover, the access to the database is controlled. In other words, unauthorized users are prevented from accessing the database.

12. How does DBMS ensure data security?

Ans. The data that is stored in a database may contain valuable or sensitive information. For example, the database of an organization can contain personal information about its employees or information about the financial deals made with other organizations. Such type of information is highly sensitive and may damage the organization or its goodwill if it were to fall in wrong hands. Therefore, it is important that such information should be provided adequate security. DBMS provides security for data by ensuring that only authorized users are able to access the database. Authorized users have the rights or permission to access or change the database. This not only helps keep track of the users who access and make changes in the database, but also prevents others without right credentials to access the database.

##### Long Answer Questions

13. Explain the relationship between two tables through an example.

Ans. The Employees\_Details table contains the following fields:

Emp_ Code	Emp_ Name	Emp_ Address	Emp_ ContNo	Emp_ Grade	Emp_ Salary
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The Department table contains the following fields:

Dept_ID	Dept_ Name	Emp_ Code	Emp_ Name	Designation	Salary_ Scale
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The relationship between these two tables is created on the basis of a common field named Emp\_Code. A relationship between these tables is established to fetch any information from both the

tables. Further, establishing a relationship among tables allows you to link them to get meaningful information.

**14. What points do you need to remember while designing a database?**

**Ans.** The points that you should keep in mind while designing the database are:

- The purpose of your database
- The tables you require
- The fields you require
- The primary key in a table
- The relationship between tables

**15. Explain data redundancy using a suitable example.**

**Ans.** Duplication or repetition of data is known as data redundancy. For example, suppose there is a residential school that uses the traditional file system to store data. In this school, data related to the students is stored in two files, `Student_Details` and `Hostel_Student_Details`. While the `Student_Details` file contains data related to all the students of the school, the `Hostel_Student_Details` file contains data about the students who live in the hostel. This implies that the `Student_Details` file contains data about all the students, that is, those who study in the school as well as those who live in the hostel. In such a case, there is duplication of data (data redundancy) because the records of the hostel students are maintained in both the files.

**16. Explain the primary key with the help of an example.**

**Ans.** Primary key refers to the key that helps in uniquely identifying the records in a table. One important characteristic of the primary key is that its column cannot contain a NULL value. Let us find the primary key in the `Student_Details` table in the Student database. This table contains four fields—Student Name, Student Roll no, Student Address, and Student Marks. Among all these fields, Student Roll no is the only field in which the records or values would be always unique. It is for this reason that the primary key for the `Student_Details` table has been set in this field or column.

**17. Why do we need to establish a relationship in a database?**

**Ans.** In a database, a relationship among tables is established on the basis of common fields between them. The main reason for establishing a relationship among tables is that it allows you to fetch any information from them.

**18. Is the relational database similar to the flat-file database? If no, explain how both types of databases are different from each other?**

**Ans.** No, the relational database is not similar to flat-file database. A flat-file database refers to a database in which all the data is stored in a single file, for example, a student database in a school. The most common example of this type of database is a spreadsheet. On the other hand, a relational database refers to a database in which data is stored in multiple tables. These tables are linked to one another through common fields.

**19. How does a primary key help in reducing data duplication?**

**Ans.** A primary key refers to a key that helps in uniquely identifying a record in a table. Thus, a column with a primary key will not contain duplicate information in any of its records.

**20. What do you understand by authorized users?**

**Ans.** Authorized users are those users whose credentials are verified

through security checks. In other words, authorized users have the rights or permission to access or change the database.

**21. How does DBMS help in reducing data inconsistency?**

**Ans.** Data inconsistency occurs due to the problem of data redundancy. For example, you may have two or more copies of the same record stored at different locations in the database created in the traditional file system. The information in these copies may not match, which can be due to several reasons. One reason may be that the user updates the records at one location in the database but forgets to make the corresponding changes in the same data saved at other locations in the database. This leads to data inconsistency.

DBMS helps reduce data redundancy since the entire data is stored at one central location. This allows users to easily access and share data as a common resource. In addition, accessing, retrieving, and modifying the stored data is easy. DBMS also allows multiple users to access the data at the same time. Moreover, the access to the database is controlled. In other words, unauthorized users are prevented from accessing the database.

**22. What is the difference between a primary key and a foreign key?**

**Ans.** A primary key refers to the key that helps in uniquely identifying the records in a table. On the other hand, a foreign key refers to a key that is a reference of a primary key in another table which implies that the records in the primary key and foreign key columns are the same in both the tables. The other difference is that a primary key column cannot contain a NULL value; whereas, a foreign key column can contain a NULL value.

## Formative Assessment

### Application-Oriented Questions

**1. Create a database that contains two tables. With the help of these tables, explain the concepts of primary key and foreign key.**

**Ans.** Let's assume that there is a database named Student. The Student database contains two tables named `Student_Details` and `Student_Marks`. Let's understand the concept of the primary key and foreign key with the help of these tables:

- **Primary key:** Refers to the key that helps in uniquely identifying the records in a table. One important characteristic of the primary key is that its column cannot contain a NULL value. Let's find the primary key in the `Student_Details` table in the Student database. This table contains four fields—Student Name, Student Roll no, Student Address, and Student Marks. Among all these fields, Student Roll no is the only field in which the records or values would be always unique. It is for this reason that the primary key for the `Student_Details` table has been set in this field or column.
- **Foreign key:** Refers to a key that is a reference of a primary key in another table. This implies that the records in the primary key and foreign key columns are the same in both the tables. Suppose there are two tables in the Student database—`Student_Details` and `Student_Marks`. The `Student_Details` table contains the fields Student Name, Student Roll no, Student Address, and Student Marks. The `Student_Marks` table contains the fields Student Roll no, Student Name, and Student Marks.

In this case, the Student Roll no field (that is the primary key in the `Student_Details` table) is a foreign key in the `Student_Marks` table,

as shown in the following tables:

Student Name	Student Roll No	Student Address	Student Marks
Deepika	Stud001	Preet Vihar	87
Geeta	Stud002	Pandav Nagar	96
Deepinka	Stud003	Shalimar Bagh	80

Primary key in the Student\_Details table

Student Name	Student Roll No	Student Marks
Deepika	Stud001	87
Geeta	Stud002	96
Deepinka	Stud003	80

Foreign key in the Student\_Marks table

2. If a database contains two or more tables and these tables are linked by common fields, what type of database is it?

Ans. This type of database is Relational Database Management System (RDBMS). A relational database refers to a database in which data is stored in multiple tables. These tables are linked to one another through common fields.

3. A database has all the records stored in a single file in a sequential manner. What type of database is it?

Ans. In the flat-file database, all the data is stored in a single file in sequential manner.

4. A table named Employee\_Details contains information about all the employees working in an organization. This table has the Emp\_Code field as the primary key. Another table named Department contains information about all the departments in the organization. This table also contains a field named Emp\_Code. The Emp\_Code field, which is a primary key in the Employee\_Details table, is present as a reference of the primary key in the Department table. What type of key is it?

Ans. The key which is the reference of the primary key in the other table is known as the foreign key.

5. What type of information would you include in a personal database? How many tables do you need to create the database? How many fields do you need for your tables? Identify the primary key for each table.

Ans. Personal database contains personal information. For example, as a student, if you create a personal database for a student, then it contains information related to the students, such as name, roll number, class, address, and contact number. A table can have any number of tables and any number of fields. Suppose that you are Mohit and want to store your personal details in a database, named as Personal\_Details. The Personal\_Details database has a table named Marks\_Details.

The Marks\_Details table has several fields, which are:

1. Name
2. RollNo
3. Address
4. Contact Number
5. Class
6. Semester
7. English
8. Maths
9. Science
10. Hindi
11. SST
12. Total Marks
13. Grade

In the Marks\_Details table, the Semester field is capable for being a primary key as we know that a primary key is used to uniquely identify a record in a table. Other fields, such as Name, Roll No, Address, Contact No, and Class, can contain duplicate values and therefore, cannot become primary keys.

6. Discuss with your parents how they manage records of their daily expenses. Further, create a database for them so that they can manage the records more easily and effectively.

Ans. My parents manually manage records of their daily expenses. This process is very cumbersome and time consuming. To make their work easier, I created a database with the name, Expenditure, having following fields:

S.No	Item Name	Date of Purchase	Quantity	Cost per unit	Total Amount
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## Unsolved Examination Questions

1. a. Write any two uses of Database Management System.  
b. What is a Primary key? Give an example.  
[Outside Delhi 2007 (1 mark)]

Ans. a. Two uses of Database Management System are:

- DBMS helps in the integration of stored data by preventing inconsistencies and duplicate data.
- DBMS also allows multiple users to access the data at the same time.

b. Primary key refers to the key that helps us uniquely identify records in a table. One important characteristic of the primary key is that its column cannot contain a NULL value. The Employee\_Details table contains the fields Emp\_Code, Emp\_Name, Emp\_Address, and Emp\_Salary in which Emp\_Code can be created as a primary key.

2. Give one use of a database. [Delhi 2003 (1 mark)]

Ans. A database is used to store and retrieve information in a computer system at a central location.

3. What is a primary key? [Delhi 2003 (1 mark)]

Ans. Primary key refers to the key that helps in uniquely identifying the records in a table.

4. Mention any two advantages of using a database. [Delhi 2002 (2 marks)]

Ans. The two advantages of using a database are:

- It reduces data redundancy
- It reduces data inconsistency

5. What is the difference between rows and columns in a table? (Delhi 2002 [2 marks])

Ans. The differences between rows and columns in a table are as follows:

- A row is also known as a record; whereas, a column refers to a field.
- A row represents a complete set of information; whereas, a column (or field) represents the smallest unit of information in a table.
- Records are composed of fields, each of which contains one item of information. On the other hand, each field of a table has a name and contains related information.