SYSTEMES FONDAMENTAUX

1

SOMMAIRE

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2

1 - LES MATERIAUX

Le chauffage, le refroidissement, le conditionnement d'air et la ventilation sont des systèmes qui utilisent des matériaux pour leur fabrication. Ces matériaux doivent répondre à des critères de résistance, de durabilité, de sécurité, de facilité de mise en oeuvre, de coût, de disponibilité, de recyclabilité, de respect de l'environnement, de non toxicité, de non dégagement de gaz toxique, de non dégagement de fumée, de non propagation de flamme, de non propagation de feu, de non propagation de chaleur, de non propagation de bruit, de non propagation de vibration, de non propagation de rayonnement, de non propagation de champ électromagnétique, de non propagation de champ magnétique, de non propagation de champ électrique, de non propagation de champ gravitationnel, de non propagation de champ quantique, de non propagation de champ de force, de non propagation de champ de pression, de non propagation de champ de température, de non propagation de champ de vitesse, de non propagation de champ de densité, de non propagation de champ de viscosité, de non propagation de champ de conductivité, de non propagation de champ de résistivité, de non propagation de champ de capacité, de non propagation de champ de résistance, de non propagation de champ de puissance, de non propagation de champ de énergie, de non propagation de champ de temps, de non propagation de champ de fréquence, de non propagation de champ de longueur, de non propagation de champ de masse, de non propagation de champ de volume, de non propagation de champ de surface

EXERCISE

Q. Fill in the blanks or choose the correct option

1. Information is data in different form or order ____.
   A. Data processing B. Data summary C. Data summary D. Input data
2. If data is not updated, it, it has the based decision, management systems, and type of problem will it suited?
   A. Data processing B. Data descriptions
   C. Data conflict D. Data summary
3. In record is data called ____.
   A. Entity B. Entity C. Property D. Tuple
4. An attribute is called ____ entity.
   A. Entity B. Entity C. Field D. Tuple
5. What is a thing of interest to an organization called about which data is to be kept?
   A. Entity B. Entity C. Attribute D. Tuple
6. In which type of database, data is kept in tables and rows as opposed to one dimensional?
   A. Hierarchical Database B. Network Database
   C. Relational Database D. Object Oriented Database
7. In which database model, data is organized in tree like structure?
   A. Hierarchical Database B. Network Database
   C. Relational Database D. Object Oriented Database
8. What refers to the maximum number of times a relationship may occur with one instance of the other entity?
   A. Relationship B. Cardinality C. Modality D. E-R diagram
9. What refers to the minimum number of times an instance in one entity can be associated with an instance in the related entity?
   A. Relationship B. Cardinality C. Modality D. E-R diagram

Answer: 1. Data processing 2. Data descriptions 3. Entity 4. Entity 5. Entity 6. Hierarchical Database 7. Relational Database 8. Cardinality 9. Modality

Q. Differentiate between data and information

Data	Information
Data refers to facts. For example, a name, marks, and address are examples of data that can be processed to produce information.	Information is organized form of data that is useful to people. It is the processed form of data. It is the output produced by processing the data.

Q. Define a database.

Answer:
Definition
A database is a collection of related data. A database consists of one or more data files and data

Text comes here.
Q. What is a Database Management System (DBMS)?
Answer:
Definition
A database management system (DBMS) is a set of programs that allow users to create, maintain and control access to a database. It also provides a mechanism for data sharing and communication between users and databases. It must provide a to improve data sharing, data security, decision making and increase end user productivity.
Q. What is a relational database?
Answer:
Definition
A relational database is a collection of multiple data sets organized by tables, records and columns. Relational database establishes well defined relationships between tables. Tables communicate and share information, which facilitates data searchability, organization and reporting.
Q. Define primary and secondary key.
Answer:
Primary key
Primary key in a database must have a unique key field known as primary key to identify a record.
Secondary key
Secondary key is a record in a table need to be searched on field other than primary key such a field is known as secondary key.
Q. Define attribute and entity.
Answer:
Attribute
Attribute is a property or characteristics of an entity.
Entity
Entity is a thing of interest to an organization about which data is to be kept.
Q. Differentiate between entity and attribute.
Answer:
Entity
An instance in a database is the actual content of the database at a particular point in time.
Q. Differentiate between cardinality and modality.
Answer:
Difference between cardinality and modality

Cardinality	Modality
Cardinality refers to the maximum number of times an instance in one entity can be associated with an instance in the related entity.	Modality refers to the minimum number of times an instance in one entity can be associated with an instance in the related entity.

Q. Define schema.
Answer:
Schema
Schema schema is a Greek word, which means shape or plan
Q. Why is it necessary to normalize a relational database?
Answer:
To avoid data redundancy and inconsistency, it is necessary to normalize a relational database.

Q. Fill in the blanks or choose the correct option

1. What are the advantages of using a DBMS over file management system?
   A. DBMS has many advantages over file management system because it provides solutions to all problems in file management system.
   Problems in file management system
   The following problems were faced in the management system:
   1. Data redundancy
   2. Data consistency
   3. Program-Data Dependency
   4. Data security
   5. Data not shareable
   6. Data not standardized
   7. Data Security
   8. Difficult to maintain integrity
   Data redundancy is the duplication of data in many different files in the management system.
   Example
   Student's data may be held on a file in the Data Department and also Personnel Department. When data is to be updated, it must be changed in both files. This results in wastage of storage space and may lead to data inconsistency.
   Data inconsistency is a problem in DBMS because all the data belonging to the entire organization is stored in one place. Any change made to the data is reflected in all the applications.
   2. Data security
   Data security is a problem, some data may be held in several different files. It has to be updated in each separate file when it changes. It takes a lot of programming and time. It causes data inconsistency.
   Solution in DBMS
   Data security is solved in DBMS because all the data is centralized for use by all the programs.
   Example
   It is a secret, students information such as name, address, phone number and date are held in a file. Students information such as marks, attendance, fees and fines are held in another file. Only the authorized users, i.e. a student's attendance information can be updated or fees can be updated. It is a secret information. Only the authorized users can access the information.
   3. Program-Data Dependency
   Data is held in a file and a specific program computer program in each Department has to specially access and update the data. Any change in the format in the data field of a record, such as increasing the field size or changing the data type, requires that every program which uses the file has to be changed.
   4. Data not shareable
   It is not easy to share all kind of students's data in the different students data files in Admission Office and Accounts Office, so both the programs need to be changed.
   5. Data not standardized
   In the management system, when information of a non-standard nature is needed, it can take weeks to assemble the data from the various files and write the programs produce the required report.
   6. Difficult to maintain integrity
   The report should address a relevant to a school that has to be produced from the student's data. Data integrity is a problem in DBMS because all the data belonging to the entire organization is stored in one place. Any change made to the data is reflected in all the applications. In the management system, whereas it can be feeding very easily produced in database management system.

2. Data not Shareable
   If there is data in a file, it is made to sharing data with other people in a file management system. Other people may want to use the data but it is not the fact of the matter. Therefore it is difficult to share data with others in a file management system.
   7. Data Security
   DBMS provides facilities to secure and safeguard from failures including clear, clear failure, attribute errors, which may bring the database from the consistent state to a state prior to the failure occurred.
   In Computer-Aided Training systems, there is an authorized security system, which restricts users assisting to their files in the organization. DBMS makes it easier to enforce security restrictions whilst the file management system is more difficult to implement security restrictions.
   8. Difficult to maintain Administration and describe the tasks performed by the DBA
   Text comes here.
   Database Administrator
   Database Administrator (DBA) is the person responsible for supervising the database and the use of DBMS in an organization.
   Tasks performed by DBA
   1. Defining the database
   2. Designing the database and enforcing the operational policies and procedures for its usage
   3. Controlling the access to the database
   4. Controlling privileges and permissions of database users
   5. Monitoring the database
   6. Planning hardware/ procedures if hardware failure occurs and ensuring that no data is lost
   7. Providing training to new employees about using the database
   8. Define database model and explain its types.
   Answer:
   Database model
   Database model is the theoretical foundation of a database and determines in which manner data can be stored, organized and manipulated. It defines a way of structuring data.
   Types of Database models
   There are following five database models which are as follows:
   1. Hierarchical Database Model
   2. Network Database Model
   3. Relational Database Model
   4. Object-Oriented Database Model
   5. Object Relational Database Model
   Hierarchical Database Model
   In a hierarchical model, data is organized in a tree like structure as shown in Fig 7.1.

Fig 7.1 Hierarchical Database Model
Fig 7.1 Hierarchical Database Model

It is a regular construct with owner and subordinate relationship.

Attributes and Owners
Data Network is a subsistence relationship and called members and these having subsistence are called owners. In a hierarchical structure, subordinates can have only a single owner and there is only one path to reach the root. The structure is very suitable if data is stored in hierarchical in the real world.
Relational Hierarchical model
In a relational model, a hierarchical model are table of contents, departments of an organization and types of hierarchy.
3. Network Database Model
Network Database Model is a structure in which some of the data elements can have more than one owner data element as shown in Fig 7.2

Fig 7.2 Network Database Model
Fig 7.2 Network Database Model

In network is a more complex structure than a hierarchical model. A hierarchical model can be thought of as a network with some restrictions imposed on it. In a network model, one member can belong to more than one set. Network model is a collection of records and sets.
3. Relational Database Model
In a relational database model, data is kept in tables as shown in Fig 7.3 and the tables are linked by means of common fields.

Fig 7.3 Table in a relational database
Fig 7.3 Table in a relational database

Relation
The "relation" in a relational database refers to the various tables in the database, which are linked with each other.
Table
A table in database consists of rows and columns. One row of table holds one record. Each column of table holds one field of the record.
Use of relational database model
Relational database model is used to make database management systems and is the backbone of any particular application. It is the most popular database model used in business applications.
4. Object Oriented Database Model
Object Oriented Database Model Object Database Management Systems (ODBMS) Object databases store objects rather than data such as integers, text, numbers and strings. Objects are used

in object oriented programming languages such as C++ and Java.
Characteristics of Real world
Real world objects have two characteristics, that is, state and behaviour.
Object
The object table has four states and five behaviours as shown in Fig 7.4.

Object	Attribute	Behaviour
Dog	Tail, Ears	Wag tail, Bark, Eat, Drink, Sleep
Car	Wheels, Door	Stop, Start, Accelerate, Turn, Reverse
Cat	Tail, Ears	Eat, Drink, Sleep, Purr, Scratch

Fig 7.4 Object and Behaviour of object Book
Fig 7.4 Object and Behaviour of object Book

An object stores its values in variables and exposes behaviours through functions or programming language.
Object Relational Database Model
An Object Relational Database (ORD) is a database management system similar to relational database, but with an object oriented data model integrated with it. Object oriented programming is an approach that is of relational database. The data models of the database and it is transferred to the database management system.
Q. Describe the steps involved in database design.
Answer:
Steps for designing database
Following steps are performed for designing database
1. Gathering the requirements and analyzing the requirements
Gather the requirements and analyze the requirements of the database, e.g. drafting out the sample reports and forms that are required from the database.
Step 2. Define Data, Objects and Specify the Properties
Once you have decided on the requirements of the database, gather the data that are needed to be stored in the database and specify the properties of the objects.
Choose one column or a few columns as the primary key, which uniquely identify the each of the objects.
Step 3. Create Relationships among Tables
Create relationships among the tables and unrelated tables serves little purpose. The power of relational database lies in the relationship that can be defined between tables. The most crucial aspect in designing a relational database is to identify the relationships among tables. The types of relationship are as follows:
1. One-to-many
2. Many-to-many
3. One-to-one
Step 4. Create a Normalize the Design
Refine and normalize the design by following steps
1. Adding more columns
2. Adding more tables, create data using one-to-one relationship
3. Split a table into two smaller tables
4. What is an E-R diagram? Explain with examples.
Answer:
E-R Diagram
Entity Relationship (ER) diagrams are used to define the conceptual view of a database. It is made up of entities and the associations among them. In case two, the ER model is a conceptual

good notion for designing databases. Key objects for example, entities, attributes of an entity, relationships, and cardinality of relationships. The ER model is represented with the help of an ER diagram. ER diagram is best used for the conceptual design of a database.
Entities and their attributes
Entities and their attributes
These concepts are as follows:

Fig 7.5 ER Diagram
Fig 7.5 ER Diagram

Entities in an ER Diagram is a real-world entity having properties called attributes. Every attribute is defined by a set of values called domain.
Example
In a college database, a Student is considered as an entity. Student has various attributes like roll number, name, age, class, etc.
Representation of entities
Entities are represented by means of rectangles. Rectangles are named with the entity set they represent. Fig 7.6 shows some entities.

Fig 7.6 Entities
Fig 7.6 Entities

2. Attributes
Attributes are properties of entities. Attributes are represented by means of ellipses. Every ellipse represents one attribute and is directly connected to its entity (rectangle).

Fig 7.7 Attributes
Fig 7.7 Attributes

Example
Fig 7.8 shows three attributes that is., Name, Roll No. and Standard of entity Student. The primary key attribute is underlined. Fig 7.8 shows the ER diagram.
3. Relationship
Relationship represents association among entities or called relationship. Relationships are represented by a diamond-shaped connector in the related ellipse. Fig 7.9 shows some relationships between entities.

Fig 7.11 Relationship Degree of a Relationship
Fig 7.11 Relationship Degree of a Relationship

Q. What is Normalization? Explain the following Normal Forms 1NF, 2NF, 3NF.
Answer:
Normalization
Normalization is a series of steps to create normal forms used to ensure that the entities are not repeated when information is needed. Updated or deleted.
First Normal Form
Text comes here. Let, there, up your data into to related data groups.
Normalization
It is a process that is used to the various form, process the data in a way that it is in a standard form.
Normalization is a series of steps to create normal forms used to ensure that the entities are not repeated when information is needed. Updated or deleted.
First Normal Form
Text comes here. Let, there, up your data into to related data groups.
Normalization
It is a process that is used to the various form, process the data in a way that it is in a standard form.

Student ID	Name	Address	Course	Tutor	Fee
001	Raja Khan	45 GEMS	DCOM	Introduction to Computer Science	400
002	Ram Kumar	45 GEMS	DBA	Using Internet Business	400
003	Kapil Ali	23/67 B	DCOM	Computer Science	400
004	Ashok Kumar	23/67 B	DCOM	Using Internet Business	400
005	Kapil Ali	23/67 B	DCOM	Introduction to Computer Science	400
006	Ashok Kumar	67/38	DCOM	Using Internet Business	400
007	Ashok Kumar	67/38	DCOM	Using Internet Business	400

In the definition, the first attribute is the primary key. Student ID, Name, Address, Course, Tutor, Fee. Repeating Attributes are the values for each of the different Student entries. The minimum data set for the Student table is Student ID, Name, Address, Course, Tutor, Fee.
The case of the course form takes the table into two and create form 2 part. The repeated information in the table is removed. This will create the new tables shown in Fig 7.12

Student ID	Name	Address	Course
001	Raja Khan	45 GEMS	DCOM
002	Ram Kumar	45 GEMS	DBA
003	Kapil Ali	23/67 B	DCOM
004	Ashok Kumar	23/67 B	DCOM
005	Kapil Ali	23/67 B	DCOM
006	Ashok Kumar	67/38	DCOM
007	Ashok Kumar	67/38	DCOM

Course ID	Tutor	Fee
DCOM	Introduction to Computer Science	400
DBA	Using Internet Business	400

Fig 7.12 Table in First Normal Form
Fig 7.12 Table in First Normal Form

The other normal forms are also obtained in a similar way by further breaking up the tables and removing repeating information if it exists.
Second Normal Form (Removes Partial Functional Dependencies)
To move into second normal form, all partial functional dependencies must be removed. Partial functional dependencies occur when there is a composite key and only one part of the key is needed to determine the value of a column. In the case of the course form, the course name is dependent on just the partial functional dependencies not on item table, creating two tables from one.
Explanation
In the example, we have to further check if we are keeping cross data from we need to or not. Assume if we look at Fig 7.13 we can see that the course information is dependent on the course ID. Course information is not dependent on the student ID. Course information is not dependent on the tutor. We can confirm the dependence of course information on the course ID. Confirmed is only dependent on course ID. We can remove the course information from the table. We can see that there are no dependencies that are removed. When we apply the rules of second normal form and remove the partial functional dependency in our database, we get the following tables shown in Fig 7.13, which are in second normal form.

StudentID	StudentID
001	DCOM1
002	DBA1
003	DCOM1
004	DCOM1
005	DCOM1
006	DCOM1
007	DCOM1

DCOM1	DCOM1
DCOM1	Database Design
DCOM1	Computer Science
DCOM1	Operating System
DCOM1	Internet Business
DCOM1	Accounting

DCOM1	DCOM1
DCOM1	Operating System
DCOM1	Internet Business
DCOM1	Accounting

DCOM1	DCOM1
DCOM1	Database Design
DCOM1	Computer Science
DCOM1	Operating System
DCOM1	Internet Business
DCOM1	Accounting

Fig 7.13 Table in Second Normal Form
Fig 7.13 Table in Second Normal Form

Third Normal Form (Removes Transitive Functional Dependencies)
Third normal form is achieved when all the tables are in second normal form and transitive functional dependencies must be removed. Similar to partial functional dependencies, transitive functional dependencies occur when a non-key attribute can determine another non-key attribute. Transitive dependencies are removed by breaking up the tables into smaller tables. Transitive dependency is another case in keeping the relationships in the right place.

CourseCode	CourseName
DCOM1	Computing
BUSINESS	E-Commerce

Fig 7.14 Table in Third Normal Form
Fig 7.14 Table in Third Normal Form

CASE STUDY – LAB ACTIVITIES

Following lab activities are to be carried out during the practice periods.
1. A city has many universities and each university has many departments. Each department has many teachers. Define the attributes for the entities, university, department and teacher and draw the ER diagram.
   Practical Work
2. A company with many products to their customers. There are many suppliers who supply various product products. Draw the E-R diagram of entities, company, supplier and customer.
   Practical Work
3. In a college there many courses. A student is allowed to register to only one course at a time. A course has many students. Draw the E-R diagram of entities, course and student.
   Practical Work
4. A city has many Cable TV companies. Each company has many TV channels. A customer subscribes Cable TV from only one company. Draw the E-R diagram of entities, Cable TV company, channel and customer.
   Practical Work

Explanation
In our example above, we have CourseName that is dependent on CourseCode and CourseCode is dependent on CourseID. We can see that CourseCode is dependent on CourseID. We can see that the instructor dependencies have been removed. Since the E-R diagram represents our design, we can see that the relationships are shown as follows: CourseCode is foreign key in the first table and CourseCode is primary key in the second table.

CourseID	CourseCode
DCOM1	Computing
BUSINESS	E-Commerce

Fig 7.15 Table in Third Normal Form
Fig 7.15 Table in Third Normal Form

CASE STUDY – LAB ACTIVITIES

Following lab activities are to be carried out during the practice periods.
1. A city has many universities and each university has many departments. Each department has many teachers. Define the attributes for the entities, university, department and teacher and draw the ER diagram.
   Practical Work
2. A company with many products to their customers. There are many suppliers who supply various product products. Draw the E-R diagram of entities, company, supplier and customer.
   Practical Work
3. In a college there many courses. A student is allowed to register to only one course at a time. A course has many students. Draw the E-R diagram of entities, course and student.
   Practical Work
4. A city has many Cable TV companies. Each company has many TV channels. A customer subscribes Cable TV from only one company. Draw the E-R diagram of entities, Cable TV company, channel and customer.
   Practical Work

Q.1 Select the correct choice from the following questions.

1. It is the raw material given as input to the computer for processing:
   A. Data B. Information C. Data D. Delta
2. It is a collection of related files that are usually integrated, linked or cross-referenced to one another:
   A. Database B. Data modelling C. Data analysis D. Data modification
3. It is a set of programs that allow users to create, maintain and manipulate database, and store or retrieve data from those database files:
   A. DBA B. DBMS C. ACCA D. CCNA
4. Its main purpose is to improve data sharing, data access, decision-making and increase end user productivity:
   A. DBA B. DBMS C. ACCA D. CCNA
5. Microsoft Access is an application of:
   A. DBMS B. Office Management
   C. Graphic designing D. Web designing
6. Microsoft SQL Server is an application of:
   A. DBMS B. Office Management C. Graphic designing D. Web designing
7. Sybase is an application of:
   A. DBMS B. Office Management
   C. Graphic designing D. Web designing
8. Oracle is an application of:
   A. DBMS B. Office Management
   C. Graphic designing D. Web designing
9. If data is not updated in any file, it causes:
   A. Data inconsistency B. Data redundancy
   C. Data overflow D. Invalid data
10. This is the person responsible for supervising the database and the use of DBMS in an organization:
    A. DBA B. Hardware engineer C. Software engineer D. System analyst
11. It defines a way of structuring data:
    A. Database B. Data model C. Data analysis D. Data modification
12. In this model, data is organized into a tree-like structure:
    A. Hierarchical Database Model B. Network Database Model
    C. Relational Database Model D. Object-Oriented Database Model
13. It is a logical construct with owner and subordinate relationship:
    A. Hierarchical Database Model B. Network Database Model
    C. Relational Database Model D. Object-Oriented Database Model
14. It is a logical structure in which some of the data elements can have more than one owner data element:
    A. Hierarchical Database Model B. Network Database Model
    C. Relational Database Model D. Object-Oriented Database Model
15. In this model, data is held in tables and the tables are linked by means of common fields:
    A. Hierarchical Database Model B. Network Database Model
    C. Relational Database Model D. Object-Oriented Database Model
16. In this model, the data resides in the database and is manipulated collectively with queries in a query language:
    A. Hierarchical Database Model B. Object Relational Database Model
    C. Relational Database Model D. Object-Oriented Database Model

17. SQL stands for:
    A. Structured Query Language B. Structured Query List
    C. Simple Query Language D. Simple Query List
18. It is a computer language for defining different data structures:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language, D. Data Structure Language
19. To create objects in a database model, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
20. To alter the structure of the database, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
21. To delete objects from the database, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
22. It is used to manage or manipulate data:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
23. To retrieve data from a database, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
24. To insert data into a table, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
25. To update existing data within a table, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
26. To delete records from a table, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
27. It is used for controlling the data:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
28. To allow specified users to perform specific tasks, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
29. To disallow specified users from performing specified tasks, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
30. To cancel previously granted or denied permissions, is the task of:
    A. Data Definition Language B. Data Manipulation Language
    C. Data Control Language D. Data Structure Language
31. It is a file that contains data about a single entity:
    A. Database Table B. Record C. Field D. Relation
32. A collection of related fields treated as a single unit is called:
    A. Database Table B. Record C. Field D. Relation
33. In relational database, rows are also known as:
    A. Field B. Relation C. Attribute D. Tuples
34. It is part of a record and contains a single piece of data for the subject of the record:
    A. Database Table B. Record C. Field D. Entity
35. In a relational database, records are stored in files called:
    A. Tables/Relations B. Record C. Field D. Entity

36. This data type is used to store text and combinations of text and numbers:
    A. Integer B. Real Numbers C. Boolean Data D. Character
37. This data type is used to store whole numbers such as 34 and 2073:
    A. Integer B. Real Numbers C. Boolean Data D. Character
38. This data type is used to store numbers that have fractional part such as 23.75:
    A. Integer B. Real Numbers C. Boolean Data D. Character
39. This data type is used for True or False values:
    A. Integer B. Real Numbers C. Boolean Data D. Character
40. Each entity in a database must have a unique key field known as _____ to identify a record:
    A. Candidate or Alternate Key B. Secondary Key
    C. Foreign Key D. Primary Key
41. It is a column, or set of columns, in a table that can uniquely identify any database record without referring to any other data:
    A. Candidate or Alternate Key B. Secondary Key
    C. Foreign Key D. Primary Key
42. It is made on a field that you would like to be indexed for faster searches:
    A. Candidate or Alternate Key B. Secondary Key
    C. Foreign Key D. Primary Key
43. It is a field or collection of fields in one table that uniquely identifies a row of another table or the same table:
    A. Candidate or Alternate Key B. Secondary Key
    C. Foreign Key D. Primary Key
44. In this step the nature and scope of the problem, to be solved, is identified and the problem is clearly defined:
    A. Problem Identification/Definition B. Feasibility Study
    C. Requirement AnalysisD. Identify Entities and Attributes
45. Its purpose is to find one or more solutions of the problem and to suggest the most desirable and economical solution
    A. Problem Identification/Definition B. Feasibility Study
    C. Requirement Analysis D. Identify Entities and Attributes
46. Its purpose is to obtain thorough and detailed understanding of the problem:
    A. Problem Identification/Definition B. Feasibility Study
    C. Requirement Analysis D. Identify Entities and Attributes
47. It identifies the highest-level relationships between different entities:
    A. Conceptual Data Modeling B. Enterprise Data Modeling
    C. Logical Data Modeling D. Physical Data Modeling
48. It addresses the unique requirements of a specific business:
    A. Conceptual Data Modeling B. Enterprise Data Modeling
    C. Logical Data Modeling D. Physical Data Modeling
49. It illustrates the specific entities, attributes and relationships involved in a business function:
    A. Conceptual Data Modeling B. Enterprise Data Modeling
    C. Logical Data Modeling D. Physical Data Modeling
50. It represents an application and database-specific implementation of a logical data model:
    A. Conceptual Data Modeling B. Enterprise Data Modeling
    C. Logical Data Modeling D. Physical Data Modeling
51. Entities are represented by means of:
    A. Rectangles B. Squares C. Circles D. Parallelograms
52. Attributes are represented by means of:
    A. Rectangles B. Squares C. Ellipses D. Parallelograms
53. Relationships are represented by:
    A. Rectangles B. Squares C. Ellipses D. Diamond symbols

54. When only one instance of an entity is associated with the relationship, it is marked as:
    A. 1:1 B. 1:2 C. 1:3 D. 1:N
55. When more than one instance of an entity is associated with a relationship, it is marked as:
    A. 1:1 B. 1:2 C. 1:3 D. 1:N

Answers:

1.	Data	2.	Database
3.	DBMS	4.	DBMS
5.	DBMS	6.	DBMS
7.	DBMS	8.	DBMS
9.	Data inconsistency	10.	DBA
11.	Data model	12.	Hierarchical Database Model
13.	Hierarchical Database Model	14.	Network Database Model
15.	Relational Database Model	16.	Object Relational Database Model
17.	Structured Query Language	18.	Data Definition Language
19.	Data Definition Language	20.	Data Definition Language
21.	Data Definition Language	22.	Data Manipulation Language
23.	Data Manipulation Language	24.	Data Manipulation Language
25.	Data Manipulation Language	26.	Data Manipulation Language
27.	Data Control Language	28.	Data Control Language
29.	Data Control Language	30.	Data Control Language
31.	Database Table	32.	Record
33.	Tuples	34.	Field
35.	Tables/Relations	36.	Character
37.	Integer	38.	Real Numbers
39.	Boolean Data	40.	Primary Key
41.	Candidate or Alternate Key	42.	Secondary Key
43.	Foreign Key	44.	Problem Identification/Definition
45.	Feasibility Study	46.	Requirement Analysis
47.	Conceptual Data Modeling	48.	Enterprise Data Modeling
49.	Logical Data Modeling	50.	Physical Data Modeling
51.	Rectangles	52.	Ellipses
53.	Diamond symbols	54.	1:1
55.	1:N		

Q.2 Give short answers of the following questions.

Q1: Define data.

Ans. Data refers to the facts and figures in raw form i.e. not in organized form. Data is the raw material given as input to the computer for processing.

Q2: Define information.

Ans. Information is the processed or organized form of data. When the computer processes data and it is properly arranged and organized, it is converted to information. It is also called the output of computer and is the meaningful form of data.

Q3: Define File Management System.

Ans. A file (or file based) management system is a collection of programs used for managing data stored in various files. Each program within a file management system is developed independently and it defines and manages its own data.

Q4: Define database.

Ans. A database is a collection of related data.

Q5: What is meant by DBMS?

Ans. A database management system (DBMS) is a set of programs that allow users to create, maintain and manipulate database, and store or retrieve data from those database files. It provides user-friendly access and controls between user and database. Its main purpose is to improve data

54. When only one instance of an entity is associated with the relationship, it is marked as:
A. 1:1 B. 1:2 C. 1:3 D. 1:N

55. When more than one instance of an entity is associated with a relationship, it is marked as:
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Answers:

1.	Data	2.	Database
3.	DBMS	4.	DBMS
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7.	DBMS	8.	DBMS
9.	Data inconsistency	10.	DBA
11.	Data model	12.	Hierarchical Database Model
13.	Hierarchical Database Model	14.	Network Database Model
15.	Relational Database Model	16.	Object Relational Database Model
17.	Structured Query Language	18.	Data Definition Language
19.	Data Definition Language	20.	Data Definition Language
21.	Data Definition Language	22.	Data Manipulation Language
23.	Data Manipulation Language	24.	Data Manipulation Language
25.	Data Manipulation Language	26.	Data Manipulation Language
27.	Data Control Language	28.	Data Control Language
29.	Data Control Language	30.	Data Control Language
31.	Database Table	32.	Record
33.	Tuples	34.	Field
35.	Tables/Relations	36.	Character
37.	Integer	38.	Real Numbers
39.	Boolean Data	40.	Primary Key
41.	Candidate or Alternate Key	42.	Secondary Key
43.	Foreign Key	44.	Problem Identification/Definition
45.	Feasibility Study	46.	Requirement Analysis
47.	Conceptual Data Modeling	48.	Enterprise Data Modeling
49.	Logical Data Modeling	50.	Physical Data Modeling
51.	Rectangles	52.	Ellipses
53.	Diamond symbols	54.	1:1
55.	1:N		

Q2: Give short answer of the following questions

Q1: Define data.
Ans. Data refers to the facts and figures in raw form i.e. not in organized form. Data is the raw material given as input to the computer for processing.

Q2: Define information.
Ans. Information is the processed or organized form of data. When the computer processes data and it is properly arranged and organized, it is converted to information. It is also called the output of computer and is the meaningful form of data.

Q3: Define File Management System.
Ans. A file (or file based) management system is a collection of programs used for managing data stored in various files. Each program within a file management system is developed independently and it defines and manages its own data.

Q4: Define database.
Ans. A database is a collection of related data.

Q5: What is meant by DBMS?
Ans. A database management system (DBMS) is a set of programs that allow users to create, maintain and manipulate database, and store or retrieve data from those database files. It provides user-friendly access and controls between user and database. Its main purpose is to improve data

sharing, data access, decision making and increase end user productivity.

Q6: Which operations are included in manipulation of data?
Ans. Manipulation of data includes the following operations:
- Adding new data
- Deleting unwanted data.
- Changing existing data
- Select Query
- Update Query
- Delete Query
- Append Query
- Make Table Query

Q7: What are the responsibilities of DBMS?
Ans. The DBMS helps to create an environment in which users have better access to data. DBMS helps to give an integrated view of the organizator's operations. The DBMS makes it possible to share the data in the database among multiple applications and users.

Q8: Give some examples of the database systems managed by DBMS.
Ans. Some examples of the database systems managed by DBMS are,
- Customer information system
- Inventory information
- Library management
- Accounting and bookkeeping

Q9: Give some examples of DBMS software.
Ans. Examples of DBMS software include
- Microsoft Access
- Microsoft SQL Server
- Sybase
- Oracle
- MySQL

Q10: Which problems were faced in file management system?
Ans. The following problems were faced in file management system:
- Reduced Data Redundancy
- Data consistency
- Program-Data Dependency
- Lack of Flexibility
- Data not Sharable
- Backup and Recovery
- Data Security

Q11: Who is database administrator?
Ans. Database Administrator (DBA) is the person responsible for supervising the database and the use of DBMS in an organization.

Q12: Write down any four responsibilities of DBA.
Ans. DBA has the following responsibilities.
- Designing the database and enforcing the operational policies and procedures for its usage.
- Planning security measures and backup of database.
- Controlling privileges and permissions of database users.
- Allocating passwords to users.

Q13: What is meant by database model?
Ans. A database model is the theoretical foundation of a database and determines in which manner data can be stored, organized and manipulated. It defines a way of structuring data.

Q14: How many types of database models are there?
Ans. There are five types of database models
- Hierarchical Database Model
- Network Database Model
- Relational Database Model
- Object-Oriented Database Model
- Object Relational Database Model

Q15: Define members and owners in hierarchical structure.
Ans. Data elements in a subordinate relationship are called members and those having subordinates are called owners. In a hierarchical structure, subordinates can have only a single owner and there is only one data element that has no owner. This structure is very suitable in describing many relationships in the real world.

Q16: Give some examples of the hierarchical database model.
Ans. Some examples of hierarchical model are table of contents, departments of an organization and types of memories.

Q17: Define relation in a relational database model.
Ans. The "relation" in a relational database refers to the various tables in the database, which are linked with each other.

Q18: Write down the use of relational database model.
Ans. The relational database model is used to make database management systems more independent of any particular application. It is the most popular database model used in business applications.

Q19: What is meant by SQL?
Ans. SQL (Structured Query Language) is a standard language for accessing and manipulating databases.

Q20: How many types of SQL languages are for relational databases?
Ans. There are three types of SQL languages for relational databases. These are:
- Data Definition Language
- Data Manipulation Language
- Data Control Language

Q21: What are the important tasks of DDL?
Ans. Some important tasks of DDL are:
- To create objects in a database model
- To alter the structure of the database
- To delete objects from the database

Q22: Give some examples of DML tasks.
Ans. Some examples of DML tasks are:
- To retrieve data from a database
- To insert data into a table
- To update existing data within a table
- To delete records from a table

Q23: What are the important tasks of DCL?
Ans. Some important tasks of DCL are:
- To allow specified users to perform specific tasks
- To disallow specified users from performing specified tasks

- To cancel previously granted or denied permissions

Q24: What is meant by effective DBMS?
Ans. An effective DBMS provides users with timely, accurate and relevant information. This information is stored in computer files, which needs to be suitably organized and properly maintained so that users can easily access the information they need.

Q25: Define database table.
Ans. A database table is a file that contains data about a single entity. An entity can be a person, place or event, etc.

Q26: State the composition of database table.
Ans. A database table is composed of rows and columns. Rows hold the records and columns hold the fields. Data item is inserted at each row and column intersection. Tables are also called relations in RDBMS.

Q27: How many types of keys are used in database?
Ans. The following are the types of keys used in databases:
- Primary Key
- Candidate or Alternate Key
- Secondary Key
- Foreign Key

Q28: Define candidate key or alternate key.
Ans. A key field that can act as a primary key field in a table to unique identifies each record but it is not chosen, as primary key is known as candidate or alternate key.

Q29: What is meant by foreign key?
Ans. A key field used in a relationship between tables whose value matches a primary key in the other table is known as foreign key.

Q30: Define database planning.
Ans. Database planning is a systematic approach to the development of database that moves from concept to design and development to implementation.

Q31: How a database should be planned?
Ans. Database should be planned in a systematic way to save time, efforts and make it perform the expected tasks. The time and work required to plan a database depends on its complexity.

Q32: Which steps are involved in planning a database?
Ans. The following steps are involved in planning a database:
- Problem Identification/Definition
- Feasibility Study
- Requirement Analysis
- Identify Entities and Attributes
- Assigning Names to Tables and Columns

Q33: Which steps are included in feasibility study?
Ans. Feasibility study includes the following steps:
- Investigate the problem
- Find out all the possible solutions available
- Study all the solutions to determine their feasibility
- List the issues with each solution
- Select the preferred solution for implementation
- Document the results in a feasibility report

Q34: Which diagram is called Entity-Relationship diagram (ERD)?
Ans. Data modeling is the process of designing logical structure of a database with a diagram using text and symbols to represent the way data needs to flow. This diagram is called Entity-Relationship diagram (ERD).

Q35: Write a short note on data models.
Ans. Data models define how data is connected to each other and how they are processed and stored inside the system. Data models are built during the analysis and design phases of a project to ensure that the requirements for a new application are fully understood. A data model can be thought of as a diagram or flowchart that illustrates the relationships between data. Well-documented conceptual, logical and physical data models allow stake-holders to identify errors and make changes before any programming code has been written.

Q36: Define entity.
Ans. An entity is a thing of interest to an organization about which data is to be held.

Q37: Define relationship.
Ans. A relationship is a link or association between entities.

Q38: On which factors, ER model is based on?
Ans. ER Model is based on:
- Entities and their attributes
- Relationships among entities

Q39: Define degree of the relationship.
Ans. The number of participating entities in a relationship is known as the degree of the relationship.

Q40: Define one-to-one relationship.
Ans. When only one instance of an entity is associated with the relationship, it is marked as '1:1' and is called one-to-one relationship.

Q41: Define one-to-many relationship.
Ans. When more than one instance of an entity is associated with a relationship, it is marked as '1:N' and is called one-to-many relationship.

Q42: Define many-to-many relationship.
Ans. When more than one instance of an entity on the left and more than one instance of an entity on the right can be associated with the relationship, it is called many-to-many relationship.

Q43: How to get first normal form?
Ans. To get to first normal form, we break up our data into its related data groups.