Assignment -1-

Vivek.V.pai
1DB18IS098
Database Managenet System [18CS53]

1) Discuss the main characteristics of the database approach?

* Main charactoristics of the database approach.

①. Self-describing nature of a database system:

* A database system includes in addition to the data stored that is of relevance to the organization. a complete definition of database's structure its contraints
* The meta data is stored in the so called 'system catalog' which contains a description of the structure of each file, the type storage format of each field, and the various constraints on the data.

②. Insulation between programs and data;

Program - Data independance:

In traditional file processing the structure of the data files accesed by an application is "hard-coded" in its source code.

Eg:- COBOL program - it gives a detailed description of the layout of the records in a file by describing, for each field, how many bytes it occupies.

* DBMS provides a conceptual (or) logical view of the data to application programs, so that the underlying implementation may be changed without the programs being modified.

Data Absorption:

- A data model is used to hide storage details and present the users with a conceptual view of the data base.
- Programs refer to the data model constructs rather than data storage details

2) Discuss advantages of using the DBMS approach.

* Controlling redundancy in data storage and in development and maintainence efforts. i.e avoids duplication, saves storage space & inconsistency.
* Restricting unauthorised acess to data. Only the DBA staff uses previlaged commands and facilities.
* Providing persistent storage for program objects (compatible with programming languages) i.e converting object suitable for file format and file format back to objects
* Providing storage structures [uses auxilary files called indexes] for efficient query processing.
* Providing backup & recovery services [against hardware and software failures]
* Representing complex relationships among data.
* Providing multiple interfaces to different classes of users (mobile users, casual users, application programmers, etc.)

* Enforcing integrity constraints on the database.
[Eg: defining data types for data items]
Eg: integrity constraints, key/uniqueness constraints

3) Explain with a diagram a simplified database system environment.

* To define the above database, we must specify the structure of the records of each file by specifying the different types of data elements to be stored in each record.

* STUDENT table includes name, student number, class, major.

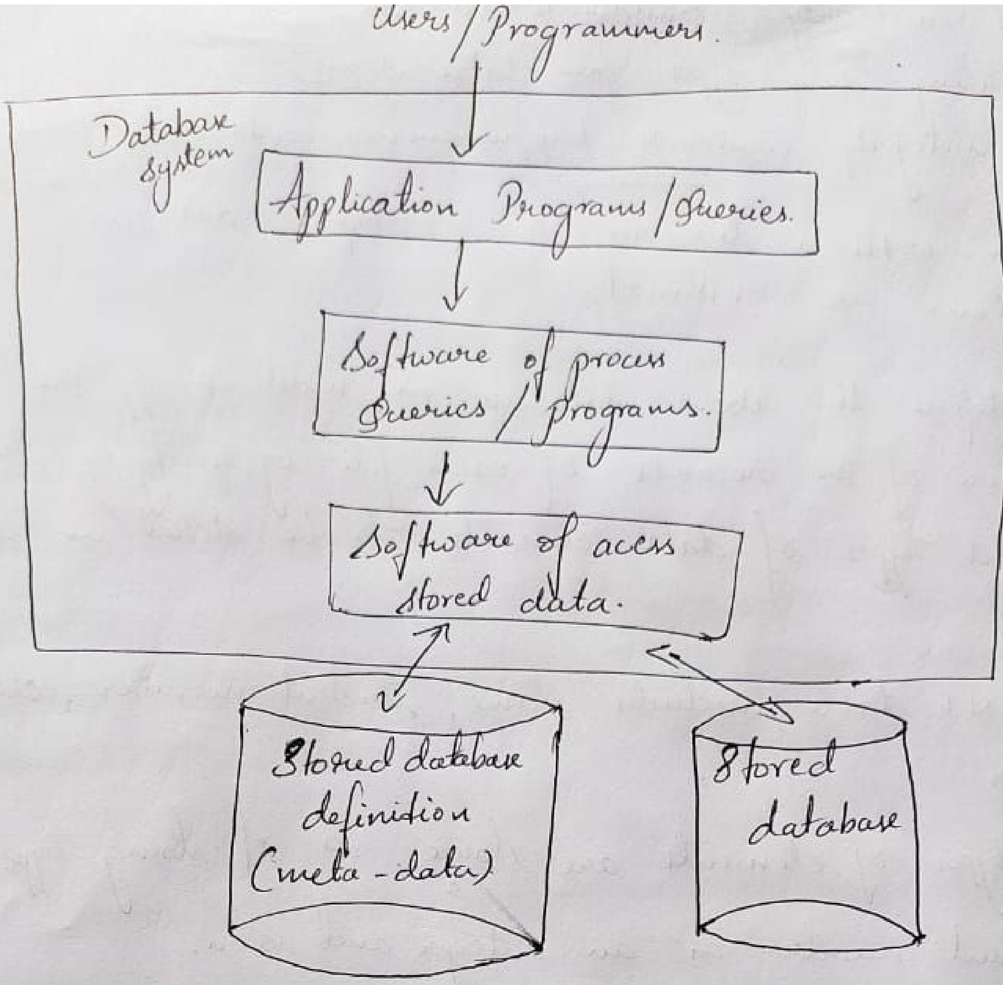
* Datatypes of elements are Name, is of string type, student number is an integer and so on.

* Manipulation involves quering and updating.

* Queries are retreving the transcript.

* Updating include change in class of particular student.

* Users / programmers use database s/m and database software.


Users / Programmers.
Database system
Application Programs / Queries.
Software of process Queries / Programs.
Software of acess stored data.
Stored database definition (meta-data)
Stored database

4) Define following.

(1) Data model:

A collection of concepts that can be used to describe the conceptual logical structure of database - provides the necessary means to achieve the abstraction.

(2) Database schema:

The description of a database, includes description of the database structure, datatypes, & the contraints on the database.

Specified during database design, not expected to change frequently.

(3) Conceptual schema:

Conceptual schema at the conceptual level to describe the structure & constraints for the whole database for a community of users. Uses a conceptual @ an implementation data model.

(4) Data independance:

Data independance is the capacity to change the schema at one level of the architecture without having to change the schema at the next higher level.

5) Describe the three schema architecture. Why do we need mapping among schema levels?

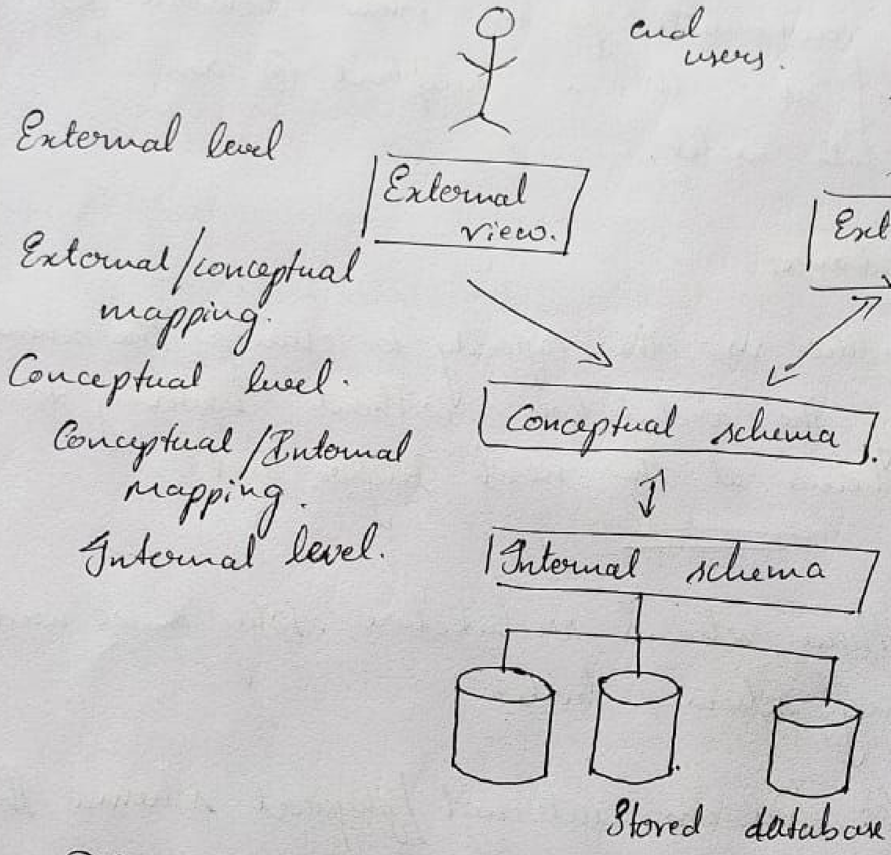
(i) internal level: has an internal/physical schema that describes the physical storage structure of the database using a low-level data models.

(ii) Conceptual level: has a conceptual scheme describing the structure of the whole database for a community of users.

It hides physical storage details, concentrating upon describing entities, data types, relationships, user queries and constraints can be described using either high-level (or) implementation data model.

database syste...

(iii) External / View level: includes a number of external schemes, each of which describes part of the database that a particular category of users is interested in, hiding rest of database.



→ * DBMS must transform a request specified on an external schema into a request against conceptual schema & then into a request on the internal schema for processing over the stored data.

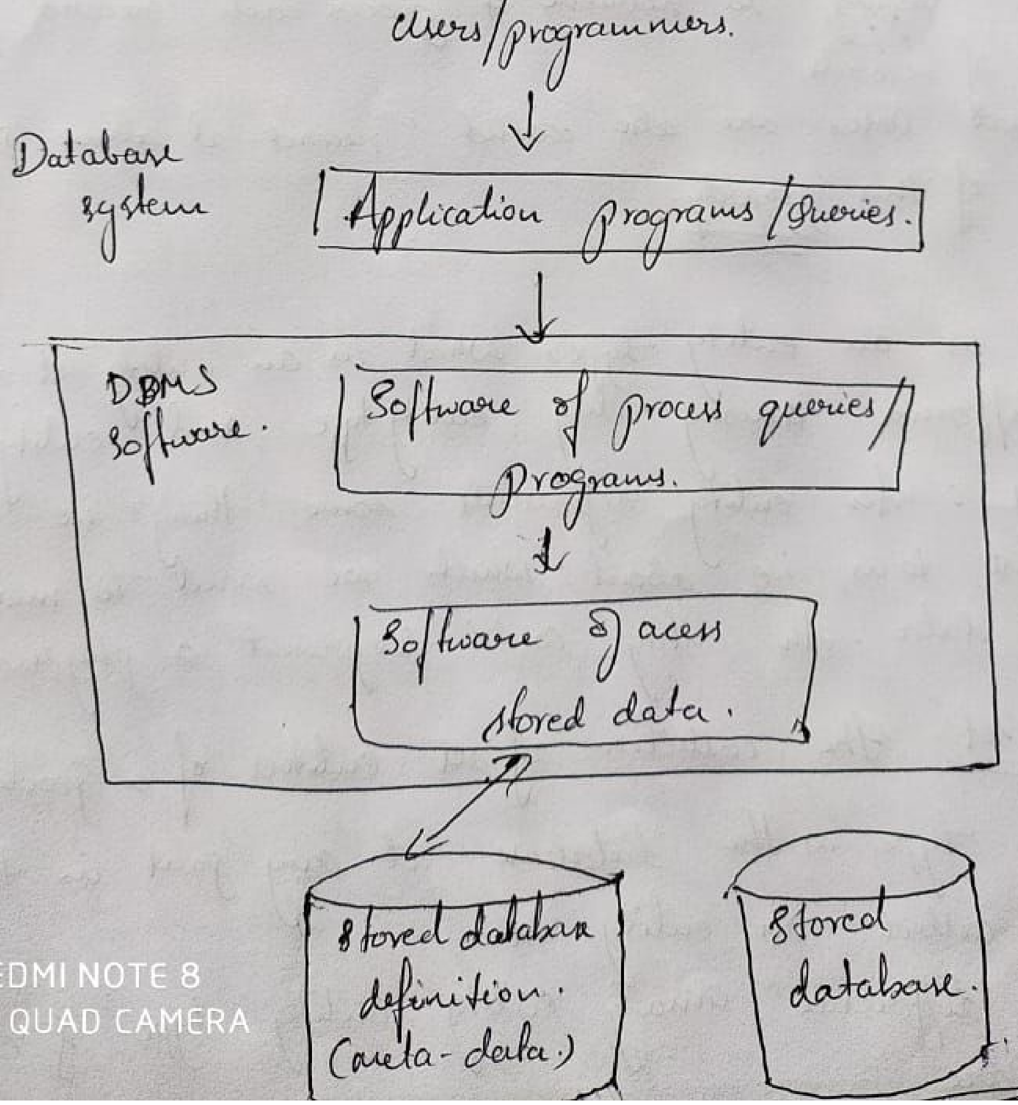
* If a request is a database retrieval, data extracted from the stored database must be reformatted to match user's external view

* This process of transferring results of requests b/w levels are called Mappings.

* DBMS which meat to support small database donot support mapping as it is time consuming.

6) With a neat diagram briefly explain databae system environmed.

- * The above databae statement, we must specify the structure of records of the each file by specifying the different types of data elements to be stored in each record.
- * STUDENT table includes name, student numbers, class major
- * Manipulation involves quering and uploading, updating
- * Datatypes of elements are name is of storing type student - number is an integer and so on.
- * Queries are retreviens the transcript.
- * Updating include change in class of particular student.
- * Users / programmers use database system and databae software.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Database system
Application programs / Queries.
DBMS Software.
Software of process queries / Programs.
Software of acess stored data.
Stored databae definition. (meta-data.)
Stored database.

→ Why low level are also called record-at-a time DML's and high level DML's are called set-at-a time DML's.

- * A high level DML. Many DBMS allow high level DML statements either to be entered interactively from a display monitor @ a terminal @ to be embedded in a general purpose programming language.
- * High level DML's, such as SQL, can specify and retrive many records in a single DML statement: therefore, they are called set-at-a-time DMLs
- * A low-level @ procedural DML must be embedded in a general purpose programming language. This type of DML retrives individual records @ objects from the database & process each separately.
- * Therefore, it needs to use programming language constructs such as looping, to retrieve & process each record from a set of records.

Low level DMLs are also called 'record-at-atime DML's because of this property.

8) What is an entity type? What is an entity set, Explain the difference among entity, entity type and entity set.

→ Entity : An entity represents some 'thing' i.e of interest to us, i.e, about which we want to maintain some data. An entity could represent a physical object

Entity set: The collection of all entities of a particular entity type in the database at any point in time is called an entity set.

The difference among entity, entity type & entity set are

The difference among entity, entity type & entity set are.

entity: It is something which has real existence

Entity type: It is collection of entity having common attributes.

Entity set: It is a set of entities of same entity type.

Student → Entity type.

Roll no	Student name	Age	
1	Angel	18	→ Entity 1 (E_1)
2	priya	20	
3	Andrew	22	→ Entity 2 (E_2)

entity set. [E_1 E_2]

9) Explain the difference between single valued attribute and a multivalued attribute.

* Most attributes have a single value for a particular entity; Such attributes are called single - valued.

* In some cases an attribute can have a set of value for the same entity.

* for instance, a colors attribute for a car, @ a college degree attribute for a person.

* Cars with one color have a single value, whereas two - time cars have two color values.

* Similarly, one person may not have any college degrees, another person may have one, and a third person may have two @ more degrees;

* Such attributes are called multivalued.

* A multivalued attribute may have lower & upper bounds to constrain the number of values allowed for each individual entity

10> What does the participating contraints specify? What are the two types of participating constrains?

* The participation contraint specifies whether the existence of an entity depends on its being related to another entity via the relationship type

There are 2 types of participation constrains.

1. total 2. partial.

1. Total participation constraint:

* It specifies that each entity present in the entity set must mandatorily participate in atleast one relationship instance of that relationship set, of this reason, it is also called as mandatory participation.

It is represented using a double line between the entity set and relationship set.

Eg: * It specifies that each student must be enrolled in atleast one course where the "student" is the entity set & relationship "enrolled in" signifies total participation.

* It means that every student must have enrolled at least one course.

2. Partial participation:

* It specifies that each entity, in the entity set may @ maynot participate in the relationship instance of the relationship set is also called as optional participation.

* It is represented using a single line b/w the entity set & relationship set in the ER diagram.

Eg: A single line b/w the entities i.e courses & enrolled in a relationship signifies the partial participation, which means there might be some courses where enrollments are not made i.e enrollments are optional in that case