Unit-1

* Earlier file process system was used. The main problems of FS FPS were —
  (i) Data Redundancy and Inconsistency
      ↳ Duplicacy
  (ii) Difficulty in accessing data
  (iii) Data Isolation - Because data are scattered in various files and files may be in different format, writing new application programs to retrieve the appropriate data is difficult.
  (iv) Integrity Problems.
      ↳ Honesty.
  (v) Atomicity Problems
  (vi) Concurrent Access Anomaly ~~Anomaly~~ Defect.

31st Jan' 2020.

View of Data:

A major purpose of a database design is to provide users with an ~~database~~ abstract view of the data that is the system hides certain details of how ~~that~~ the data are stored and maintain.

Data Abstraction:

Since many database system users are not computer trained, developers hides the complexity from users through several levels of abstraction to simplify users interaction with the system.

Levels of Data Abstraction:

(i) **Physical level:** (Lowest level of abstraction)
It describes how the data are actually stored. The physical level describes complex low level data structures in details.

(ii) **Logical Level:**
The next higher level of abstraction describes what data are stored in the database and what relationships exist among those data. Database administrators, who must decide what information to keep in the database, use the logical level of abstraction.

(iii) **View level:** (Highest level of abstraction)
It is the highest level of abstraction which describes only a part of the database

Instance:

Databases change overtime as information is inserted or deleted. The collection of information stored in a database at a particular moment is called Instance of Database. Instance changes continuously.

Schema:

The one or design of database is called database schema. Schemas are changed infrequently

If and or

Schemas are of three types:
(i) Physical Schema
(ii) Logical Schema
(iii) View Schema or Sub Schema - used to hide some specific information.

Data Models:

A data model is a collection of conceptual tools for describing data, data relationships, data semantics and consistency constraints.

(i) Entity Relationship Model (ER Model) → (Real world object).
(ii) Relational Model

Entity Relationship Model:

ER Model is a perception of a real world that consists of a collection of basic objects called Entities and of relationships among these objects. Entities are described in a database by a set of attributes. A relationship is an association among several entities.

Component Uses:

Rectangles  → Entity sets

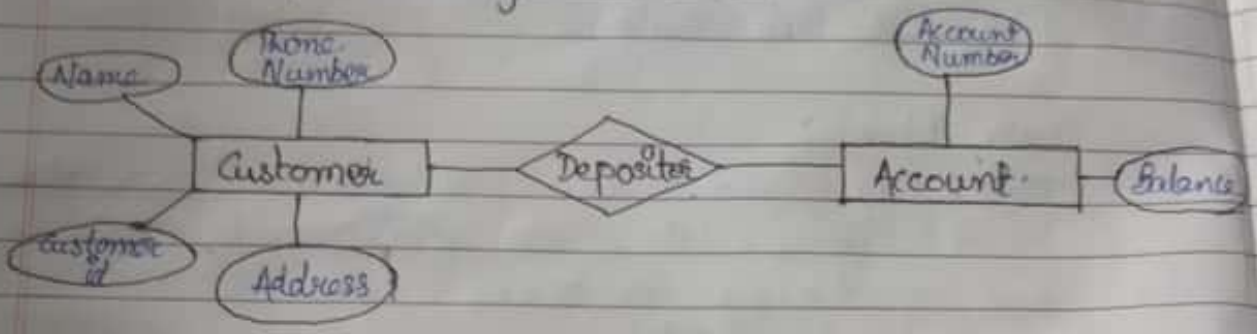
Ellipse  → Attributes

Ramond  → Relationships among entity sets.

Lines ——— → links between entity sets and relationships

ER Model:

Bank Account of Consumer:



Relational Model:

Entity Table —

Customer.

Customer id	Name	Phone number	Address
01	ABC	99	X
02	XYZ	88	Y
03	PQR	77	Z

Account.

Account no.	Balance.
123	55
321	100
111	200

Entity Sets.

Relationship table:

Depositor

Customer id	Account no.
03	111
01	321
02	123.

Data Independence:

It can be defined as the capacity to change the schema at one level of a data base system without having to change the schema at the next higher level.

(i) Logical data independence:

It is the capacity to change the conceptual schema without having to change external schemas or application programs.

(ii) Physical data independence:

It is the capacity to change the internal schema without having to change the conceptual schema hence the external schemas need not be changed as well.

Languages:

DDL: Data Definition language.
DML: Data Manipulation language

Date - 3rd Feb, 2020.

The four operation being performed on data (in DML)-
(i) Retrival
(ii) Insertion
(iii) Deletion
(iv) Modification

A DML is a language that enables users to access or manipulate data as organised by the appropriate data models.

Query – A statement of request for retrieval of information from any database. The statement use to write this language is known as query language.

DML are of two types –

(i) Procedural DML – requires a user to specify what data are needed and how to get those data.

(ii) Declarative DML (Non-Procedural DML) – requires a user to specify what data are needed without specifying how to get those data.

Function of DBA (DataBase Administrator)

(i) Schema Definition
(ii) Storage Structure and Access Method Definition
(iii) Schema and Physical Organisation Modification.
(iv) Granting of Authorisation for Data Access.
(v) Routine Maintain Maintainance.

Structure of DataBase System

A database system is partitioned into module that deals with each of the responsibilities of the overall system. The function components of a database system can be broadly divided into – Storage Manager and Query Processor Components.

- A storage manager is a program module that provides the interface between the low level data stored in the database and the application program and queries submitted to the system. It is responsible for the interaction with the file manager. It translates DML into Statement

low level command . It is responsible for storing, retrieving and updating data in the database. Its components are —

(i) Authorisation and Integrity Manager
(ii) Transaction Manager
(iii) File Manager
(iv) Buffer Manager
↳ stores something temporarily.

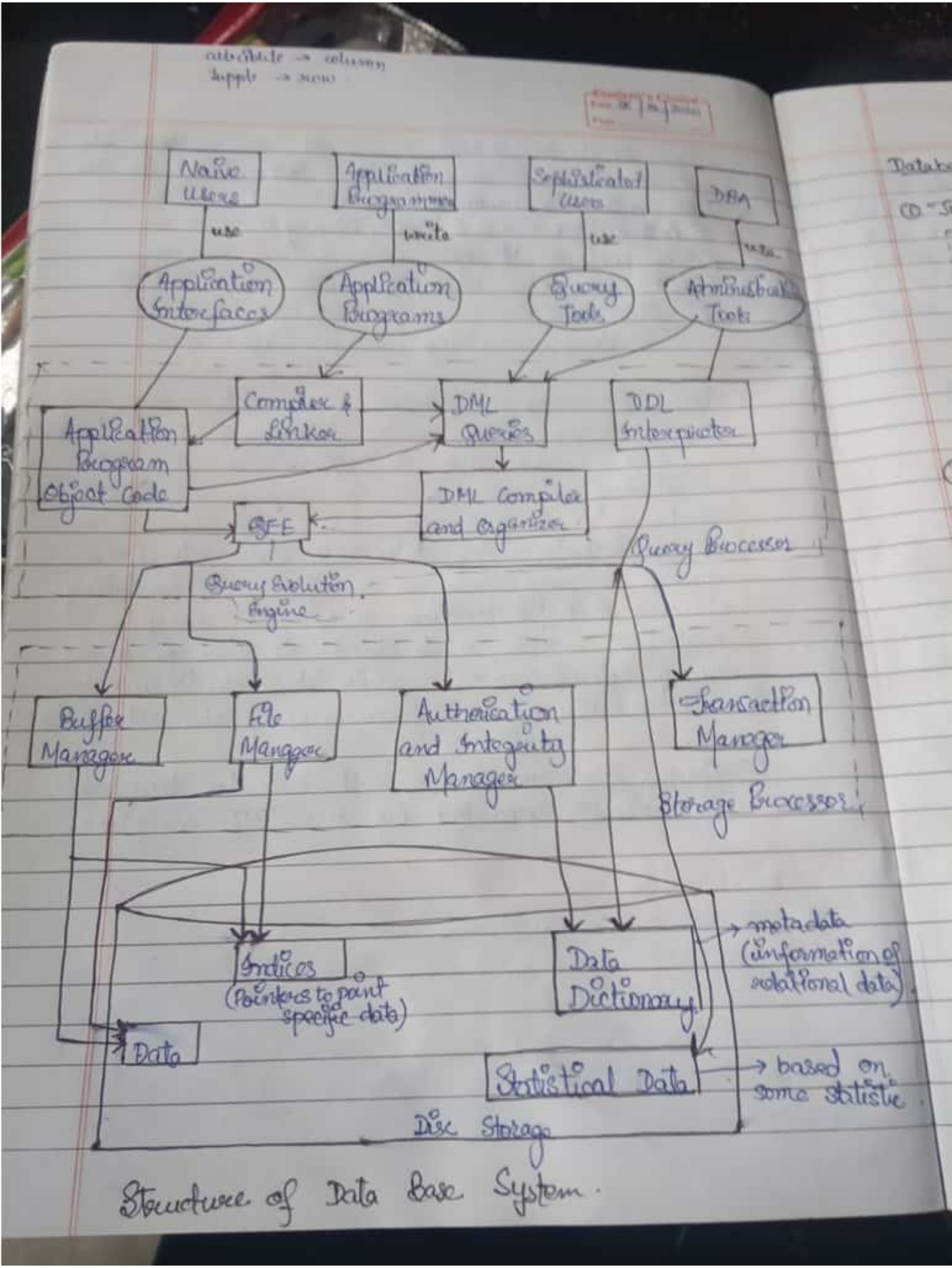
- Query Processor has three components —

(i) DDL Interpreter - which interprets DDL statements and records the definations in the data dictionary.

(ii) DML Compiler - translates DML statements in a query language into an evalution plan consisting of low level instruction that the query evalution engines understand. It also performs query optimisation in which it picks the lowest cost evalution plan from among the alternatives.

(iii) Query Evalution Engine - It executes low level instructions generated by the DML compiler.

attribute → column
tuple → row

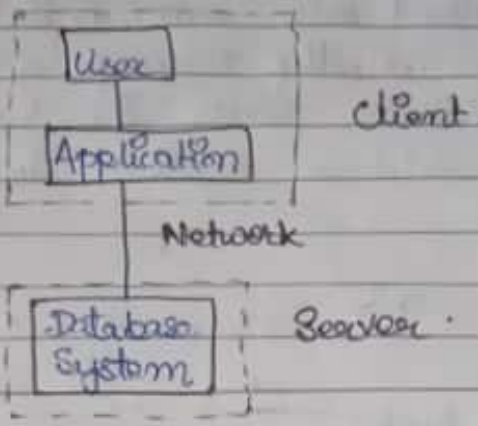


Structure of Data Base System.

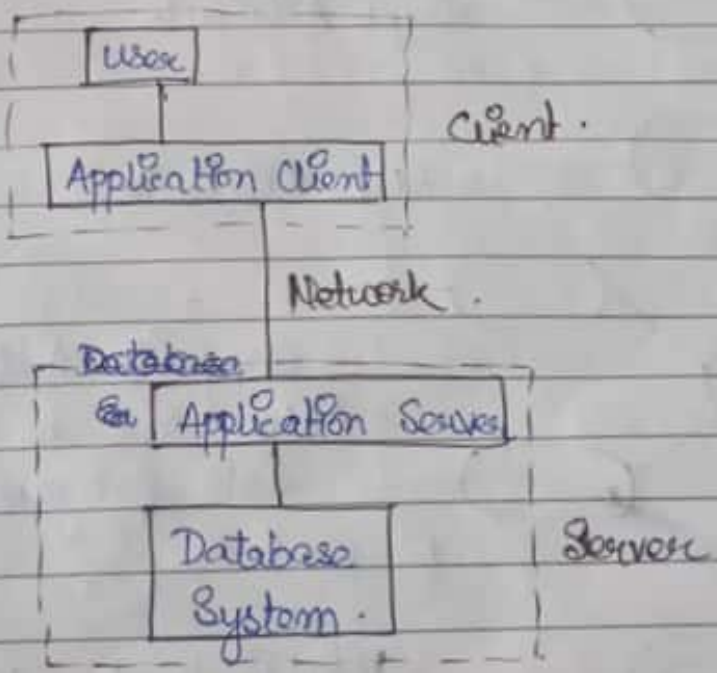
client → receive information
server → send information

Database Architecture

① Two tier architecture:



② Three tier architecture:



Two tier architecture:-

The application is partitioned into a component that resides at the client machine which invokes database system functionality at the server machine through query language statement.