

Date _____
Page _____

Foreign key Table \rightarrow Primary key Table \rightarrow Foreign key \rightarrow

↳ Referencing key Foreign key

* What is DBMS?

database management system is DBMS
↳ collection of program - system
↳ create database users
- \rightarrow Create, maintain, delete
- \rightarrow Database software

DBMS Ex: ~

MySQL, Oracle, Microsoft access
etc.

data \rightarrow Tool software which DBMS
help us to organize data
 \rightarrow Database

Subpoint: ~

DBMS &

↳ Data \rightarrow

↳ material Raw Data

- \rightarrow Electronic Data computer

- \rightarrow Self dependent data

↳ \cup form fixed data
↳ \cup duplicate & Repeable data

~: Information

↳ \cup Information data Meaning full

↳ \cup depend data Information

↳ \cup form special in Information

↳ \cup no duplicate Information

~: Database

Database Collection & Records

↳ \cup list

↳ \cup Information Structured database

Data word Simple collection organized

↳ \cup database & collection systematic

↳ \cup list

data work original & database

↳ \cup list of management

~: knowledge

* Characteristics of Database *

i) concurrent use :-

concurrently users in system database
it allows different users different data (Base)
Ans. Answering question different
central system information
use of data concurrent
to increase system economy

ii) Data Integrity :-

Total accurate data DBMS
data duplication Integsity data
also loss - loss of data
loss of data consistency
Integsity data in use is

* Type of data Integrity:-

- 1) Entity Integrity
- 2) Referential Integrity

1) Entity Integrity:-

Table ALL rows Rule b Integrity Entity
Everyone, all rows Primary key must be unique
null, all rows must be unique primary key
- rows must be unique

2) Referential Integrity:-

Rows ~ Rule b Integrity Referential
value is key foreign row Table associated
rows must match value is primary key
rows sure ~ Integrity Referential
ConsistencyRelationship middle of Tables
- rows must be unique

iii) Transactions:-

Logical group of operations Transaction
Treat as operation logical only
-

Ex:-

withdraw paisa from Account Bank
deposit paisa into Account Bank
- (P.S.)

ACID properties :-

for \leftarrow properties of Transaction
- \leftarrow properties ACID

- 1) A \rightarrow Atomicity
- 2) C \rightarrow Consistency
- 3) I \rightarrow Isolation
- 4) D \rightarrow Durability

~: Atomicity - 1

step \leftarrow Transaction \rightarrow
atomicity Transaction : \leftarrow It is loged \leftarrow
- \leftarrow log

~: Consistency - 2

\leftarrow Transaction \rightarrow
state \leftarrow state \leftarrow database
- \leftarrow consistency

~: Isolation - 3

Transaction \leftarrow \leftarrow \leftarrow
Transaction \leftarrow execute \leftarrow
- \leftarrow Influenced

~: Durability - 4

\leftarrow Transaction \leftarrow
change \leftarrow complete
- \leftarrow system permanently

Type of Transaction ~

- 1) Implicit Transaction
- 2) Explicit Transaction

iv) Data persistence:

data also b word persistence of DBMS
at life

Data Persistence - life of data

- Constant
- stored in variable
- stored in secondary storage

v) Structured and Described data:-

only data only is system database
definition is data of all
- life & description

The database system does not only contain the data but also the complete definition and description of the data. These descriptions are basically detail about extent, the structure, the type and the format of all data and, additionally, the relationship between the data. This kind of stored data is called metadata (data about data).

4) Data Administration:-

A high level function that is responsible for the overall management of data resources in an organization including:

- Data definition, policies, procedure and standard.
- Database planning, analysis, design, implementation, and maintenance.
- Data protection
- Data performance assurance
- User training, education, consulting support.

Q2 Before DBMS come along keeping organisation file processing system has a no of major disadvantages:-

i) Data redundancy & inconsistency:-

→ Storing of some data in different file is called Redundancy

Duplications کے ساتھ کوئی کوئی data کا تکرار ہے۔
- اسی کے Redundancy کا وجہ

→ Some data in different files, but few change made in one file is called Inconsistency

data کا تکرار کے ساتھ کوئی کوئی data کا تکرار ہے۔
- اسی کے وجہ Inconsistency

increase cost of storage کے وجہ

- کوئی کوئی data کا تکرار کے وجہ

ii) Difficult in accessing data:-

Need to write a new program to carry out each new task.

پرانے کاموں کے کام کے لئے provide کر دیا جائے function کے access
کے لئے data specific (ex. گھر کی کام کے لئے) کے لئے

- کوئی کوئی کام کے لئے

(ii) Data Isolation :-

→ Multiple files and formats

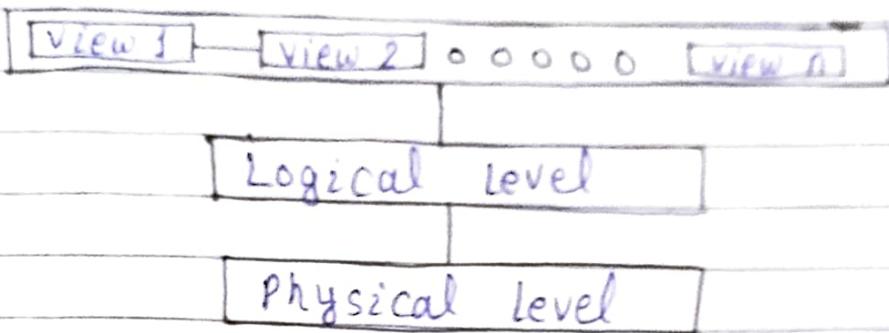
iii) Transaction isolation :-
Transactions will be executed in
parallel without influencing each other

iv) Integrity problem/consistency constraints:-

v) Atomicity problems: ~

* DATA BASE ABSTRACTION: ~ Block diagram

View Level



~: DATA ABSTRACTION *

ما يدور في المحوّر
غير مطلوب لـ user is irrelevant to user
ـ is irrelevant to user
ATM - : not

(OR)

structure Data Complain in Database system
ـ Data user or database is irrelevant
irrelevant developed in Interaction
ـ to hide details (unnecessary)
ـ user data irrelevant in DB
ـ in Data Abstraction is less

Database abstraction *

level (user / External)) view level ,
level (middle / conceptual) Logical level
Internal level / Physical level

~: View level

- اور اس level user کے level تک
کا abstraction ~ - سوچنے کا level upper ~
اور user کے ساتھ سے جو بھی level highest
ہے اس کے کیسے interaction کا Base data
(DB) part ہے ایسے کا data base ہے
سوچنے کا level

~: Logical level

middle کا data abstraction ~
میں میں اس ساتھی کی اور یہ level
مخفونہ data کو وہ database

~: Physical level

lowest کا data abstraction ~

- سوچنے کا level

میں database کے ساتھ سے
level (DB) سوچنے store data کا طریقہ
details کا structure data complain (DB)
- سوچنے کا level

* DATA MODELS:~

کو Data Abstraction جو DBMS کے
duties کا لیں ہے اس کے لیے Introduce
کیا جائے data کے لیے define کر کے
کہ data کے لیے connected کے
store کے لیے System کو پختہ process
کیا جائے۔

* Type of Data Model:~

- 1- Hierarchical Data Model
- 2- Network Data Model
- 3- Object Oriented Model
- 4- Relational Data Model
- 5- Entity-Relationship Model (or) ER Model

~: Hierarchical Data Model - 1

- کہ promote کے sharing data کے
- کہ provide security کے database کے
- کہ 1 to many relationship parent کے کی
کہ child relationship/ parent کے کی
simple concept کو ہے اس کے لیے جو

- کہ it's flexible کے
جس کے changing کے structure کے لیے
- کہ it's change کے program

~: Relational Model

Type (ج) کے دیگر میں بھی flexible ہے اور ~
- لیکن changes کے لئے fast

01 Table کا باتی لہجہ Table of data (ج) (م)
- بھی simple اور easy concept ہے

(ج) نے also integrity data ~
data base کے permissions کے owners like user
- لیکن no access control of

Storage computer hardware powerful (ج) (م)
- لیکن softwares کے device اور

~: Network Data Model

نیز Model hierarchical ہے اور concept ہے 01
- بھی simple ہے

relationship child / parent more لی (ج) (م)
- لیکن

لیکن less access fast data (ج) (م)

- لیکن provide integrity data ~

(DML) 01 Data definition language (DDL) (ج) (م)
- لیکن Data manipulation language

~: Object oriented Model -4

کوڈ کو دلچسپی content semantic چیزوں پر



- جس کرتا ہے support of inheritance

- اس کرنے سے increase integrity data

- کرتا ہے Better performance

جس کی مزادرت system powerful چیزوں پر

یہ Transaction ٹکڑے کر سکتے ہیں

- اس کی وجہ سے slow

- اس model complex ہے

- کرتا ہے learn ہے کیونکہ use کیلئے

اس کی وجہ سے security چیزوں پر



~: ER - Model

graphical \rightarrow design database \sim
visual \rightarrow diagram \sim our approach
design of database \rightarrow is representation
 \rightarrow library

would real \rightarrow entity / relationship \sim
 \rightarrow کرتے \rightarrow is display of object

- was proposed as Peter C. 1976 of ER-Model.

~: Entity

object would real entity \rightarrow in ER Model
 \rightarrow attributes or properties of entity \rightarrow کی
 \rightarrow student \rightarrow database \rightarrow school \rightarrow \rightarrow \rightarrow
 \rightarrow کی entity

(OR)

sold or place, person \rightarrow کی entity \rightarrow
 \rightarrow \rightarrow object world

Ex:- Customer id, Customer name

~: Entity set

entities \rightarrow \rightarrow کی entity \rightarrow
or properties \rightarrow کی \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow
 \rightarrow کی share \rightarrow \rightarrow attributes

An entity is a set of entities of the same type that share the same properties or attributes

- Ex: 1. Number of students in a classroom
2. " " customers in Bank

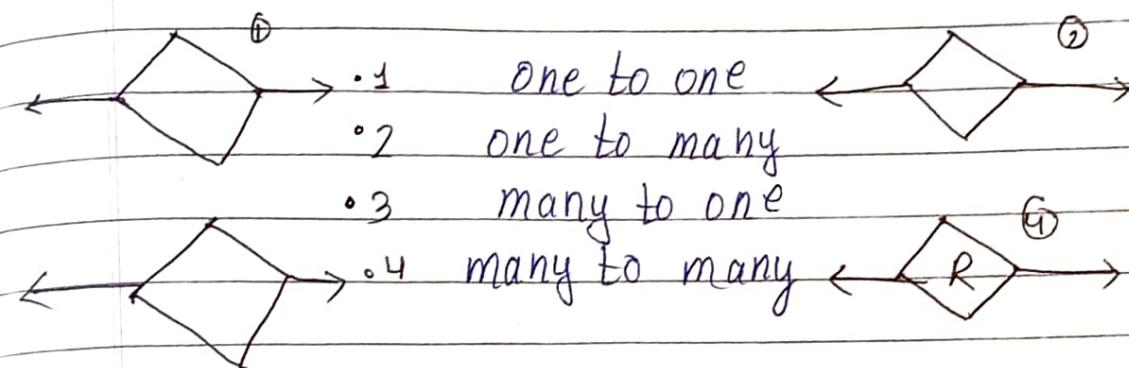
~: Relationship *

↳ middle ↳ Entity

- ↳ ↳ relationship ↳ association

association ↳ ↳ cardinalities mapping *

↳ constraint data ↳ ↳ - ↳ ↳ define ↳



* Type of entity :~

~: weak entity - 1

↳ entity ↳ ↳ weak entity

unique ↳ ↳ ↳ attributes ↳ ↳ ↳

↳ ↳ ↳ ↳ ↳ ↳ identity

- ↳ ↳ ↳ ↳ ↳ ↳ primary key ↳ ↳ ↳

~: strong entity - 2

primary key ↳ ↳ ↳ entity ↳ ↳

- ↳ ↳ ↳ ↳ ↳ ↳ entity strong ↳ ↳ ↳

★ Type of attribute:-

~: Simple & Composite attribute

attribute simple ↗

وے کوئی ایسے divide کر سکے جو subparts ہے اور اسے
کوئی subparts attribute composite کہا جائے
گے اسے بھی divide کر سکے جو

Ex:-

Last name, middle name, First name & Name attribute
composite name کو لیے divide کر سکے name
, middle names, First name کو attribute
- ↗ attribute simple last name

~: Single valued & Multivalued attribute

کوئی attribute ↗

کوئی only یہی entity special کو کہا جائے
کہی attributes valued single ↗ بھی value

Ex:-

↘ attributes valued single یہ age کو person کو

کوئی یہ entity کو ↗ کوئی attribute ↗

attributes multivalued ↗ یہ values کو ↗
کہی car

Ex:-

Phone no. کے employees کو colors ↗ کے car کو

~: Stored & derived attributes :-

type (جنس)

related (مرتب) \rightarrow value is attribute
below derived \rightarrow value is attribute

- 4

Ex:-

birth date \rightarrow age is person (is)
derived (derived) \rightarrow age is derived
- attribute
attribute stored in birth date
- 0%

* INSTANCE AND SCHEMAS :-

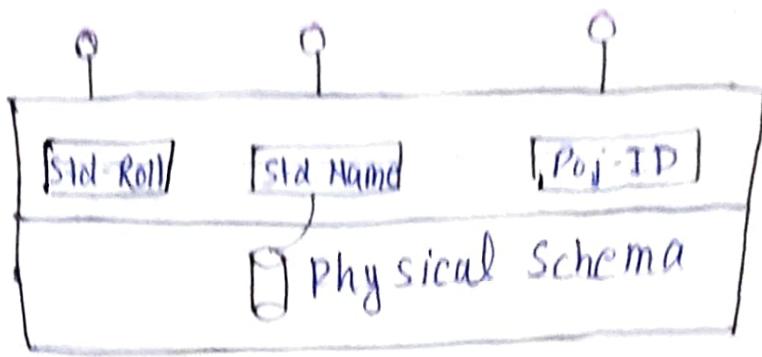
~: Database Schemas .

structure skeleton (هيكل)

or view logical (المنطقية) \rightarrow database or -
data (بيانات) \rightarrow also known as represent
organized (organized) in database \rightarrow organized
- attribute (جذر) \rightarrow key (مفتاح) in data (بيانات)

constraints (القيود) \rightarrow data \rightarrow define (define)
- attribute (جذر) \rightarrow define (define)

defined (defined) of Entities (_entities) in Schema database
- represent (represents) relationship (العلاقة) \rightarrow represent



★ Type of Schema:-

1. Logical Schema
2. Physical Schema

~: Logical Schema

لـ الـ لـ Schema
data لـ define لـ constraint
- لـ store لـ database

لـ constraint logical لـ below -
- لـ define

~: Physical Schema

all b data لـ schema
لـ form لـ data لـ storage
(ex)

لـ data لـ define ~ Physical Schema
لـ represent Type لـ DBMS
- لـ store Type لـ data

* DATA BASE INSTANCE :-

A database instance is a special collection of data instances stored in a collection of tables.

base data all those are Instance term
which will describe environment
types and Table & software DBMS etc
- like functionality

- i) validation
- ii) constant
- iii) condition

(b) A database designer or what is ~

★ DATA INDEPENDENCE :-

Effect of definition Schema \Rightarrow level Next
Modify or definition Schema \Rightarrow level \Rightarrow is
 \Rightarrow data Independence or ability is

Logical change \Rightarrow (view level) Schema External
Logical \Rightarrow (conceptual level) Schema
 \Rightarrow \Rightarrow independence data

★ Type of data independence:-

- 1- Logical data Independence
- 2- Physical " "

Schema Physical \Rightarrow \Rightarrow \Rightarrow Logical Schema -
 \Rightarrow independence data Physical \Rightarrow \Rightarrow \Rightarrow

★ RELATIONSHIP AND RELATIONSHIP SETS

Customer Entity			Loan Entity		
Customer Name	Street	Address	Loan No.	Loan type	Loan amount
RAM	S.V. Street	Hyd	90-1	PMRY	5000/-
RAVI	A.V Street	Bangalore	90-2	CHEY	3000/-
SAI	N.R. Street	Anantapur	90-3	AFS	2000/-

* Generalization / Specification : ~

~: Generalization *

up-bottom \rightarrow Generalization

level lower \rightarrow level approach

level higher unit \rightarrow combine

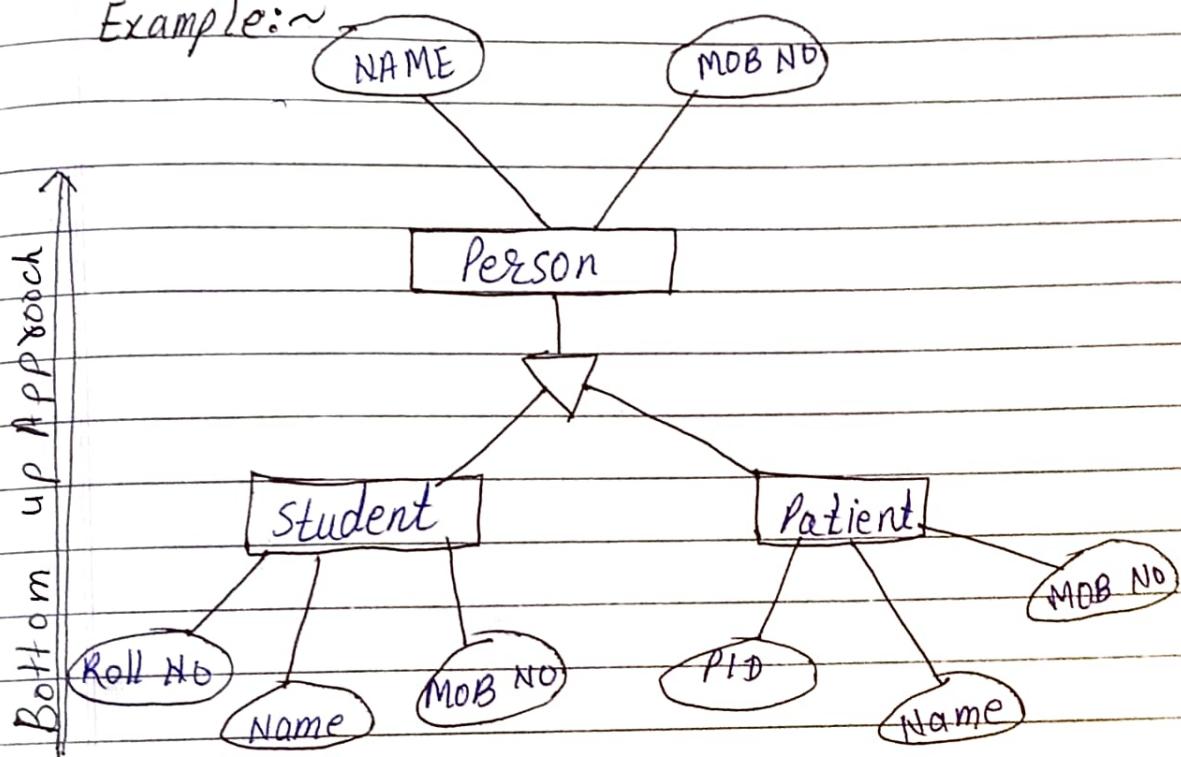
- \rightarrow Combine \rightarrow unit

unit \rightarrow level higher \rightarrow Generalization *

level lower \rightarrow Entities level lower

- Unit level high

Example: ~



- ↗ relationship ISA ↗ generalization

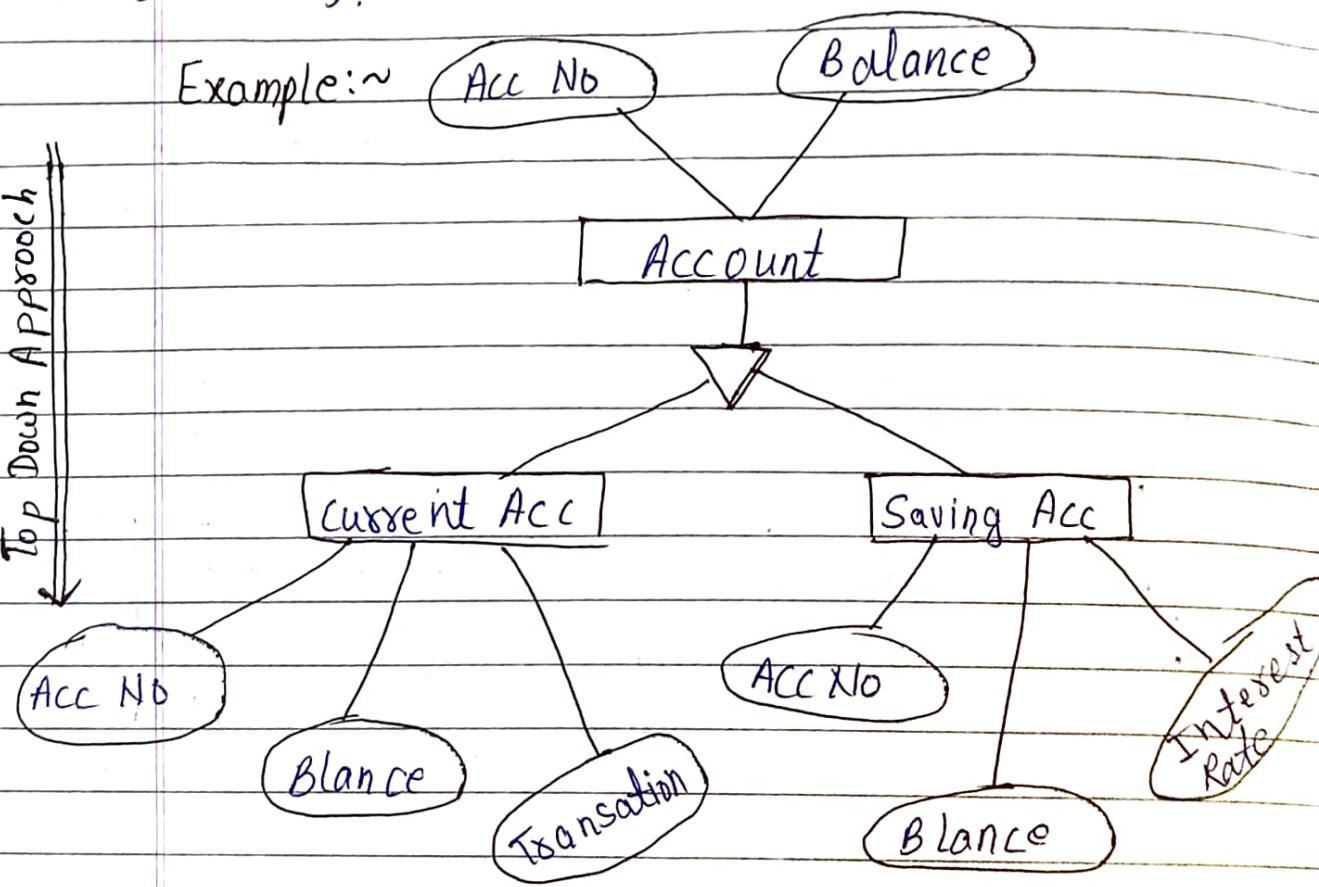
- ~~size~~ size & Schema + Generalization

- Entities of group entities Generalization - 0.5 3_g

~: Specialization

- ورثیّة process و Specialization

WORK opposite \vdash is Generalization
while super class \vdash only \vdash $\forall x \exists y$
 \vdash $\exists y$ WORK \vdash Approach down TOP \vdash $\forall x$



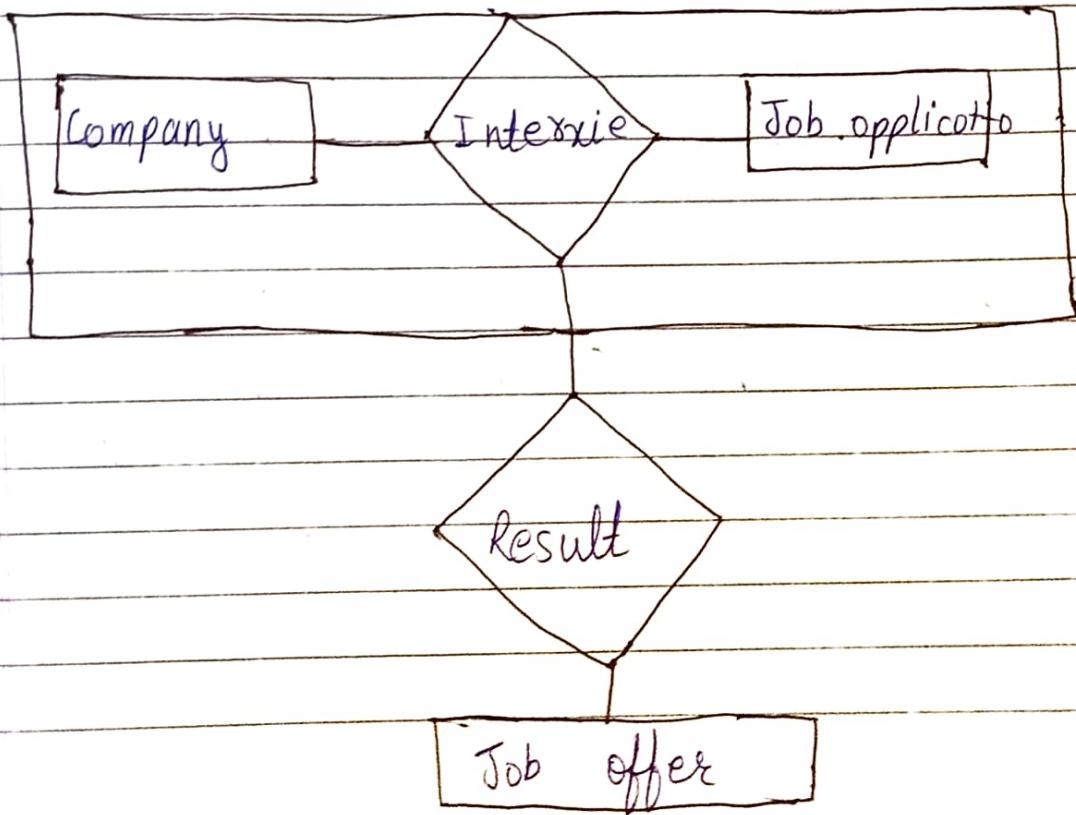
- ↳ relationship is a part of specialization ←
 size increase & Schema → specialization ←
 - OR ↗ ↘
- f. entity single always → specialization ←
 - ↗ ↘ apply

~: Aggregation *

technique is Aggregation

ER-Model, relationship among relationship
 relationship is also a relation p. OR
 & aggregation is, OR new fact, OR is
 - OR ↗ ↘ use

Ex:-



↳ Relationship "HSA - A" or Aggregation
↳ Type special in K Association

* History of SQL :

1. Mr. T. language programming SQL
Boyce Researchers IBM 1970

2. Chamberlin Donald & Raymond
change Mr. T. to Mr. R. developed SEQUEL
- which is SQL

Structured Form Full b' SQL
American ANSI is ~ language Query
standard (Institute Standards National
- language

~ what is SQL *

Query Structured Form Full b' SQL
Language Computer b' c' ~ language
1. command of database Mr. v. v.
Create of database v. b. b. Instruction
delete, update v. b. Store data - v. b.
The commands different b' v. v. b. b.
- v. b. b. b. SQL v. v. v.

A H. ~: Use of SQL

- ۱۔ یہ Create database کی بیس سے SQL

- ۲۔ یہ Insert data New کیوں database

۳۔ یہ Modify لے update of data ہے جو میں

- ۴۔ یہ Delete of data

- ۵۔ یہ Create table New کیوں ہے database

- ۶۔ یہ میں قسم کیا کیا Type کو جاری SQL Command

1- DDL (Data definition language)

2- DML (Data Manipulation language)

3- DCL (Data Control language)

4- TCL (Transalation Control language)

SQL Language Statement

DML

Select

Insert

Update

Delete

DML

Create

Alter

Drop

DCL

Grant

Revoke

TCL

Begin

Tran

Commit

Rollback

~: DDL *

language definition Data also known as
pattern structure database use known as
- variables & it is defined

Table & Schema of database ↪
etc constraint Indexes
- variables use

database which use known statement DDL
- user known skeleton

* Here are some task that come under ~ DDL

~: Create *

new objects of database ↪
- variables use

~: Alter ↪

structure of database use known as
- variables & it is changed

~: Drop ↪

records in Table will use known as
variables & (table) will be

~: Rename ↪

change particular object will use known as
variables & it is

~: Comments ↵

، dictionary data use کوں

- دیکٹیونری میں کوں کسی comment

~: DML ↵

Access data in database use کوں

- دیکھنے کے لئے اور کوں کسی جاگہ پر manipulate کرنے کے لئے

Here are some task that come under DML:~

~: Select ↵

کوں کوں data in database use کوں

- دیکھنے کے لئے select query

~: Insert ↵

کوں کسی جاگہ data کو Table میں

- دیکھنے کے لئے insert query

~: Update ↵

کوں data کو Table میں کسی جاگہ update کرو

- دیکھنے کے لئے update query

~: Delete ↵

Table کو کسی Record کو remove کرو

- دیکھنے کے لئے delete query

~: Merge ↵

، Insert & update operation UPSERT ↵

Operations update

~: Call ←

query structured w/ use b o1
if call or subprogram Java L language
use b w 2

~: Explain Plan ←

parameters Explain data o1 o1

~: Lock Table ←

- use b control of concurrency ~

~: DCL *

data save L stored use b o1

- use b again

- use b Transactional Execution b DCL

- use b parameter rollback use o1

Control data o1 database oracle o1

Rolling o1 Execution L language

- use b facility

* Here are some task that come under DCL:

~: Grant ←

access user's database w/

- use b use w s use s privileges

~: Revoke

permission ~ user use b ut

~: b l b w ~ L ~

Authorization of Revoke

Connect, Insert, update, Execute, Delete, ^{update}
select

~: TCL

change ~ ~ use ~ Statement DML

~: b l b w ~ L ~ f Run ~

b l b w Grouped or Transaction logical & TCL

~: 4

Here are some task that come under TCL.

~: Commit

b l b w ~ ~ database ~ ~

~: b l b w use ~ L ~ f

~: Roll back

original ~ ~ ~ commit ~ ~

b l b w use ~ L ~ f restored ~ ~ database

~: 4

* DATA BASE MANGER : ~

set of program & program computer
Basic of database management.
- DBMS functionality

Eg: ~

- * Create of data base
- * mantance of database
- * Back-up and Restore
- * Rename delete etc.

data of local use by data base manager
- DBMS manager Remote base

↳ DBMS "Network" Remote database
use to manage online or off line

↳ DBMS below manager database
- DBMS of function administration

Eg: ~

- * Managing Table
- * Views
- * Stoye procedure etc.

~: Data base Administrator

Data base Administrator

control & data all user or user who
is administrator database & his
right begin of database

user different & administrator database

dba or his Access & who has create
data & user or person who
has responsibility

Eg:-

~: Data Access

past user Type

The Authorized user has Access data

- via L

- via L user will update of database

his user or problem user

change user Schema

his maintenance software of database

* Function of database Administrator: ~

~: Defining Conceptual Schema 1

logical b' database

key (سے) جو Table کی design

foreign key (سے) جو primary
کر Administor + data decision (سے)

~: Physical Database Design 2

database کی p. جس

physical database کو ہو کر create

وں Disc کے computer کی storage

decide database کو کہ store کر کر
کر لے

~: Security and Integrity Check 3

کے database

کے data کو authenticate user کو
authorized user کو کے کر Access

کے database کو کے database کے کے
کے maintain کے integrity کے data

~: Granting user Access 4

کے database

Access b' database کو کے کے user

- کے کے decide database کے کے کے

Eg:~

لے (U1-U5) اور user 5 کو database \leftarrow مبارہ
U5 کو لیں اور permission selected only اور
permission کو لیں permission delete اور
- لیں لیں گے کو database

* Data base user:~

person کو ڈی جی بی اس کو work کرے DBMS
work کو save کرے اور protected کرے data
- لیں لیں user کو کرے

* Data base user:~

- 1) Application Programmer
- 2) Sophisticated users
- 3) Specialized users
- 4) Stand-alone user
- 5) Navy user & end user

~: Application programmes

W.F. L. 1974 user 89 of

L10 25 program Application 25 database

Cobol 6C General program ~ 0's
all purpose General and Extension

purpose general yes, for ton
- results of the language examination

- With the use language programming

~: Sophisticated User ~

Deployment of user w/

- ODBC Int Data base

Σ SQX command

- SQL is access database

you can use it on

* Data base developer

* Database Designer

~: Specialised User (3)

2. A log user is a

کو program Complex (کمپلکس) کہا جاتا ہے۔

special in the first year, develope

to use a database as it is a program - (u.s.)

~: Stand-alone user ۲۴

کسی user pedimode میں

- کسی کو use of package database

~: Navy user ۲۵

Application کو کسی user کی

کسی Connect کی کو database میں مزبورانہ

- کسی کو use of database کی کو کسی

Eg:- ATM

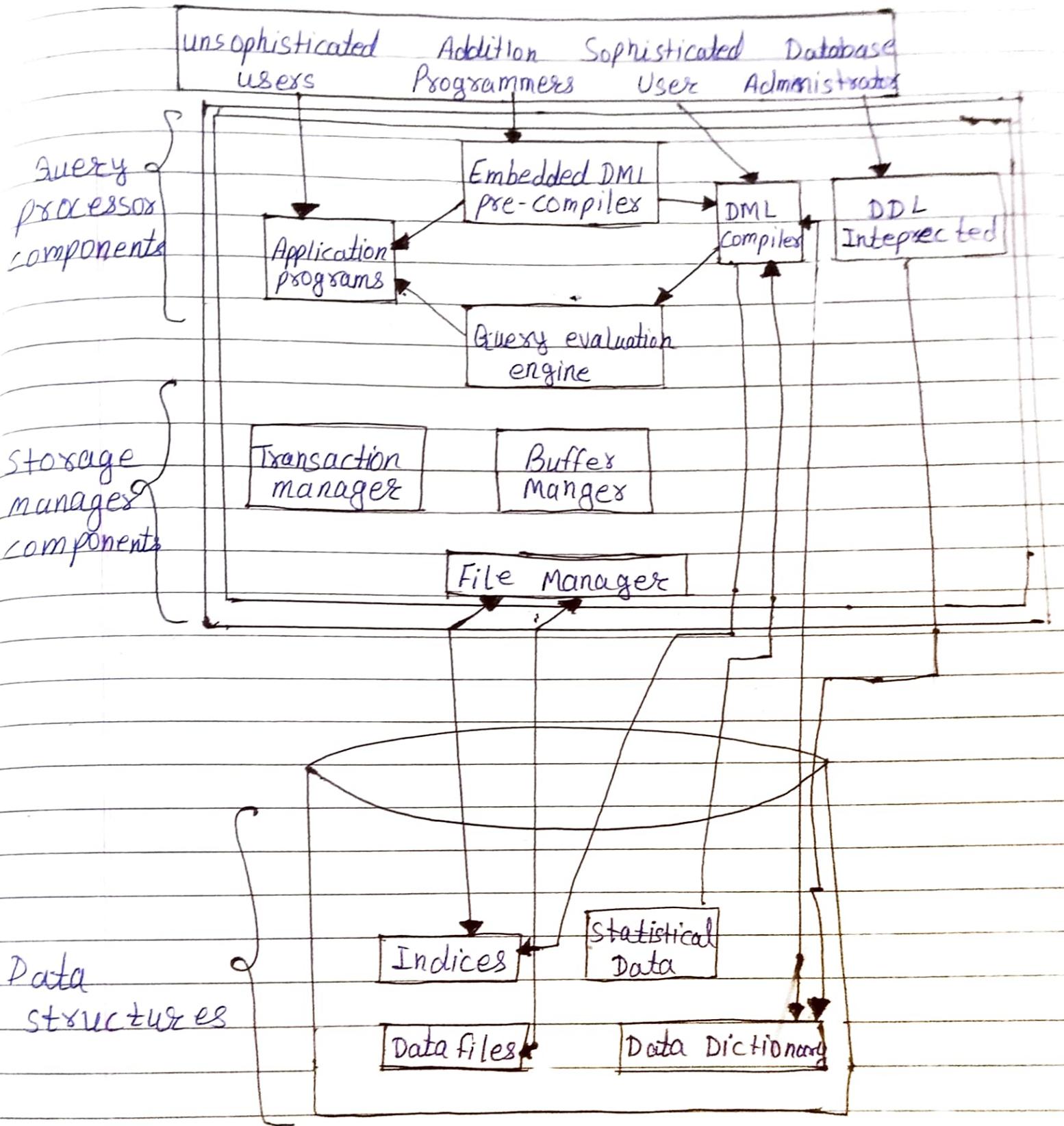
~: End user

work main & End user

کسی کو I/P کو data کو Database

کو O/P کو کسی کو کسی کو کسی

* OVERALL SYSTEM STRUCTURE :



~: Data Dictionary *

- 1 file in data dictionary of DBMS
- database consists of group of files
 - store Metadata

data DBMS has data dictionary
which access of data base

Metadata of data dictionary
is data of data and DBMS
Metadata provide information of
the data

~: Type of data dictionary *

Active data dictionary 21
Passive data dictionary 22

~: Active data dictionary 21

data dictionary 20

DBMS automatically updates
Active data dictionary 21

~: Passive data dictionary 22

data dictionary 20

DBMS automatically updates passive
data dictionary 21

~: Metadata *

of data <--> data

Metadata - \cup l: \rightarrow Metadata \leftarrow l: describe
Information \leftarrow \rightarrow data \leftarrow \rightarrow
- \cup l: \rightarrow provide

www \cup WWW use b Metadata

is page web metadata \leftarrow l: w J: i: l: s:
Metadata \leftarrow l: contain \rightarrow Information
l: \rightarrow store \leftarrow \rightarrow Keyword \rightarrow page web
page web \leftarrow engine search \rightarrow \cup \rightarrow
- \cup l: \rightarrow chances \rightarrow \rightarrow \rightarrow

~: Data Mining *

l: data \leftarrow data mining

l: l: \leftarrow \rightarrow discovery knowledge

l: data \leftarrow \rightarrow Mining data

search \leftarrow data small \rightarrow group

- \rightarrow process \leftarrow if

- \cup \rightarrow goals following \leftarrow data mining *

- 1) Explanatory
- 2) Confirmatory
- 3) Analyzatory

~: Key *

Important keys in database Relationship ←

- ↪ play role

records in data in Tables use key

→ to identify uniquely or somehow

Types of key: ~

- 1) Primary key
- 2) Candidate key
- 3) Super key
- 4) Foreign key

~: Primary Key 21

- ↪ Unique key Primary

key primary one only in Table & ↪

↪ unique

- ↪ Multicolumn or single ~
composite for key Primary Multicolumn
- ↪ ↪ key

More Only one Primary key Composite

- ↪ ↪ column is than

- ↪ ↪ can contain value Null ~

Type of Primary key

- 1) Simple Primary key (SPK)
- 2) Composite " " (CPK)

~: SPK

↳ It is just one field only.

~: CPK

↳ It is more than one field.

~: Candidate key

database relational key will

↳ Identify uniquely or now can be
- called Candidate key

↳ One or more candidate key

~: Super key

entity will Super key will

set attribute will will be

entity set entity value combine is if

- if it is unique

contain value Multiple Super key