CHAPTER-1

DBMS → It is the collection of data in systematic way of organized.
Application → Universities, Airlines, Banking, bigmart etc.
Objectives → mass storage, Data protection, Data backup and recovery etc.

Advantages.
→ minimize file redundancy
→ sharing of data
→ Highly secure → Backup and recovery.

Disadvantages.
→ Extra cost
→ Require large memory

Data Abstraction → It minimize the complexity of user.
Types → (i) physical level → Database specialist ley kaam garxa.
(ii) logical level → Database Administrator ley kaam garxa
(iii) view level → benifit for end user.

Data independence
- lower level ma data change vayo vani higher level ma effect gardaina.
Types ① logical ② physical

Schema → roughly database banauniho.
Instances → It means database time anusar change hunxa
DDL → It deals with CREATE, ALTER, RENAME and DROP. (Data defination language)
DML → It deals with SELECT, INSERT, DELETE, UPDATE. (" manipulation ")
DCL → It deals with grant and revoke (" control ")
grant: allow user access privileages to database.
revoke: withdraw user access priveleages given using GRANT command.
Database manager and user
Types (i) Database Administrator → yesle database ko sabai kaam garxa.
(ii) Database designer → yesle database design garxa.
(iii) End user → yesto user jasle database bata advantage linxa.

CHAPTER-2

E-R diagram importance cha because yabata database ko table hasu ko relation tha hunxa.
Data Model → simple representation of complex real world data structure
ER Model → design or blueprint of Database that can be later implemented as a DB
ER diagram → graphical representation of entities & relation betn entities.

Strong entity	Weak entity
→ It has it's own partial key	→ It contains partial key
whose existence doesn't matter on existence of other entity	→ depends on it's owner entity (strong entity)

Logical → entity, entity relationship, attribute, primary key foreign key include hunxa.
Physical → primary key, foreign key, column name, Table name
Conceptual → entity and entity relationship.

Alternative data model
Types ① Network data model
→ Same as tree but graph in structure. child node have two parent node.
(ii) Hierarchal data model
→ Model organize data in tree like structure. Start from root node & child node have only one parent node.

CHAPTER-3.

Relational Model → It low level query language. yesle garda table ra table bich ko relationship tha hunxa.
Terminology
(i) Select → To check condition
(ii) Project → for select statement
(iii) Union → sabai display garxa
(iv) ~~Set difference → A ko matra display garxa (A-B)~~
(v) cartesian product → A*B cha vane A ko genta data B ko sabai data sanga multiply garxa.

Relational Algebra → It takes relation as input and generate relation as output.
→ It is procedural query language.

CHAPTER-4

SQL → Squential Query language.
Features → is used to define the data and manipulate when it is needed.

Query	Sub Query
→ Yo fast hunxa	→ Yo slow hunxa
→ yesle database data store garxa wa retrive garna kaam lagxa	→ query vitra arko query lekhnu parxa
→ e.g. select * from table name	→ e.g. embeded system (if else system use hunxa)

Join operation	Set operation
→ column name same navayeni hunxa.	→ column name same hunu parxa.
→ It types	→ It's types
(i) Natural join	(i) Union
(ii) Inner join	(ii) Intersect
(iii) Outer join	(iii) set difference

QBE → Query by example
→ Yo powerful query language ho

Stored Procedure
→ Yesle code lai reuse garna help garxa.
→ Yeslai chai pailanai prepare garera rakhna parxa.

CHAPTER-6

Needs of security → protects from improper acess → user authetication
→ Multilevel ~~sec~~ security → protection of sensitive data → Database integrity.
Security → To secure the data in different level.
different level are → Database system → operating system → Network system (iv) Human
Intigrity violation → Primary key must be not null ani dublicate data remove hunxa.
Acess control → yesle chai ko le k authorised payera vanne jankari garaucha
Types (i) Discretionary → It is mostly used by windows
(ii) Madatory → It is mostly used by military based organization.
Autorisation → Data administrator ley k k grant dine ra k k revoke garne kaam garxa.
Types (i) Resource (ii) Alternative (iii) Drop.
(Resource: naya resource dine; Alternative: Add, delete garnadine; Drop: Drop garna dine)
View → View ley database secure garne kaam garxa.
Encryption → yesle plain text lai ~~clipper~~ cipher text ma convert garxa security ko lagi.
Decryption → yesle ~~clipper~~ cipher text lai plain text ma convert garxa for purpose of reading.

CHAPTER-5

Database constraints → Dublicate data hatauna help garxa. (Not null)

Integrity constraints → It checks (i) length or size (ii) datatype (iii) It is unique or not.

Types:
(i) Domain integrity constant → unique cha ki chaina vanera check garxa
(ii) Entity " " → Primary key unique cha ki chaina check garxa
(iii) Refferential " " → It is based on foreign key.
(iv) key " " → Primary key must be not null.

Refrence integrity → It follows the rules of foreign [∵ Jaha yo kaam gardaina tya cascading hunxa]

Assertion → Yesle condn matra check garxa.
Syntax: create Assertion <Assertion_name> check < predicate condn >.

Triggers → Yesle chai condition pani check garxa ani data modified ni garxa.

Functional dependencies → dui ta attribute bich ko relation find garxa.

Types: (i) Trival (ii) Non-trival (iii) full (iv) partial (v) multivalued (vi) Transitive.

UNF → It doesnot follow doesnot follow normalization rule.
→ It is not atomic in natrne → It suffers from database anamolies.

1NF → It is atomic in natrne → column name must be unique → all the store value should be same value.

2NF → It should be in 1NF → ~~Transitive~~ partial dependency should be removed

3NF → It should be in 2NF → Transitive dependency should be removed.

3.5NF → It should be in 3NF → yesma non-prime attribute le prime attribute tha hunu vayena.

4NF → It should be in 3.5NF → multivalued dependency should be removed ~~eg~~

BCNF → is the advanced version of 3NF → It is stricter than 3NF.

Decomposition → Euta relation R xa vane teslai $R_1, R_2 - R_n$ samma divide garne kai ---

Types: (i) lossless join decomposition (ii) attribute persservation (iii) Redundency
~~(iv) Dependency Preservation.~~

CHAPTER-7

(Q) **Query processing kasari huncha?**
Step 1: Parses and translator → SQL lai multiple RA ma convert garxa
Step 2: Optimizer → multiple RA lai multiple execution plan ma convert garxa.
Step 3: Evaluation engine → yesle yeuta execution plan chose garxa using cost estimation

(Q) **Cost estimation garne tarika?**
(i) CPU cycle measure garna parxa (ii) Disk access measure garna parxa.
(iii) Transit time in network.

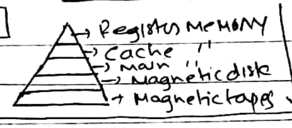
(Q) **Query optimization garne tarika!**
(i) Create operator tree (ii) Select operation jaile in downward tira rakhna parxa.
(iii) cross product lai joinle replace garna paryo (iv) chaiyeko bela matra projection use garne.

Cryptography → study of technique for secure communication

Cryptoanalysis → study of breaking algorithm of encryption.

CHAPTER-8

Disks and storage



(i) Increase in capacity (sabai vanda badhi capacity magnetic tapes)
(ii) Decreasing the cost per bit
(iii) Increasing the access time (magnetic tape ma dherai time)

Q) **Record lai kun tarika bata organize garna sakchau?**
Two types. (i) fix length record type → yesma length fix hunxa, yesma data search garna sajilo hunxa but extra ram khanxa.
(ii) variable length record type → yesma different length hunxa.

File organize garne tarika
(i) Heap file organization → Jaha space khali xa tya rakhyo vane heap file organization vanhxa.
(ii) Sequential " " → yesma chai record haru sorted garera rakhna parxa. yesma pointer pani use hunxa.
(iii) Indexing and Hashing organization
→ Primary → Dense index → yesma sabai search key huncha
→ Secondary → Sparse index → yesma related search key huncha.
Hashing organization → hash function use garera chaining ko tarika le file organize garxa.

B+ tree index → Yesle data lai sort garna help garxa ani yo chain leaf note ma matra kaam garxa.

CHAPTER-9

Crash recovery → Yesle database lai consistency and usable state ma lyane kaam garxa.

Failure classification → (i) Transaction failure → logical error, system error
(ii) System crash → power off vayo vane lose volatile memory
(iii) Disk failure (in Natural Disaster).

Recovery garne tarika → (i) log based recovery → Deffered data modification, Immediate Data "
(ii) check point (iii) shadow paging

Remote backup system → database lai physically pani arko arko thau ma backup ko lagi rakhne system.

CHAPTER-11

Relation of object oriented model and DBMS

DBMS	OODM
Relation	class
Tuples	object
Attributes	variable

Distributed database
(i) Homogeneous distributed → yesma same software use
(ii) hetrogeneous distributed → Yesma different software use hunxa

Application → Data communication
→ Data sharing.

Data warehouse → collection of database yesma strategic data matra store hunxa ani data read matra garna ~~sake~~ milxa.

CHAPTER-10

Transaction → Yo vaneko database lai read garna ra update garna milxa.

ACID properties

→ Atomic → ~~ki either all commited huna paryo~~ ki neither none commited huna paryo.

→ consistency → yesma sum of money before transaction and after transaction same huna paryo.

→ Isolation → yesle parallel transaction lai serial ma convert garnu paryo.

→ Durability → yesle database lai permanent save garxa.

Schedules → It means series of operation from one or more transaction

Types,

(I) serial schedule → yeuta transaction sakiyesi arko suru hunxa.

(II) Non-serial schedule → Yeuta nasakidai arko suru hunxa.

(III) Equivalent schedule → Duita schedule euta time ma sakinxa.

(IV) conflict schedule → Duita transaction yeutai object ma same time ma ~~garirache~~ garirahanxa euta write operation aayo vane

Serializability

(I) Conflict serializability → Precedence graph banauda loop aayena vani use hunxa

(II) View serializability → yedi conflict serializability xaina vane tespaxi serializable check garna lai use hunxa.

* Concept of locking for concurrency control.

(I) lock based protocal (II) Two phase locking protocal

(III) Time stamp Based ordering scheme.

Deadlock → ~~Procedure graph banauda loop aayena~~

It is a situation in which two or more transaction are waiting for one another to give up locks.