Lecture 1

Data => raw facts of figures and fact

51 -> data

51% -> information

data k sath koi content / value attach ku dengaii toh yeh information ban jaye gaa.

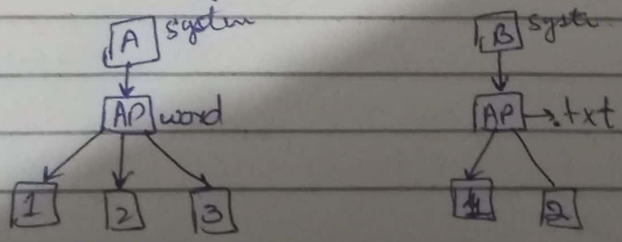
- Data is more important than information.
Data agar na hoga toh information m bantee
- Information hamari ghalt bhi ho saktee agar hum ghalt process kren gaii ya ghalt data utha liya.
- Data gathering is the important part

- Decisions are based on the data

Mela Data Data that describes the data.
data of data
eg Text hai us ka font, color
Youtube Video (upload date, last modification)

Data file collection of ~~data~~ related information

File based system
A system of files and collection of application programs manipulating them is a file based system.



آپس میں connected نہیں ہر کسی کے پاس same file نہ ہے (1, 2)
file base system کے اس کی وجہ سے resource ضائع ہوں گے۔ اگر ہم نے ایک فائل میں modifications changes کی ہیں تو ہر کسی میں خود جا کر کرنا پڑے گا۔

Main Issue => Data redundancy (data duplicate)

Data integrity => data valid hai or data authentic hai.

data inconsistent => her jagah per diff hogaa jab changes kren gai toh her jagah update kra pareh gaa toh agar kaheen pe update na huai toh data integrity ajatee inconsistent =>.

DBMS (Data base management system)
↳ centralized hogayi hai (agar data usk gaye toh mara)

Lecture #3

DBMS -> data base management system
is used to create, mantain and provide controlled access to user database.
DBMS manages data resources

Advantages
↳ draubacks of file system

- program data independence
- minimal data redundancy
- improved data sharing (jo un ko access hai sirf woh show hoga)
- enforcement of standards (all data access done in same way)
- improved data quality.
  - validation : password (6-8 characters), name mai numbers na aasakain
- better data accessibility/responsiveness (use of SQL)
- security, backup/recovery, concurrency (data same)

Costs of data base approach

1. Up-front costs (installation k time per)
   Kisi DBMS ko install kiya toh us k liye cost dee hogi

2. Ongoing costs (DBMS use krte huai new features)
   koi new module, new security feature add kiya
   mantainance
   Organizational

Lecture#3

Types of database
on the basis of size, location, no of users.

location

① Centralized single repository, Database he aik location, diff users different place

② Distributed database
copies different locations per hai.
Physically different location
logically 1 ~~place~~ database
→ Different countries, remote

centralized drawback
no of users zadha, aik he jagah per haii DB toh load zadha hojata haii.

distributed database
• Logically 1 single database
different locations, they exists as servers
different locations (servers are connected to each other)
They are synchronized, they are connected, linked, so there are ~~less~~ no chances of redundancy

+ Data access retrieval faster (load less)
+ if one server crash, not effect on others.
- need to be ensure data is consistent
- can be slower accessing non-local data
(دور بیٹھے کو access کرنا، time زیادہ لگے گا)

Distributed types

① Homogeneous (same)

↳ same OS, hardware resources, data structure

→ restriction daal dete h yeh kam h sabke yet in in chzo ko use krk

② Heterogeneous (different)

platform independant

→ compatible ho (her system pe chal jaye gaa)

Usage

① Operational Database:-

day to day transactions ko use, mantain krne

-> eg daily basis pe logon ko salary dena.

② Data warehouse

=> periodic basis pe

quarterly, yearly pe hum data dekhen gaii

Band mai donoh hotee

Storage size and no of users

Size ↑ cost ↑

Database Development

SDLC, Prototype

SDLC system development life cycle

-jab bhi koi new requirement daleee hai toh dubara se SDLC create krni gaii

-Prototype maii humai dubara create nahi krni gaii, joh feature add krna hai bss woh add krni

Prototyping is RAD -> rapid application development

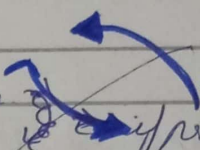
- adding new features
- efficient approach.

Analysis -> kuch formats mai structure bana data hain

Prototype steps

1. Identify problem
2. develop initial prototype
3. implementation and use prototype
4. revise and enhance prototype

then



دوبارہ steps ①, ② بنیں گے

اگر problem نکل آئی ۔ problem نکلتی نہ ③ step پر جائیں گے

SDLC mai dubara start se kuna parta hain.

Lecture 5

Conceptual Data Modelling

Data model => map
Saree requirements likhte k bon see chizain use honge
Data model graphical representation
physical, logical, view level pe ku tarah ka hoga

entities
designer, application programmer, end user

Constraint => a restricted placed on the data (data per restrictions daalte hain jese number mai alphabets nahi aasakte)

Data Models Types based on Data Abstraction:

Complex information ko hide krna.
- External
- Conceptual
- Internal

End users ka external k sath link haii
External have multiple models (eg CUI faculty, student portal
Conceptual => jahan external modes ikhte hain
(jese CUI faculty, student portal ath jagah per hain)
Internal => in ke coding, DBMS bana diya

External Model

pura system different modules mai divide hua hai
End users k mutabiq divide hua haii

Conceptual Model

- global view of entire database
- most CM is ER (entity relationship) model

macro level view => general view (zadha detail mai nahi jateh)

- Does not depends on DBMS software or hardware

کیونکہ یہ ابھی تک implement نہیں ہوا ۔

<u>Internal Model</u>

- Representation of database as seen by
- Saree implementation agayii

<u>Physical model</u> → lowest level of abstraction.

- software and hardware are dependant
- physical model is relevant to software and hardware

Q) External ~~ko~~ mai sabse zadha high kyu hai abstra

=> kyu k end user ko nahi pata k yeh kya chzain use ho rahi, user ko sirf ussi ka part ~~jo~~ ~~dod~~ us ko dikhayii deh gaa.

Cardinality => kis type ka relation hai

Record => instance, row

Lecture 6

ER Model

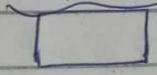
Conceptual Model

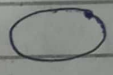
conceptual mai hum ER model use krte
entity => jis se relevant record keeping krne hai

entity type => Student ka table
entity instance => Student k table ka saraa data.

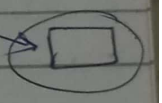
Relationship instance => link between entities
(primary key and foreign key)
Relationship type => one to one, one to many ---

ER Model Chen-Notation

 => entity

 =>attributes

 => relationship

Single line => strong/simple double line => weak. 

double => identifying

 double => multivalued

 associative entity.

 derived attribute.

id => underline => primary key

- Entity is described from its attributes

Entity set

- key lazmi hoti (primary key)
- domain (relevant data)

ER Model Attributes

3 types.

① Single vs Composite.

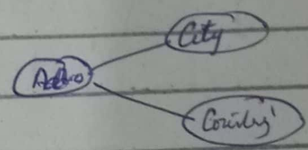
- attribute joh break nahi hosakta ⇐ Simple
- attribute joh break hosakta eg Date of birth
  ↳ ~~Single~~ ~~Simple~~ Composite

② Single vs Multi-valued

Single => single value/record add krsakte
eg name, age
Multivalues => many values/records add krsakte
eg skills, degrees, hobbies

③ Stored vs Derived

stored => joh exist kr raha hota eg date of birth
derived => joh hum store se derived krte/nikalte
eg date of birth se age, date of joining se current tak hum experience year nikalte.

Composite 

Q) ER diagram ko dekh kr batana hai k yeh kon sa attribute, entity, relation hai?