

1. Good Evening

2. Lecture begins at 9:05 pm

3. Topic - Intro to DBMS

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SQL

Agenda

1. Module details ✓
2. Data, Database, DBMS
3. Types of DBMS → RDBMS
4. RDBMS 

Terms

Properties
5. Keys
7. Links & First Queries.

## Module Details

1. Intro to DBMS
2. Schema Design ✓
3. Normalizations + Data Types
4. CRUD → Queries [SQL]  
Insert, Update, Delete, Read

5.

Joins

name	bid
A	1

Students



bid	brname
1	Jan23

Batch



SN	BN
A	Jan23

6.

Aggregates & Builtin Functions

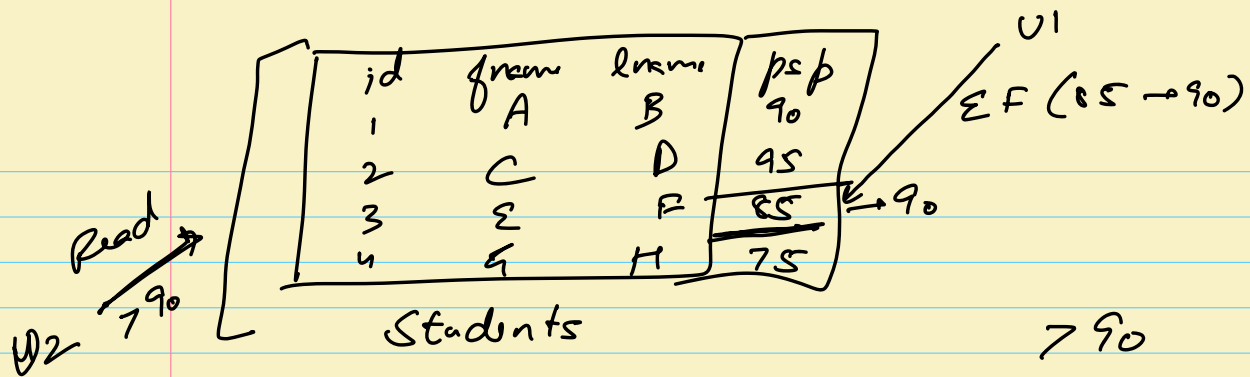
id	name	color	price
1	A	Red	10
2	B	Black	20
3	C	Red	30
4	D	Black	40

Products

Red	40
Black	60

7.

Transactions & Locks



U1 is updating, U2 must wait

8. Indexing [BTree]

id	fname	lname

Optimise performance  
of queries in DBMS

9. Subqueries + Views

id	fname	lname	psp	bid

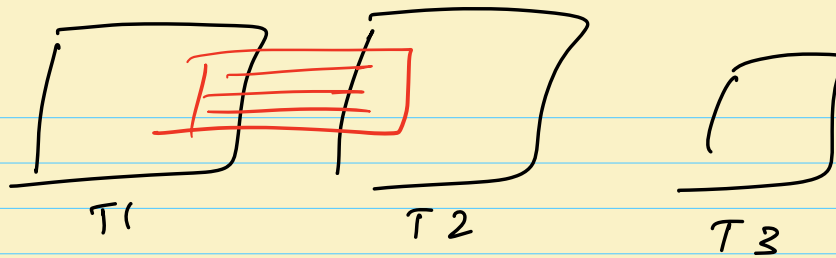
Students

id	fname	lname

Batch

Placement's Test — Average RSP of each batch

1. View = Read the data [But not update]



10.

Stored Procedures + UDFs

Topic not covered

1. Trigger <sup>X</sup> → Constraints <sup>✓</sup>

2. Cursors <sup>X</sup>

3. NoSQL <sup>X</sup>

↳ HLD [NoSQL vs SQL]

9:05

10:00 - 10:10

11:00, Doubt Session

HW → 22 Queries

mark bench

Schema Design → TAs

## Definitions

Data → Information specific to business problem

Airbase → Databse { Data is stored & managed in a databse }

## DBMS (Database Management System)

The software which helps us manage databases.

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## Types of DBMS

### 1. File System

Q1) Can I use a file system as a DBMS?

Scaler ✓✓

Students.txt ✓  
Batchus.txt ✓  
Instructor.txt ✓

id	fname	lname	email	bid
1	Sameet	Mahil	sm2s	1
2	cbc	dy	abc2s	1
3				
⋮				
⋮				

Students.txt

"Su"

Problems in using file system as a DBMS?

1. Data Retrieval is not efficient

MySQL (DBMS) → SOL  
Structured Query Language

MySQL

Select \* from Students where first-name LIKE 'Su%';

## 2. Data Inconsistency & Duplication

id	fn	ln	email
1	abr	def	a@b.com
2	ghi	mno	g@h.com
3	pqr	sta	a@b.com

Students.txt

Unique key constraint

DBMS (MySQL) → Constraint  
 Unique key

Batches.txt		Students.txt		
id	batch-name	id	name	bid
1	Jan 23	1	A	1
2	Dec 22	2	B	1
3	Nov 22	3	C	2
		4	D	2
		5	E	3
		6	F	4

FK

DBMS → Constraint (Foreign key)

→ Normalisation → 2<sup>nd</sup> & 3<sup>rd</sup> Lecture

### 3. Security

U1 → Read files ✓  
       └ Create X  
       └ Delete X  
       └ Update X

U2 → Read ✓  
       Create ✓  
       Delete ✓  
       Update ✓ X

U → ABC

Students.txt

—	<u>Add new rows</u>	✓	✓
—	<u>Delete old rows</u>	X	✓
—	<u>Update old rows</u>	X	✓

File System

### DBMS : Security & Permissions

U1 → Insert

U2 → Delete  
       Read

id	fname	lname
—	—	—
—	—	—

Students,



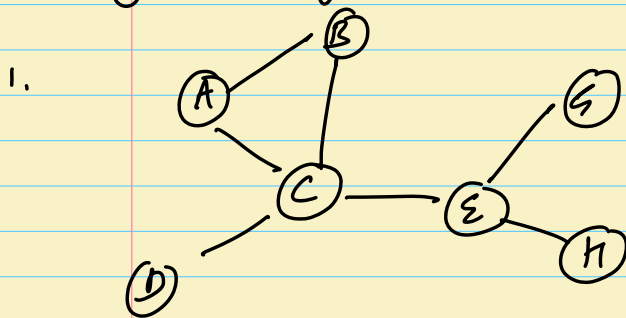
Granular

DBMS = Software ~~Files~~

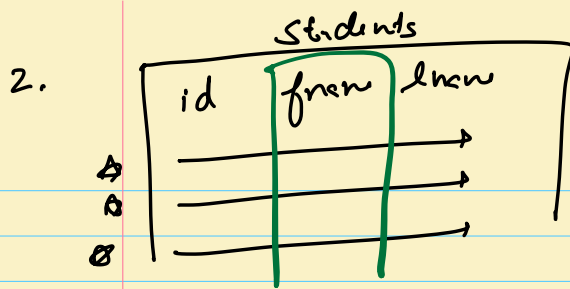
Break = 10:10 - 10:20

- Type of DBMS [HLD]
- RDBMS → Terms
  - ↳ Properties
- Keys
- Intro to SQL

Types of DBMS



neo4j = Graphs.



Cassandra  
focuses on  
columns of data.

3. Key - Value Redis

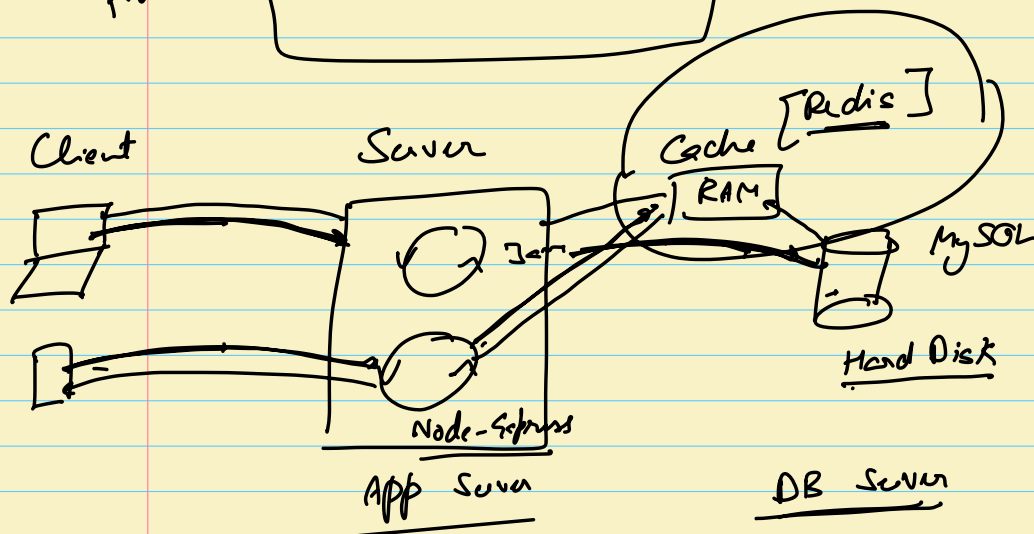
4. Document Oriented MongoDB

VS

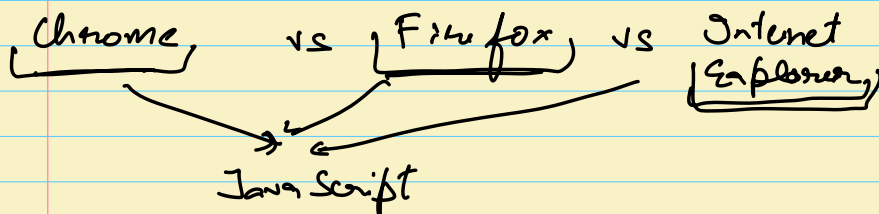
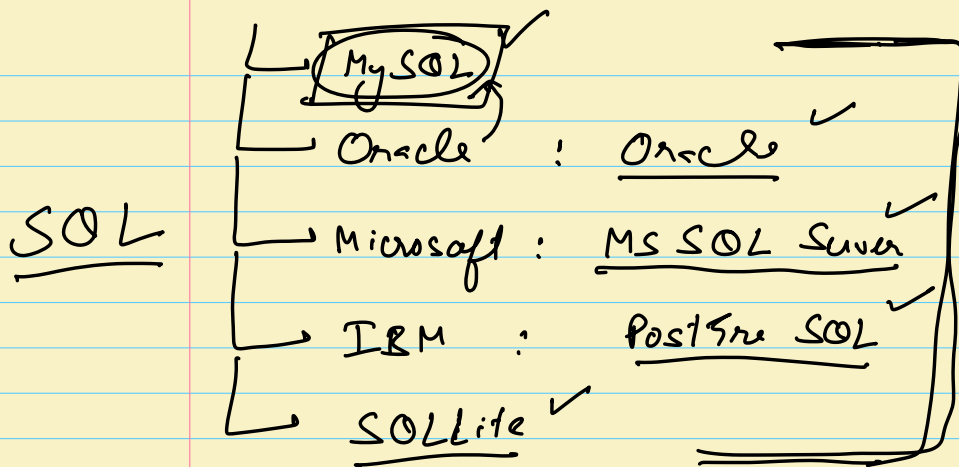
5. RDBMS

→ 1. vs 2. vs 3. vs 4. vs 5

HLD NoSQL vs SQL



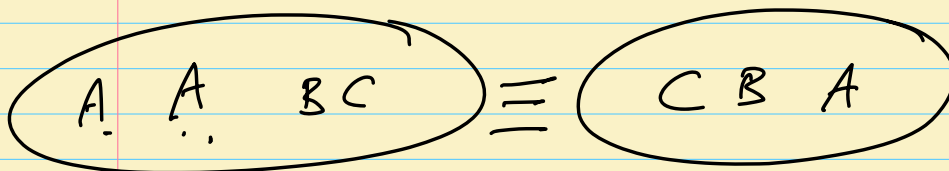
# RDBMS



## Terms related to Relational Database

Work on the concepts  
of Sets & Relations

$A - B$        $A \cap B$        $A \cup B$



S1

S2

→ Order doesn't matter in a set

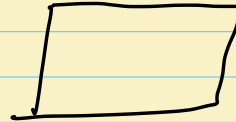
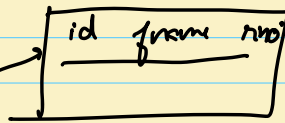
→ Set contains unique values.

Terms → Entity, Class, Table

1. Relation

Students

Batches



2. Attribute : Column Names or Properties of class

3. Tuple : Row or Record.

4. Degree : Count of Columns

5. Cardinality : Count of Rows in a Relation

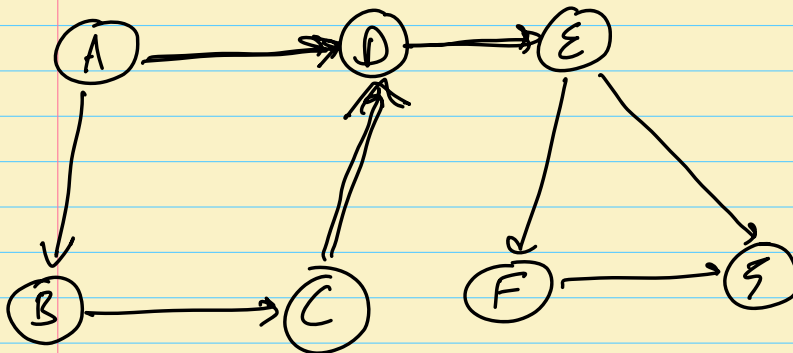
Students

id	name	roll no
1	A	25
2	C	26

1, A, B, 25

2, C, D, 26

Number or Count



In Degree of D =

Out Degree of D =

Keys : Any collection of attributes that can uniquely identify a tuple inside a relation.

1. Super key
2. Candidate key
3. Composite key
4. Primary key
5. Foreign key.
6. Unique key

Students : fn, ln, email, pno

A B aab XXX

A C aac YYY

	SK	CK	Composite keys.
fn	X	X	X
ln	X	X	X
fn, ln	X	X	X
<u>fn, ln, email</u>	<u>✓</u>	X	<u>✓</u>
<u>fn, ln, email, phone</u>	<u>✓</u>	X	<u>✓</u>

<u>ln, email, phone</u>	✓	X	✓
<u>email, phone</u>	✓	X	✓
<u>email</u>	✓	✓	X
<u>phone</u>	✓	✓	X

Candidate key → Can't have unnecessary attributes. All the attributes combined help in uniquely identifying a tuple.

Seat ?

Seat in a show?

Show

id	Name	Timing
1	Aster2	9:00 am
2	"	12:00 pm
3	"	3:00 pm
4	"	6:00 pm
5	"	9:00 pm

Seats

id	row	col
1	A	1
2	A	2
3	A	3
4	B	1
5	B	2

ShowSeat

status	show id	seat id	
Yes	4	1	A1 for 6 PM ✓
Yes	4	2	A2 " 6 PM ✓
No	5	1	A1 " 9 PM X

## Show Seat Relation

	SK	CK
<u>Show id</u>	X	X
Seat id	X	X
<u>Show id, Seat id</u>	✓	✓

Show id, Seat id ✓ vs email, phone

Super key ✓

Candidate key ✓

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Primary key  
Foreign keys  
Unique keys. }