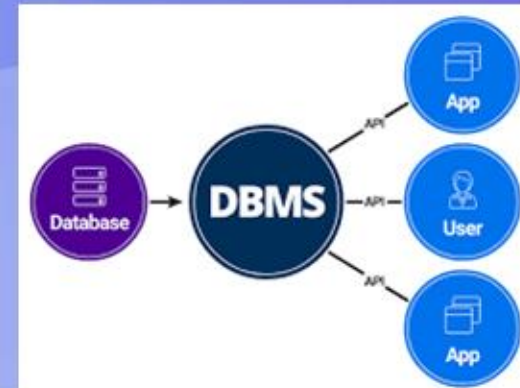


Database Management System COMP 202TH



Lecture: 1 Database.....What is it? & why we need it?

Data

- Your Name
- ID
- Course
- Semester/Year
- Subject
- Email
- Etc...



**Known facts that
can be recorded
and have implicit
meaning**

- ❑ **You want to store this data somewhere.**

**What now
when you
have
some
data...**



OK lets store in a spreadsheet

Name	ID	Course	Semester	Subject	Email	AdhaarNo	Admitted On	CollegeRoll
Harsh Thakur	2107799	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	clasiharsh@gmail.com	964954357739	2021-09-02 06:30	21BCS071
Shivam Thakur	21071069	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	shivam1705st@gmail.com	429791456357	2021-09-02 06:27	21BCS070
Sahil Kumar	21082544	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	anshulthakur4043@gmail.com	392310877005	2021-09-02 06:15	21BCS069
Kanika	21071050	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	kanika310422@gmail.com	874740859085	2021-09-02 05:26	21BCS068
Vikrant Chand Katoch	21082890	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	vikrant1069@gmail.com	785532027127	2021-09-02 05:21	21BCS067
Tushar Verma	21081809	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	vermatushar1117@gmail.com	690852416754	2021-09-02 05:11	21BCS066
Sunyour	2107411	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	SAKLANISUNYOUR@GMAIL.COM	701739065015	2021-09-02 04:56	21BCS065
Aditya Kumar	21082554	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	aditya7900397@gmail.com	396130339432	2021-09-02 04:55	21BCS064
Dhruv Thakur	21083207	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	dthakur2807@gmail.com	203441059848	2021-09-02 03:45	21BCS063
Riya Thakur	2107451	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	rr9409097@gmail.com	809631557359	2021-09-02 03:21	21BCS062
Sahil Parmar	21081131	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	sahilparmar0794@gmail.com	466653126805	2021-09-01 11:21	21BCS061
Shubham Sharma	21071074	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	sharmashubham74524@gmail.com	856884295984	2021-09-01 11:00	21BCS060
Priyansh Rajput	21082658	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	priyanshrajput567@gmail.com	994397802895	2021-09-01 07:32	21BCS059
Abhinav Thakur	21082007	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	khushi7807839379@gmail.com	808343445013	2021-09-01 06:46	21BCS058
Abhishek Kaushal	21082851	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	abhikaushal215@gmail.com	646839232933	2021-09-01 05:28	21BCS057
Aryaman Pathak	21081485	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	Aryamankaintjatt2017@gmail.com	224332865708	2021-09-01 03:36	21BCS056
Jatin Verma	21082098	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	vermajatin2004@gmail.com	931467943831	2021-08-31 14:07	21BCS055
Akshay Dhiman	21082657	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	dhimanakshay485@gmail.com	950928356099	2021-08-31 07:07	21BCS054
Rishant Sharma	21082505	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	rsharma75800@gmail.com	888834318313	2021-08-31 06:49	21BCS053
Saurabh Chand Katoch	21082512	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	saurabhckatoch@gmail.com	429149015962	2021-08-31 06:38	21BCS052
Anish Jaswal	21083118	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	jaswalanish225@gmail.com	653507267796	2021-08-31 05:58	21BCS051
Jiten	2107803	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	thakurjiten92@gmail.com	228421855130	2021-08-31 05:18	21BCS050
Nittin Thakur	21082955	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	nitinthakurmithu9015@gmail.com	670747703619	2021-08-31 04:58	21BCS049
Ishita Thakur	21082840	B.Sc. Physical Science (Phy. CompSci. and Math)	1st Year	Computer Science	ishitathakur575@gmail.com	225097864662	2021-08-31 04:50	21BCS048

So this spreadsheet is satisfying our need.

Just having a data is not good enough reason to need a database..... and it's not the problem

What if you have to store data of all the students in the college approx. 5000 students

Now, say there are 100 colleges $\rightarrow 100 * 5000 =$ data of 50000 students

Are you going to scroll down in the spreadsheet to get the 49999 student?

Do you care about if someone else got an access to your data?

Is it fine to have duplicate information along the spreadsheet?

When do we need a database?

Size: You may have thousands or millions of rows of students or customers or any piece of information.

Accuracy: Do you care if someone entered incorrect data. Nothing could actually prevent me from typing incorrect data into a spreadsheet.

Security: If the data is sensitive and you need to restrict the access to the data.

Do you need to know who made every change at every point?

Redundancy: Having multiple copies of the same data will lead to conflict, you would need to have only a non-repeated unique data.

Importance: What if you had a crash and all your data was lost? Its unacceptable to lose important data.

Overwriting: What about having more than one person overwriting the same data at the same time. You will end up with everybody overwriting everybody else's changes.

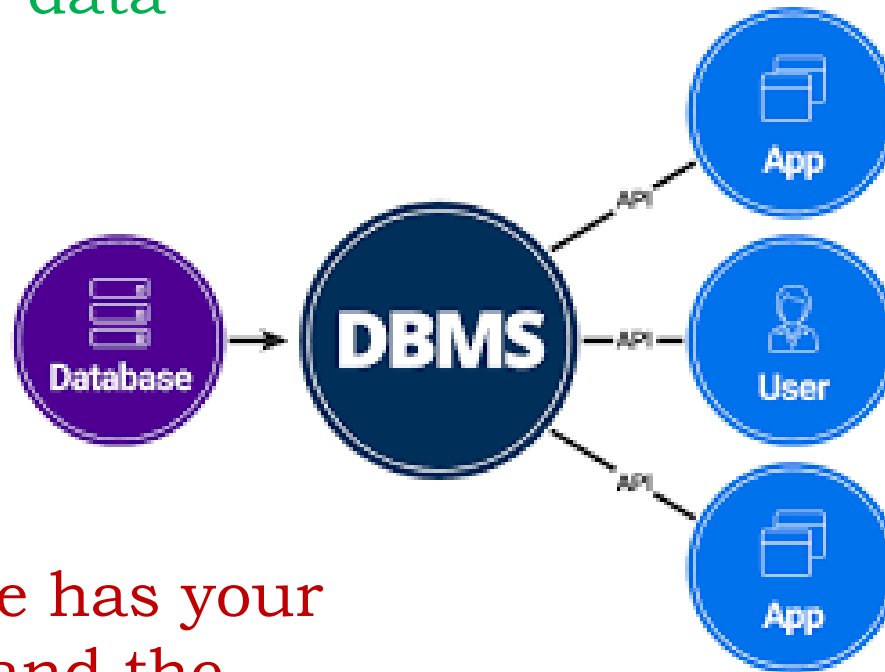
Database

- It's a **structured system to put your data in**, that imposes rules upon that data, and the rules are yours, because the importance of these problems changes based on your needs.
 - May be your problem is the size, while for some sensitivity is the highest concern.
- A **database is a collection of related data**.
- A database is an electronic system that allows data to be **stored, easily accessed, manipulated and updated**.

Database Management System (DBMS)

- The DBMS is **the software** that would be installed on your personal computer or on a server, then you would **use it to manage one or more database.**
- Example:
 - Oracle
 - MySQL
 - SQL Server
 - MongoDB

DMBS is the program that surrounds and manages your actual data

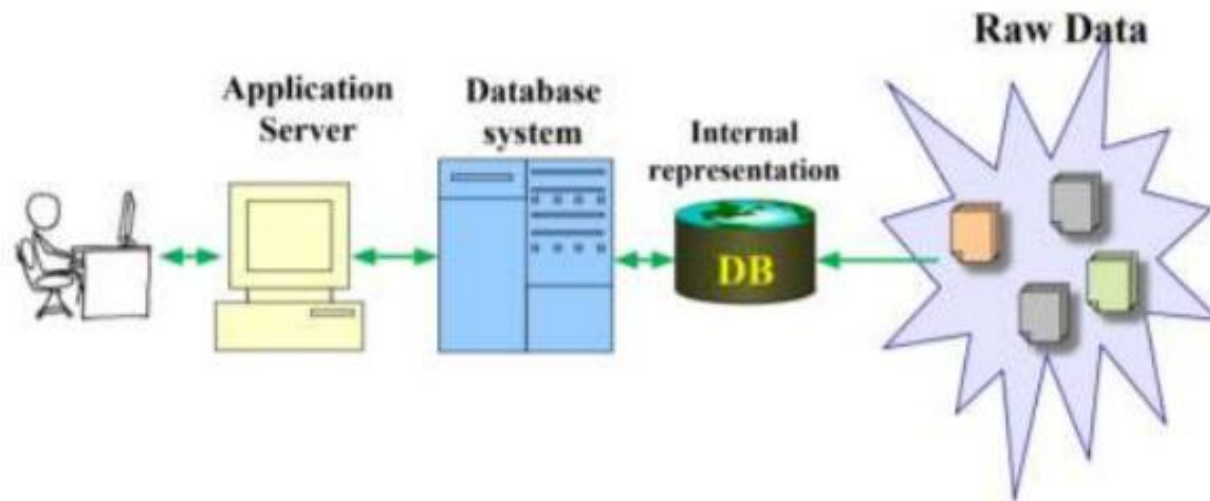


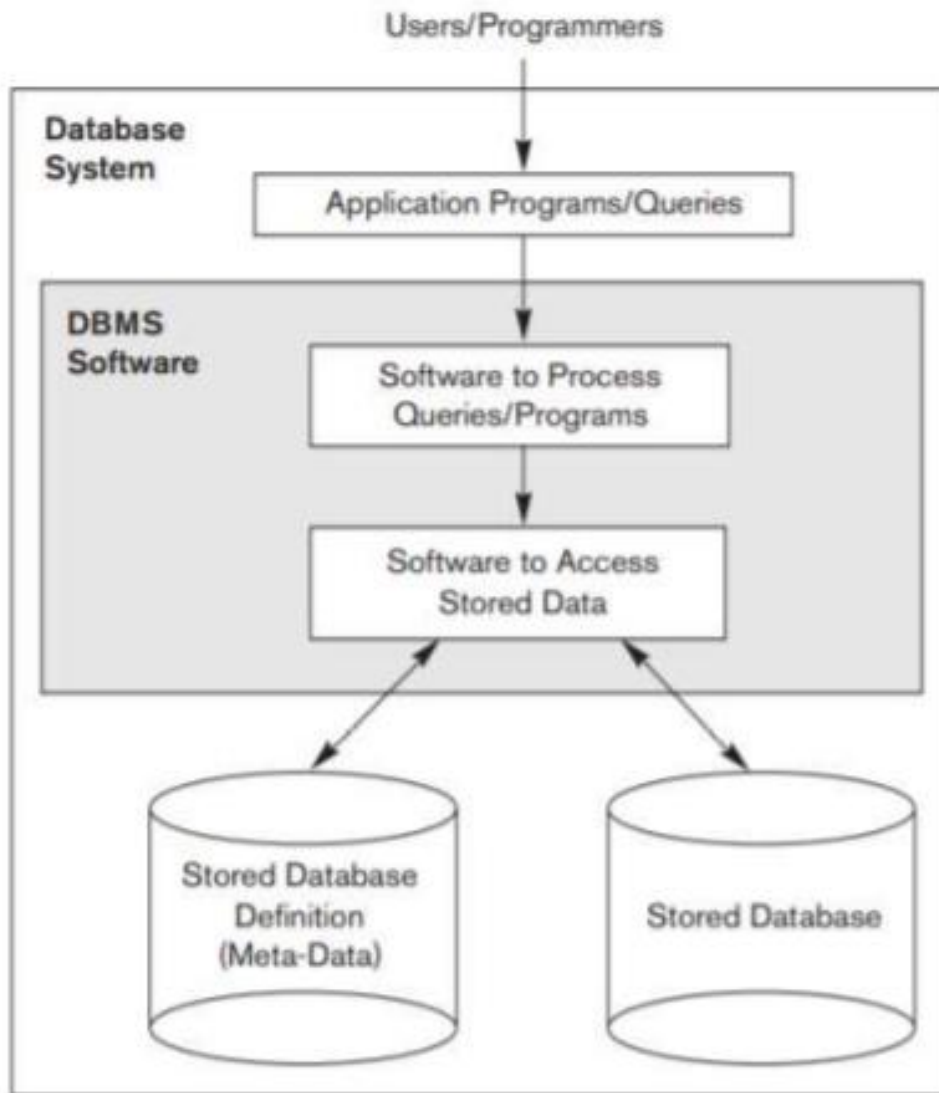
The database has your actual data and the rules about that data

Database Vs DBMS

- The database **has your actual data and the rules about that data,**
- While the DBMS is the program that **surrounds and manages your actual data and it enforces the rules** you specified on your data.
 - The rules for example could be the type of data like integer or string or the relationship between them.

Database System Environment





Database System Environment

- Defining a particular database in terms of its data types, structures and constraints.
- Construct or load the initial database contents on a secondary storage medium (i.e. hard drives)
- Manipulate the database:
 - Retrieval: Querying, generating reports
 - Modification: Insertions, deletions and updates to its content
- Processing and sharing by multiple concurrent users and application programs- yet, keeping all data valid and consistent.

File Oriented System

- Conventional Approach(File Oriented Approach);
 - store **data locally** and develop program(s) for each type of application
 - Every subsystem of the information system will have its **own set of files.**
 - Offered **little flexibility and were difficult** to maintain as the system becomes more complex.

Limitations of File Processing System

- Separated and Isolated Data
- Data Redundancy
- Program-data interdependence involving file formats and accessing techniques:
 - E.g. a field in the sales file might be coded as “decimal” while the same field in the customer file could be coded as “binary”.
- Difficulty in representing data from user’s view:
 - Difficult to determine relationships between isolated data in order to meet user requirements.
- Data inflexibility

File Oriented System versus Database System

- Data Independence
- Data Redundancy
- Data Integrity
- Centralized Control
- Security
- Performance and Efficiency