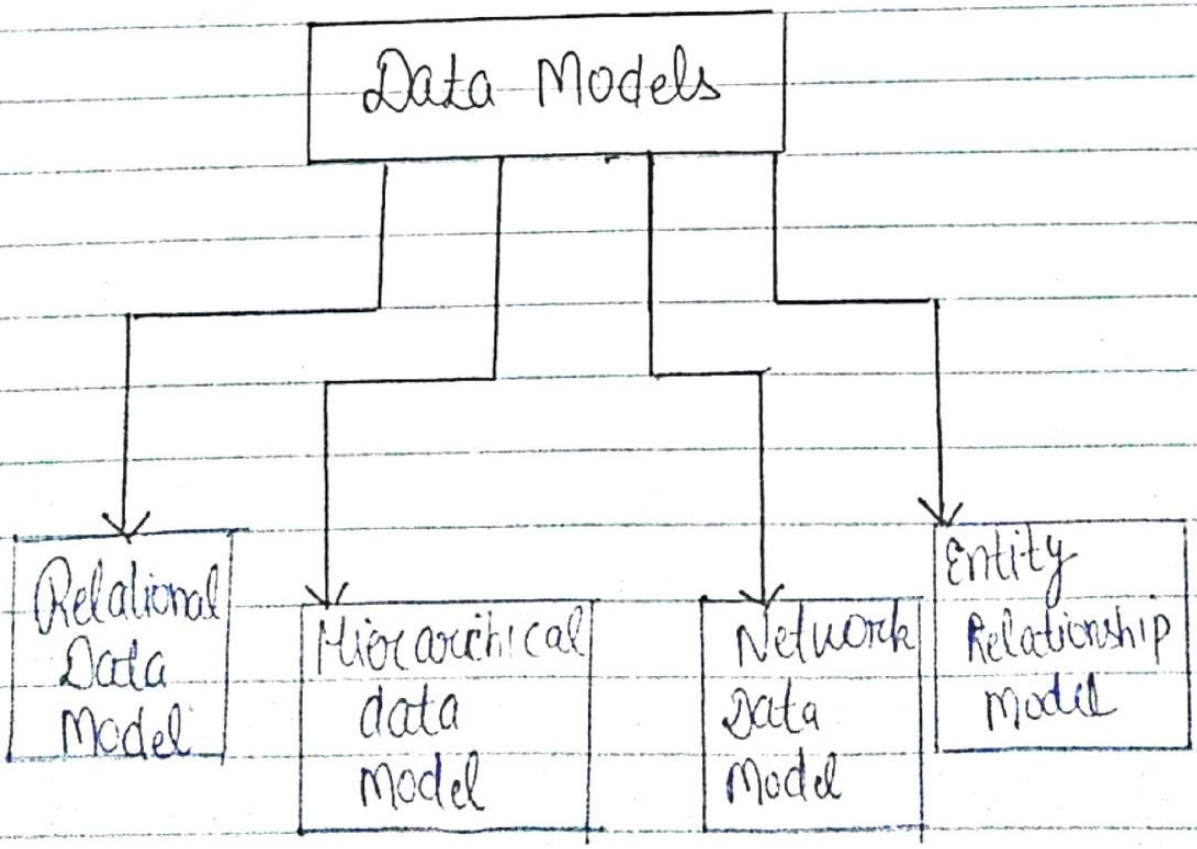
Data Models

* Introduction to Data Models :-

- Data Model is the modeling of data description, data semantics and consistency constraints of the data.
- Data models define how data is connected to each other and how they are Processed and stored inside the system.
- Data models define how the logical structure of a database is modeled.



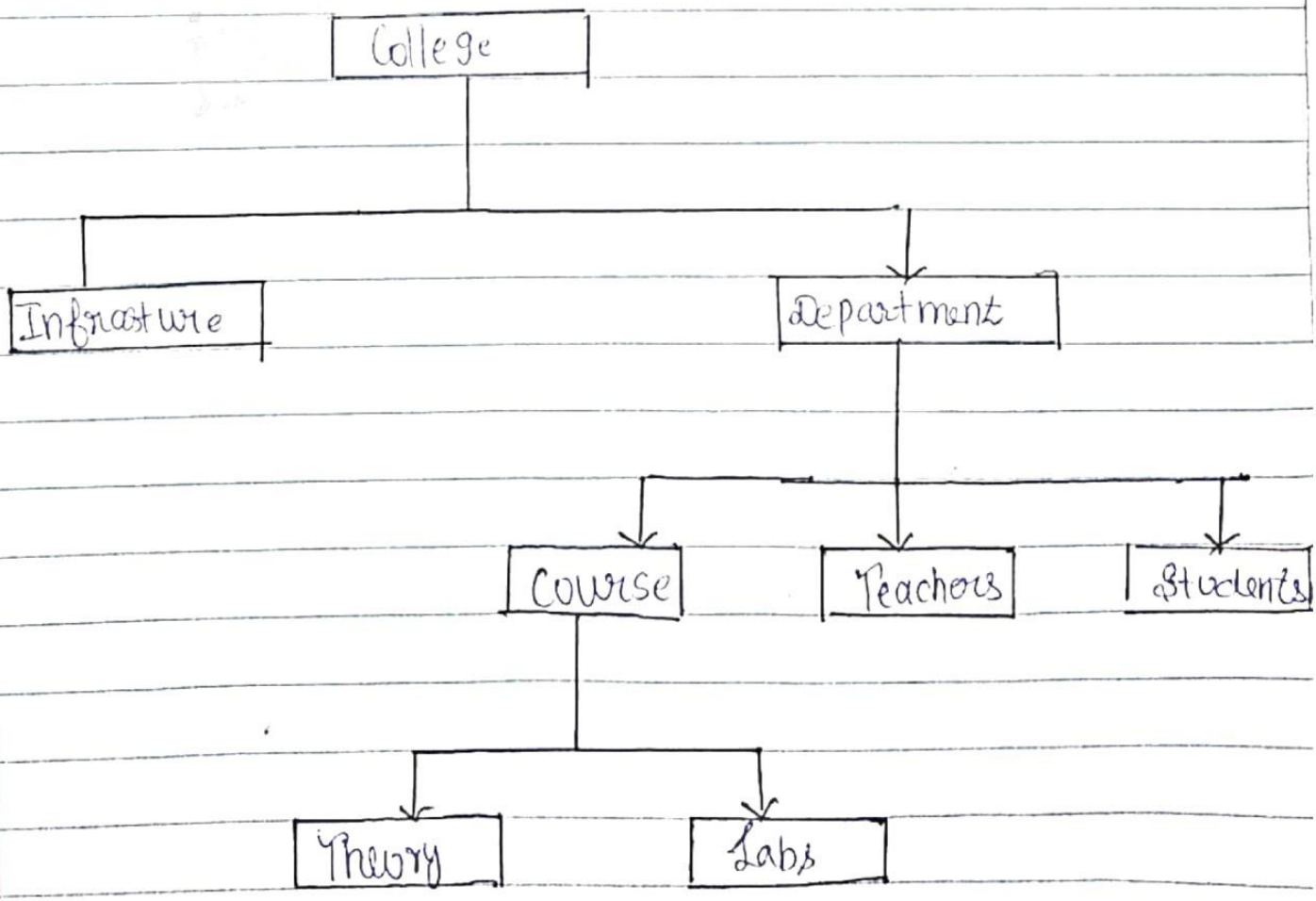
(1) HIERARCHICAL MODEL

- Hierarchical model is one of the oldest database model's.
- It was developed by IBM, in the 1950s.
- The hierarchical data model organizes data into a tree structure, with a single root, to which all the other data is linked.
- Tree Structure i.e. hierarchy of Parent and child record relationships.
- In this model, a child node will only have a single parent node.
- A Parent child relationship type is a 1:N relationship between two record type.
  - → On One side is called Parent record type.
  - → On the N side is called the child record type.

- Each child can have only one Parent, where as each parent node can have more child or no child at bottom level.

- Example: (I) In banking industry banks have multiple branches with multiple ... customers who have multiple accounts.

(II) One department can have many courses, many professors and many students.



- Sample database consisting of three records types : BOOKS, SHOPKEEPER, and BOOKS_ORDER.

→ The BOOKS record type contains for each book, a Book_Id, BOOK_title , Price, Author and Publisher.

→ The SHOPKEEPER record type contains for each shopkeeper : shop_Id, Shop_Name, phonenumber, city.

→ The BOOKS_ORDER record type contains for each order a BOOK_Id, Shop_Id and quantity order

BOOKS Table

BOOK_Id	BOOK_title	Author	Publisher	Price
B1	C	ABC	LPB	175
B2	C++	XYZ	BPB	200
B3	JAVA	PQR	Tata	250
B4	PYTHON	JPwob	PHI	195

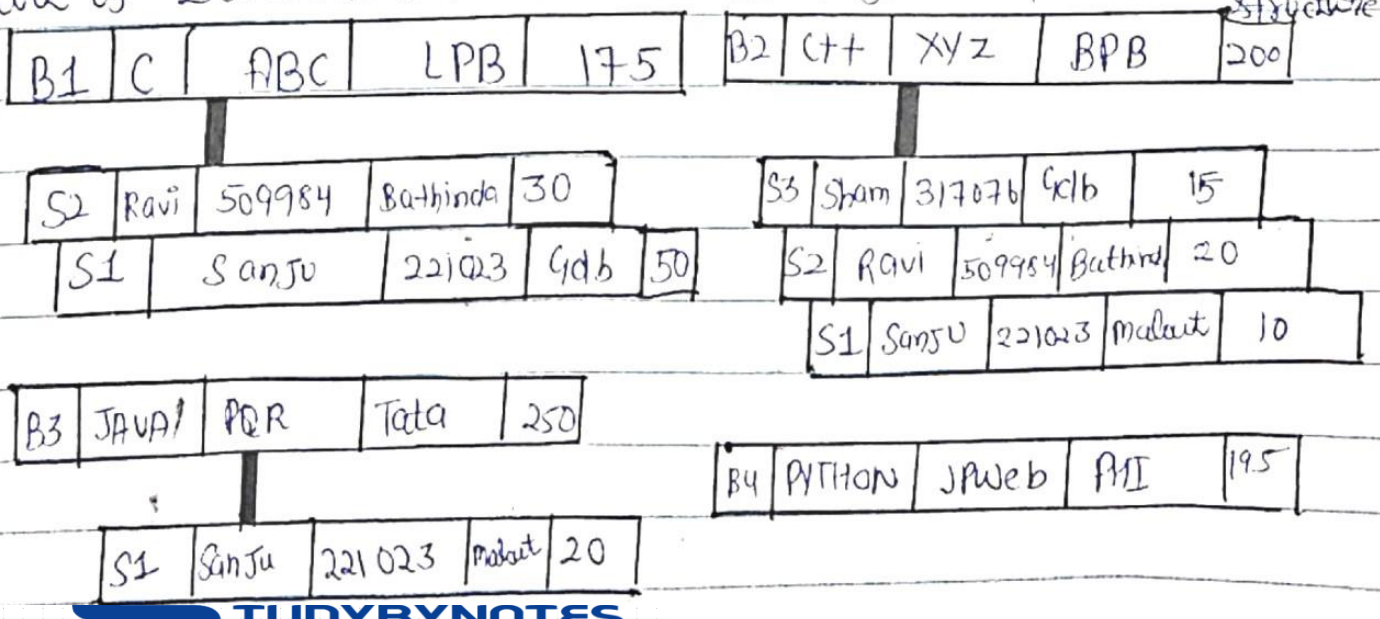
SHOPKEEPER TABLE

Shop_Id	Shop_Name	Ph No	City
S1	Sanju	221023	malout
S2	Ravi	509984	Bathinda
S3	Sham	317076	Gdb

BOOKS_ORDER Table

Shop_Id	Book_Id	Qty_order
S1	B1	50
S1	B2	10
S1	B3	20
S2	B1	30
S2	B2	20
S3	B2	15

* Hierarchical diagram as shown below which represents the part of the whole sales database. The diagram depict the tree structure



* Operations ON HIERARCHICAL MODEL :-

1. Insertion Operation :- The insert Operation is used to insert a new record into the database.

→ The newly Inserted record becomes the current record for the database.

→ If the inserted Record is root record then it creates new hierarchical tree with the new record as the root. But if it is a child record then we should make its Parent first because a child node cannot exist without a parent (root).

Insertion of New Book, B5

Parent → | 135 | HTML | Pankaj | LP | 90 |

No Problem encountered

Insertion of New Shopkeeper, S4

(?) missing Parent

child → | S4 | ABHI | 225566 | Chq | ? |

Problem encountered due-to Missing Parent Record

(2) Deletion Operation:-

The delete operation is used to delete a record from the database. To delete a record from the database, we first make it current record and then issue the delete command.

→ If the user want to delete the Parent node without a child node, it would be Performed easily for example:- B4 then no problem will occur

→ If the user wants to delete the Parent record then it would delete all the child nodes also because deletion of any record occurrence automatically delete all dependent occurences too.

(3) Updation Operation:-

- The updation operation is used to update a record in database.
- for example:- If we want to modify the Price of Book B1 from Rs. 175 to 200.

(4) Retrival Operation:-

The Process of searching and fetching of a record in the database is known as retrieval of a record.

* Advantages of Hierarchical Model :-

- It Manages large amount of data.
- It Improves data sharing.
- It is very efficent to handle large nomber of transactions.
- Many children per Parent.
- It have many different Structures and forms.

* Disadvantages of Hierarchical Model :-

- One Parent per child.
- Data Independence.
- The Physical link make it very difficult to expand or modify the database.
- Many to many relationship not supported.