Userid	Name	Mobile	Email	Acno	Balance	type
1	Kishori	2323	asd@gmail.com	1234	4567	saving
1	Kishori	1111	asd@gmail.com	1235	5678	demat
1	Kishori	1111	asd@gmail.com	1245	6789	current
2	Rajan	222	raj@gmail.com	2345	5678	saving
3	Sahil	3333	sah@kjddj			

Insertion anamoly

If you try to insert a customer record who did not open the account then you will not be able to add the customer information in account table, because primary key cannot be null

Deletion anamoly

If a customer has only one account and if the customer decided to close the account, then along with account details we will lose customer details also.

Updation anamoly

If in the table there are many accounts for one customer, and if customer changes the mobile number for one account maybe it will remain unchanged for other account

Userid	Acno	Balance	type
1	1234	4567	saving
1	1235	5678	demat
1	1245	6789	current
2	2345	5678	saving

Userid	Name	Mobile	Email
1	Kishori	2323	asd@gmail.com
2	Rajan	222	raj@gmail.com
3	Sahil	3333	sah@kjddj

Normalization

Storing data in multiple small tables to avoid insertion, updation and deletion anamoly, and also reduce the redundancy of data to maintain integrity of data(correctness of data).

Types of normalization

1NF,2NF,3NF,3.5NF(BCNF), 4NF

What is 1 NF

If every row and every column contains single value, and each column contains the values of same domain, then the table is in 1 NF.

Sid	studentname	marks	mobile
1	Rakesh	67,89,78	111,333
2	Saket	78,56,78	222
3	Dilip	78,87,99	567,789

Sr.key	Sid	studentname	marks	mobile
1	1	Rakesh	67	333
2	1	Rakesh	89	111
3	1	Rakesh	78	333
4	2	Saket	78	222
5	2	Saket	56	222
6	2	Saket	78	222
7	3	Dilip	78	567
8	3	Dilip	87	789
9	3	Dilip	99	567

In above table since every row and every column contain atomic value, so it is in 1NF.

What is 2NF

All non-prime attributes should be dependent on all prime attributes and not on portion of it.

Partial functional dependency should not be there.

Sid	Coursename	sname	cid	Marks
1	JAVA	Rakesh	100	87
1	.NET	Rakesh	200	89
2	JAVA	Dinesh	100	88
2	.NET	Dinesh	200	89
1	JAVA	Rakesh	100	95

To check the table is in 2NF or not

1. It should be in 1 NF
2. No partial dependency is there
   Primary key --- > sid+cid
   Prime attribute- all the attributes which forms primary key/candidate key is called as prime attribute
   Non prime attribute- all attributes which are not part of primary key are called as non prime attributes
   Prime attributes --- sid, cid
   Non prime attributes – sname, coursename, marks
   Sid--→sname
   cid-→cname
   sid+cid-→marks

Sid	cid	Marks
1	100	87
1	200	89
2	100	88
2	200	89

student

Sid	sname
1	Rakesh
2	Dinesh

course

cid	Coursename
100	JAVA
200	.NET

What is 3 NF

1. The table should be in 2NF
2. Transitive dependency should not be there.
   What is transitive dependency
   x->y y->z so x-→z
   In which if x is a prime attribute, y is non prime attribute, z is also no prime attribute

cid	cname	studid	sname	fid	fname
1	DAC	1	Rajesh	1	Rohit
2	DBDA	2	Ramesh	1	Rohit
3	DTISS	3	Rekha	3	Anil
1	DAC	4	Dipak	1	Rohit
1	DAC	5	Sonali	1	Rohit

One student can be admitted for one course

And one faculty can look after many courses

But for one course there is only one faculty member.

Is the given table in 2NF---yes

Prime attribute ---→ studid

Nonprime attributes--→sname, cid,cname,fid,fname

Studid--→cid--→cname

Studid->fid--→fname

Studentid-→cid--→fid

Course_student

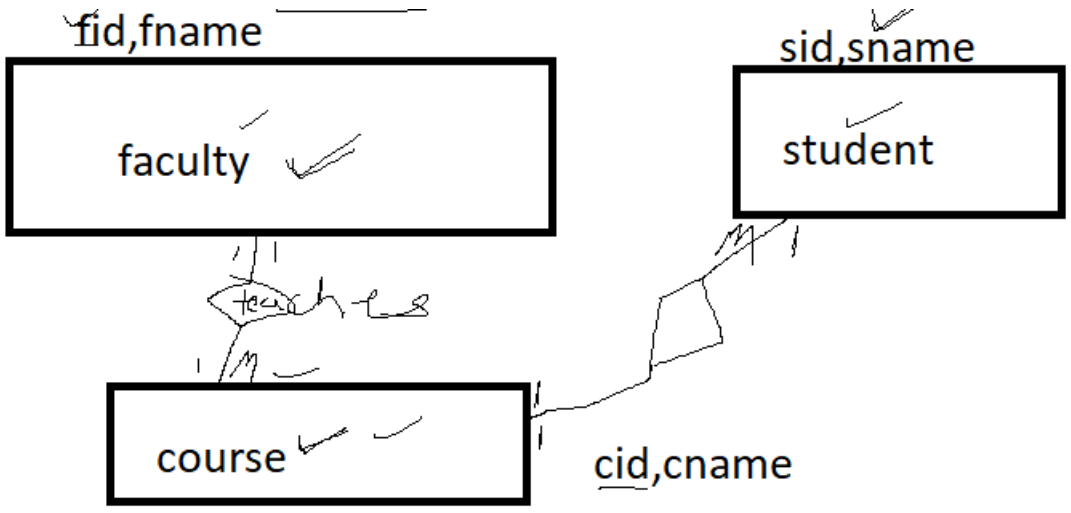
cid	studid	sname
1	1	Rajesh
2	2	Ramesh
3	3	Rekha
1	4	Dipak
1	5	Sonali

course

cid	cname	fid
1	DAC	1
2	DBDA	1
3	DTISS	3

faculty

fid	fname
1	Rohit
3	Anil

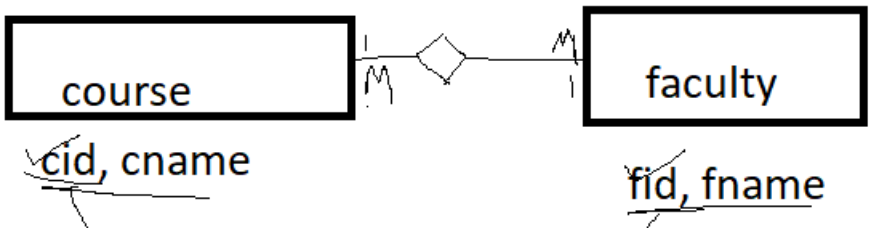


Thre levels

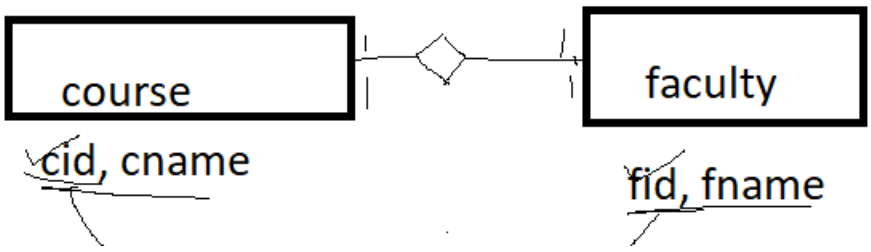
1. Conceptual – If you find entities and relation between entities then it is conceptual model
2. Logical level--- if for every entities you define attributes then it is called as logical model
3. Physical ----- if for every attribute you assign data type and constraints then it is called as physical data model.

ER diagrams

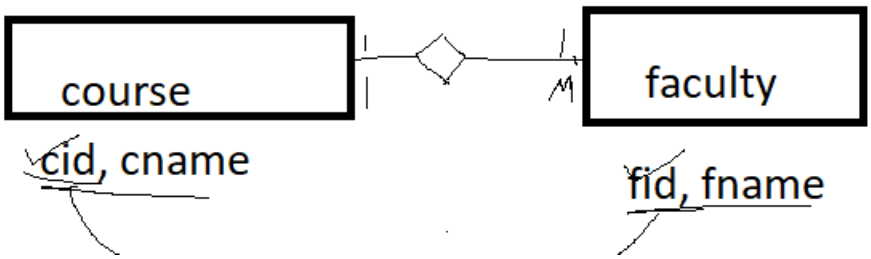
1. One To Many-→ key of one side will be added to many side
2. One to One -→ then any one side key will go to other side
3. Many to Many --→ then a separate relation table will be created , add keys of both sides into relation table.



Create relation table by adding cid and fid columns



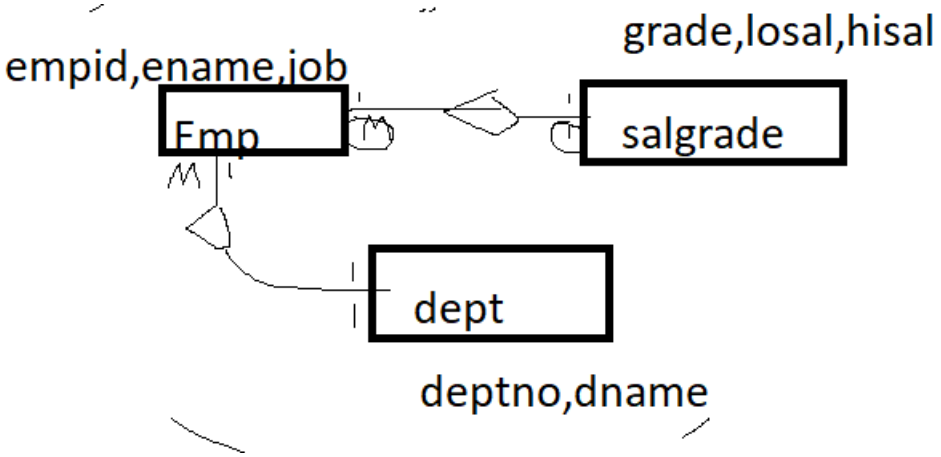
If course is important then add fid in course table, otherwise add cid in faculty table



Add cid into faculty table

Example 2

```
-> inner join salgrade s on e.sal between s.losal and s.hisal;
+-------+--------+-----------+------+------------+---------+---------+--------+--------+------------+----------+-------+-------+-------+
| EMPNO | ENAME  | JOB       | MGR  | HIREDATE   | SAL     | COMM    | DEPTNO | DEPTNO | DNAME      | LOC      | GRADE | LOSAL | HISAL |
+-------+--------+-----------+------+------------+---------+---------+--------+--------+------------+----------+-------+-------+-------+
|  7369 | SMITH  | CLERK     | 7902 | 1980-12-17 | 1040.00 |    NULL |     20 |     20 | RESEARCH   | DALLAS   |     1 |   700 |  1200 |
|  7521 | WARD   | SALESMAN  | 7698 | 1981-02-22 | 1250.00 |  500.00 |     30 |     30 | SALES      | CHICAGO  |     2 |  1201 |  1400 |
|  7654 | MARTIN | SALESMAN  | 7698 | 1981-09-28 | 1250.00 | 1400.00 |     30 |     30 | SALES      | CHICAGO  |     2 |  1201 |  1400 |
|  7900 | JAMES  | CLERK     | 7698 | 1981-12-03 | 1235.00 |    NULL |     30 |     30 | SALES      | CHICAGO  |     2 |  1201 |  1400 |
|  7499 | ALLEN  | SALESMAN  | 7698 | 1981-02-20 | 1600.00 |  300.00 |     30 |     30 | SALES      | CHICAGO  |     3 |  1401 |  2000 |
|  7844 | TURNER | SALESMAN  | 7698 | 1981-09-08 | 1500.00 |    0.00 |     30 |     30 | SALES      | CHICAGO  |     3 |  1401 |  2000 |
|  7876 | ADAMS  | CLERK     | 7788 | 1983-01-12 | 1430.00 |    NULL |     20 |     20 | RESEARCH   | DALLAS   |     3 |  1401 |  2000 |
|  7782 | CLARK  | MANAGER   | 7839 | 1981-06-09 | 2695.00 |    NULL |     10 |     10 | ACCOUNTING | NEW YORK |     4 |  2001 |  3000 |
|  7934 | MILLER | CLERK     | 7782 | 1982-01-23 | 2197.00 |    NULL |     10 |     10 | ACCOUNTING | NEW YORK |     4 |  2001 |  3000 |
|   100 | xxx    | SALESMAN  | NULL | NULL       | 2345.00 |    NULL |     10 |     10 | ACCOUNTING | NEW YORK |     4 |  2001 |  3000 |
|  7566 | JONES  | MANAGER   | 7839 | 1981-04-02 | 3272.50 |    NULL |     20 |     20 | RESEARCH   | DALLAS   |     5 |  3001 |  9999 |
|  7698 | BLAKE  | MANAGER   | 7839 | 1981-05-01 | 3448.50 |    NULL |     30 |     30 | SALES      | CHICAGO  |     5 |  3001 |  9999 |
|  7788 | SCOTT  | ANALYST   | 7566 | 1982-12-09 | 3600.00 |    NULL |     20 |     20 | RESEARCH   | DALLAS   |     5 |  3001 |  9999 |
```



Example 3

- roomno
- customerno
- booking date
- roomname
- roomlocation
- cname
- adress
- city
- state
- Email list
- phonenumber
- rateofroom
- mgrno
- managername

Rules
1.One customer can book many rooms
2.One room can be booked by many customers on different date
3. Booking of a customer is managed by one manager
4. One manager can book many room for many customer

roomid	Custid	Bkdt	Rname	cname	rloc	address	city	state	phonenum	Mgrno	Mgname	bkrate	Std rate
1	1	10 oct 20										3000	5000
1	2	10oct 22										4000	5000
1	3											5000	5000

Room id--→ roomname,roomloc, stadard rate,mgrno,mname
Roomid+bkdate-→ custid,cname,address,city,state,phonenumber,bk-rate

These are in 2NF
(Room id, roomname,roomloc, stadard rate,mgrno,mname)
(Roomid,bkdate,custid,cname,address,city,state,phonenumber,bk-rate)

Are they in 3NF
Manager(mgrno,mname)
room
(Room id, roomname,roomloc, stadard rate,mgrno)
customer
(custid,cname,address,city,state,phonenumber)
booking
(Roomid,bkdate,custid, bk-rate)
Email(custno,email)

It is not in 1NF because multiple emails for 1 customer
email
Custid, email