SESSION 12_Normalization

Creating foreign key.
BLUEPRINT:

		emp			
id	fname	lname	age	gender	email
		dep			dep_emp
	depid	depname		dep.depid	emp.id
	101	IT		101	2
	106	HR		106	3
	105	F		101	5
	220	A			

#emp Table:

```
mysql> SELECT * FROM emp;
+-----+---------+---------+------+--------+-----------------+
| id  | fname   | lname   | age  | gender | email           |
+-----+---------+---------+------+--------+-----------------+
|  -1 | ancient | one     | 3500 | F      | zzzz@marvel.com |
|   0 | natasha | romanof |   30 | F      | zzzz@marvel.com |
|   1 | nayan   | gadhari |   22 | M      | zzzz@marvel.com |
|   8 | wanda   | witch   |   29 | F      | zzzz@marvel.com |
|  23 | hope    | wasp    |   28 | F      | zzzz@marvel.com |
|  38 | peter   | parker  |   18 | M      | zzzz@marvel.com |
|  40 | nick    | fury    |   45 | M      | zzzz@marvel.com |
|  78 | wanda   | witch   |   89 | F      | zzzz@marvel.com |
|  89 | bruse   | banner  |   24 | M      | zzzz@marvel.com |
|  98 | wanda   | witch   |    9 | F      | zzzz@marvel.com |
| 283 | tony    | stark   |   35 | M      | zzzz@marvel.com |
| 980 | steve   | rogers  |    9 | M      | zzzz@marvel.com |
| 988 | steve   | rogers  |    9 | M      | zzzz@marvel.com |
+-----+---------+---------+------+--------+-----------------+
13 rows in set (0.00 sec)
```

#dep TABLE:

```
mysql> SELECT * FROM dep;
+-------+---------+
| depid | depname |
+-------+---------+
|   101 | IT      |
|   104 | HR      |
|   109 | A       |
|   678 | F       |
|   999 | BOD     |
+-------+---------+
5 rows in set (0.00 sec)
```

#info TABLE:
CREATE TABLE table_name(depid int, id int, FOREIGN KEY(dep id) REFERENCES dep(depid), FOREIGN KEY(id) REFERENCES emp(id));

```
mysql> CREATE TABLE info(depid int, id int, FOREIGN KEY(depid) REFEREN
CES dep(depid), FOREIGN KEY(id) REFERENCES emp(id));
Query OK, 0 rows affected (0.08 sec)
```

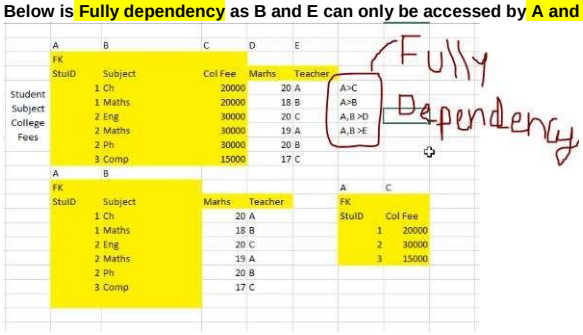
```
+-------+------+
| depid | id   |
+-------+------+
|   999 |   -1 |
|   999 |  980 |
|   999 |  988 |
|   101 |   89 |
|   101 |    8 |
|   101 |    1 |
|   104 |    0 |
|   104 |   23 |
|   104 |   38 |
|   109 |    8 |
|   104 |   78 |
|   109 |  283 |
|   678 |   40 |
+-------+------+
13 rows in set (0.00 sec)
```

Try to print fname, lname, and depname (3 different column from 2 tables)

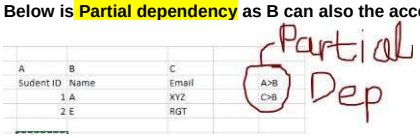
```
mysql> SELECT fname,lname,depname FROM emp,dep WHERE id in  (SELECT id
 FROM info WHERE depid = 101 ) and depid in (SELECT depid FROM dep WHE
RE depname = 'IT');
+-------+---------+---------+
| fname | lname   | depname |
+-------+---------+---------+
| bruse | banner  | IT      |
| wanda | witch   | IT      |
| nayan | gadhari | IT      |
+-------+---------+---------+
3 rows in set (0.00 sec)
```

NORMALIZATION *(every column should depend upon primary key and no redundancy)*

Below is Fully dependency as B and E can only be accessed by A and B

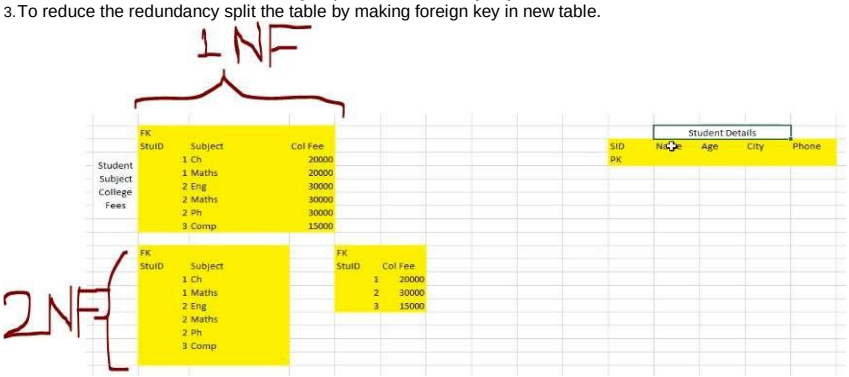


Below is Partial dependency as B can also the accessed by A or B.



1NF:
Data should be atomic (*means it doesn't contain multiple data in one row)*
Sigle column there cannot be a multiple columns.

2NF:
1. Table should be in 1NF from.
2. All the NON KEY columns should fully dependent on Primary key.
3. To reduce the redundancy split the table by making foreign key in new table.



3NF:
1. Should be in 2NF form.

2.There should not be **transitive dependency**.
We can jump from 2NF to 4NF.

A		C	B			A>B	B>C
EmpID	EmpName	C Code	Country				
1	Amit	91	India				
2	Nayan	1	Canada				
3	Nitin	86	China				

PK		FK		PK	
EmpID	EmpName	Country	C Code	Country	
1	Amit	India	91	India	
2	Nayan	Canada	1	Canada	
3	Nitin	China	86	China	

BCNF:
1.Table should be in 3NF.
2.Every Non Key Column should **be connected by Primary key.**

PK			PK	FK	FK
EmpID	EmpName	C Code	Country	EmpID	Country
1	Amit	91	India	1	India
2	Nayan	1	Canada	2	Canada
3	Nitin	86	China	3	China
4	Sumit			4	Canada

4NF:
1.It should be in BCNF form.
2.Still there is some redundancy then split.

A>B	A>C								
		Stu	Sub	Hobby					
		1	Ch	Dance					
		1	NA	Learning					
		2	Mt	Swimming					
		2	CH	NA	Stu	Sub	Stu	Hobby	
		2	PH	NA	1	Ch	1	Dance	
					2	Mt	1	Learning	
					2	CH	2	Swimming	
					2	PH			

5NF:
1.It should be in 4NF form.
2.Split Table into **as small part as possible**.

			LY					
BookID	Bname	DepID	DepName	Author	Price	SID	Sname	Time
1	A	101	Comps	James	235	C101	Tony	2
2	B	201	IT	Ted	532	I103	Bruse	3
3	C	301	EXTC	Lily	452	EX405	Tom	7
4	D	401	Civil	Marshall	462	CV89	Natasha	9
5	E	101	Comps	Zoey	324	C105	Aurthur	1
6	F	201	IT	Ted	462	I206	Nayan	5
7	G	301	EXTC	James	213	EX409	Harsh	2
8	H	401	Civil	Ted	452	CV96	Tiffny	4
9	I	101	Comps	Zoey	486	C118	Ritu	3
10	J	201	IT	Marshall	533	I107	Scarlet	7
11	K	301	EXTC	James	344	EX445	Cruela	9
12	L	401	Civil	Lily	789	CV45	Taylour	2

Book	
BookID	Bname
1	A
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
10	J
11	K
12	L

dept	
DepID	DepName
101	Comps
201	IT
301	EXTC
401	Civil
101	Comps
201	IT
301	EXTC
401	Civil
101	Comps
201	IT
301	EXTC
401	Civil

stu	
SID	Sname
C101	Tony
I103	Bruse
EX405	Tom
CV89	Natasha
C105	Aurthur
I206	Nayan
EX409	Harsh
CV96	Tiffny
C118	Ritu
I107	Scarlet
EX445	Cruela
CV45	Taylour

book.price	
BookID	Price
1	235
2	532
3	452
4	462
5	324
6	462
7	213
8	452
9	486
10	533
11	344
12	789

Book.author	
BookID	Author
1	James
2	Ted
3	Lily
4	Marshall
5	Zoey
6	Ted
7	James
8	Ted
9	Zoey
10	Marshall
11	James
12	Lily

Book.dept	
DepID	BookID
101	1
201	2
301	3
401	4
101	5
201	6
301	7
401	8
101	9
201	10
301	11
401	12

Book.stu	
BookID	SID
1	C101
2	I103
3	EX405
4	CV89
5	C105
6	I206
7	EX409
8	CV96
9	C118
10	I107
11	EX445
12	CV45

Book.time	
BookID	Time
1	2
2	3
3	7
4	9
5	1
6	5
7	2
8	4
9	3
10	7
11	9
12	2