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Q.17 a.) This table is not in 1Nf because in the 'course' column, it has multiple values. But for a table to be in 1Nf it must contain only atomic values at each row and column.

~~There a~~ Here the attribute 'Id' is the primary key and the candidate key. The attribute "Name", "Age", "Location", "Course" are non prime attributes. "Id" is the prime attribute.

⇒ The 1 Nf Would be :-

Id	Name	Age	Location
1	Sachin	22	Delhi
2	Ram	22	Jamshedpur
3	Mike	23	chennai
4	Sameer	21	Bengalaru
5	Vijay	22	Mumbai

Id	Course
1	OS
1	DBMS
2	DAA
2	DBMS
3	ML
3	OS
4	DAA
4	ML
5	ML
5	DBMS

b.) This table is already in first Normal form because here are no multivalued attributes. Here "Id" is the primary key and "Name", "phone", "state", "country" are not.

q.2.7. a.) This is not in 2Nf because there is partial dependency {Duty-shift-Id} → Duty shift. for a table to be in 2Nf all the non key attributes should be functionally dependent on the entire primary key. Hex the primary is {Emp-ID, Duty-shift-Id} But {Duty_shift_ID} → Duty-shift.
Hence, partial dependency exists

⇒ 2Nf would be :-

primary key

Emp-ID	Duty_shift_ID	Name	Age	
101	1	Arun	26	→ Name, Age
102	2	Bobby	28	(Non-prime Attributes)
103	3	Suresh	32	
104	1	Sita	24	

primary key

Duty_shift_ID	Duty-shif	
1	Morning	→ Duty shif
2	Afternoon	(Non-prime attribute)
3	Night	

b?. This is not in 2Nf because, there partial depency exists

{ Project -ID } → { Proj_Name }

The primary key is { Emp-ID, Project_ID }. All the non prime attributes Name, proj_Name, No of hours, should completely depend on entire primary key.

⇒ 2Nf would be :-

Emp_ID	Project_ID	Name	No_of_hours
123	Prj-321	Ajay.	10
321	Prj-45	chary	15
546	Prj-24	Rajesh	23
765	Prj-11	Abishek	16

{ Emp-ID, Project_ID } → Primary key

Project, ID	Proj_Name
Prj-21	Speech_system
Prj-45	HR system
Prj-24	Automate Tickets
Prj-11	MLP

{ Project_ID } → Primary key

Q.3>. a.> This table is not in 3 NF because, there exists transitive dependency between {Cust_address} & {Cust_loc}, On a non-primary key which is {Cust_Post Code}

⇒ 3 NF could be :-

Primary key

Cust_ID	Cust_Name	Cust_Post Code
25	Dell	560037
45	Lenovo	560046
89	Acer	210067
90	Samsung	4500078

⇒ {Cust_ID} → Primary key

Primary key

Cust_Post Code	Cust_Address	Cust_loc
560037	whitefield	Banglore
560046	Marathahalli	Banglore
210067	Bandra	Mumbai
4500078	Delhi Central	Delhi

{Cust_Post Code} → Primary key

b.) This table is not in 3NF because, there exists transitive dependency.

{ Contractor } → { fee }

There should be no transitive dependency in 3NF.

~~There should~~

{ Building } → primary key

{ Contractor, Builder, fee } → Non-prime attributes

{ Building } → Contractor

{ Building } → Builder

{ Contractor } → fee

So, here transitive dependency exists on Building ID.
So, table is not 3NF.

⇒ 3NF should be :-

Building	Contractor	Builder
B - 2156	Taylor	Prestige
B - 8765	Sandeep	Hiranandani
B - 4567	Vishaka	Tata

primary key → { contractor, fee }

Contractor	fee
Taylor	2567891
sandeep	3567356
vishaka	4567990