

**N&N** Hospital is facing problems in its data organization. As database analyst, you have to normalize following N&N Hospital data up to **4NF**. Elaborate each step you perform with logic and state clearly any other **VALID** assumption that you make.

Doc no.	Name	Address	Phone	Department Id	Designation	Charges Per hour	Patient No.	Patient Name	CNIC	Phone	Room No.	Room Type	Bed No.
D1	Dr.Nadeem	Abc 123	0333-123, 042-123	Neurology	Professor	5000	P1	Kahlid	12345-1	042-1	R2	Normal	B1
							P5	Ahmed	12345-2	042-2			
							P7	Anum	12345-3	042-3			
D2	Dr.Nadeem	Kb13	0334-124, 0300-123	Orthopedic	Professor	5000	P4	Mehmood	12345-4	042-4	R2	Normal	B1
							P7	Anum	12345-3	042-3	R4	Two bed	B5
							P9	Khawar	12345-6	042-5			B7
D4	Dr.Erum	Ak123	0321-123	ENT/ Neurology	Asth. Professor	3000	P10	Tanweer	12345-7	042-6	Nil	Nil	Nil
							P1	Khalid	12345-1	042-1	R5	Special	B8
D5	Dr.Hafeez	Nd123	0321-124	Skin/ Orthopedic	Asth. Professor	3000	P12	Sohail	12345-9	042-8	Nil	Nil	Nil
							P13	Ahmed	12346-0	042-9	R6	Special	B9

1NF(1<sup>st</sup> normalization)

Here we need to maintain the atomicity of the cells. So we need to remove multivalues from the cells. And make a new entry for those values.

Doc no	name	Address	phone	Depeartm	designatio	charges p	patient no	patient na	cnic	phone	room no	room type	Bed No
D1	Dr.Nadeer	Abc123	0333-123	Neurology	Professor	5000	p1	Khalid	12345-1	042-1	R2	Normal	B1
D1	Dr.Nadeer	Abc123	0333-123	Neurology	Professor	5000	p5	Ahmed	12345-2	042-2	R2	Normal	B2
D1	Dr.Nadeer	Abc123	0333-123	Neurology	Professor	5000	p7	Anum	12345-3	042-3	Nil	Nil	Nil
D1	Dr.Nadeer	Abc123	042-123	Neurology	Professor	5000	p1	Khalid	12345-1	042-1	R2	Normal	B1
D1	Dr.Nadeer	Abc123	042-123	Neurology	Professor	5000	p5	Ahmed	12345-2	042-2	R2	Normal	B2
D1	Dr.Nadeer	Abc123	042-123	Neurology	Professor	5000	p7	Anum	12345-3	042-3	Nil	Nil	Nil
D2	Dr.Nadeer	kb13	0334-124	Orthopedi	Professor	5000	p4	Mehmood	12345-4	042-4	R2	Normal	B1
D2	Dr.Nadeer	kb13	0334-124	Orthopedi	Professor	5000	p7	Anum	12345-3	042-3	R4	Two	B5
D2	Dr.Nadeer	kb13	0334-124	Orthopedi	Professor	5000	p9	Khawar	12345-6	042-5	R4	Two	B7
D2	Dr.Nadeer	kb13	0300-123	Orthopedi	Professor	5000	p4	Mehmood	12345-4	042-4	R2	Normal	B1
D2	Dr.Nadeer	kb13	0300-123	Orthopedi	Professor	5000	p7	Anum	12345-3	042-3	R4	Two	B5
D2	Dr.Nadeer	kb13	0300-123	Orthopedi	Professor	5000	p9	Khawar	12345-6	042-5	R4	Two	B7
D4	DR.erum	Ak123	0321-123	ENT	Asth.Proff	3000	p10	p11	12345-7	042-6	Nil	Nil	Nil
D4	DR.erum	Ak123	0321-123	ENT	Asth.Proff	3000	p1	Khalid	12345-1	042-1	R5	Special	B8
D4	Dr.erum	Ak123	0321-123	Neurology	Asth.Proff	3000	p10	p11	12345-7	042-6	Nil	Nil	Nil
D4	Dr.erum	Ak123	0321-123	Neurology	Asth.Proff	3000	p1	Khalid	12345-1	042-1	R5	Special	B8
D5	Dr.hafeez	Nd123	0321-124	Skin	Asth.Proff	3000	p12	Sohail	12345-9	042-8	Nil	Nil	Nil
D5	Dr.hafeez	Nd123	0321-124	Skin	Asth.Proff	3000	p13	Ahmed	12345-0	042-9	R6	Special	B9
D5	Dr.hafeez	Nd123	0321-124	Orthopedi	Asth.Proff	3000	p12	Sohail	12345-9	042-8	Nil	Nil	Nil
D5	Dr.hafeez	Nd123	0321-124	Orthopedi	Asth.Proff	3000	p13	Ahmed	12345-0	042-9	R6	Special	B9

## 2NF

Here we need to remove the partial dependencies that exist between the relation.

After normalizing our table looks like.

Here our candidate key is (patient-no,department,doct-no,phone-no)

Patient name,cnic,phone is only dependent on patient no so made new table

Dname,Dname,Charges,Address,Desination is only dependent on Dno.

[illegible]

### 3NF

in 3nf we need to remove transitive dependency. After normalizing our table looks like

3NF													
Dno	Dname	Address	Designation		Designatic	Charges	Dno	PatientNo	RoomNo	BedNo		RoomNO	RoomType
D1	Dr.Nadeer	abc123	Professor		Professor	5000	D1	P1	R2	B1		R2	Normal
D2	Dr.Nadeer	kb13	Professor		Asst.Profe	3000	D1	P5	R2	B1		R4	TwoBed
D3	Dr.Erum	ak123	Asst.Professor				D1	P7	nil	Nil		R5	Special
D4	Dr.Hafeez	nd123	Asst.Professor				D2	P4	R2	B1		R6	Special
							D2	P7	R4	B5			
							D2	P9	R4	B7			
							D4	P10	Nil	Nil			
							D4	P1	R5	B8			
							D5	P12	Nil	Nil			
							D5	R6	R6	B9			
Doctor-PatientTable													
			D.no	PhoneNO	Departme	PatientNo							
patient table				Doctor phone									
patient No	patient na	CNIC	Phone	D1	042-123	Neurology	P1						
p1	Khalid	12345-1	042-1	D1	0333-123	Neurology	P5						
p4	Mehmood	12345-4	042-4	D1	042-123	Neurology	P5						
p5	Ahmed	12345-2	042-2	D1	0333-123	Neurology	P7						
p7	Anum	12345-3	042-3	D1	042-123	Neurology	P7						
p9	Khawar	12345-6	042-5	D2	0334-124	Orthopedi	P4						
p10	Tanweer	12345-7	042-6	D2	0333-124	Orthopedi	P7						
p12	Sohail	12345-9	042-8	D2	0333-124	Orthopedi	P9						
p13	Ahmed	12345-0	042-9	D2	0300-123	Orthopedi	P4						
				D2	0300-123	Orthopedi	P7						
				D2	0300-123	Orthopedi	P9						
				D4	0321-123	ENT	p10						
				D4	0321-123	ENT	p1						
				D4	0321-123	Neurology	p10						
				D4	0321-123	Neurology	p1						
				D5	0321-124	Skin	p12						
				D5	0321-124	Skin	p13						
				D5	0321-124	Orthopedi	p12						
				D5	0321-124	Orthopedi	p13						