Doc no	Name	Address	Ph no.	Dept id	Designation	Charges	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	Khalid	12345-1	042-1	R2	Normal	B1
							P5	Ahmed	12345-2	042-2			
							P7	Anum	12345-3	042-3	Nill		Nill
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/Neuro	Asst. Professor	3000	P10	Tanveer	12345-7	042-6	Nill		Nill
							P1	Khalid	12345-1	042-1	R5	Special	B8
D5	Dr. Hafeez	Nd123	0321-124	Skin/ortho	Asst Professor	3000	P12	Sohail	12345-9	042-8	Nill		Nill
							P13	Ahmed	12346-0	042-9	R6	Special	B9

⇒ We can see that Phone number col. has multiple value. But to be in 1NF there should'nt be multi-valued record. So we can have another table for phone numbers like.

Id	Doc no.	Ph. no
1	D1	0333-123
2	D1	042-123
3	D2	0334-124
4	D2	0300-123
5	D4	0321-123
6	D5	0321-124

⇒ Here Id is the primary key in this table

Doc no.	Name	Address	Dept Id	Designation	Charges	Patient No.	Patient name	CNIC	Phone	Room no.	Room type	Bed no
D1	Dr Nadeem	Abc 123	Neurology	Prof	5000	P1	Khalid	12345-1	042-1	R2	Normal	B1
						P5	Ahmed	12345-2	042-2			
						P7	Amin	12345-3	042-3	NiL		NiL
D2	Dr Nadeem	Xbd3	Ortho	Prof	5000	P4	Mehmood	12345-4	042-4	R2	Normal	B1
						P7	Amin	12345-3	042-3	R4	Two Bed	B6
						P9	Khawar	12345-0	042-5			G7
						P10	Tanveer	12345-7	042-6	NiL		NiL
D4	Dr. Eram	AK123	ENT/Neuro	Asst. Prof	3000	P1	Khalid	12345-1	042-1	R5	Special	B8
D5	Dr Hafeez	Nd123	Skin/ortho	Asst Prof	3000	P12	Sohail	12345-9	042-8	NiL		NiL
						P13	Ahmed	12345-0	042-7	R6	Special	B9

So the above table is in 1NF.

Now, the candidate keys are Doc. No and Patient No.

Because Doc. No., Patient No. → Name, Address, Dept Id, Design, charges, Patient name, CNIC, Phone, Room, Room type, Bed no.

But we can also see that Patient Name, CNIC, Phone, Room No, Room type, Bed no is a ~~dependfunctionally~~ dependent on Patient No. So we conclude that there is a partial dependency. So to convert to 2NF we need to split the table, such that Doc No → Name, Address, Dept Id, Designation, charges, ~~Patient No~~.

Patient No. → Patient Name, CNIC, Phone, Room no., Room type, Bed no.

Doc No	Name	Address	Dept id	Designation	charges	Patient No
D1	Dr. Nadeem	Abc 123	Neurology	Professor	5000	P1
D2	Dr Nadeem	Kb 13	Orthopedic	"	"	
D4	Eman	AK123	ENT/Neuro	Asst Prof	3000	
D5	Hafeez	Nd123	Skin/ortho	"	"	

So these tables are in 2NF as there is No functional dependency as But here designation define charges and so to be in 3NF there also should be any non-prime attribute defining other non prime attribute So we carve out Designation from above table such that

Designation	charges
Professor	5000
Asst Prof.	3000

Patient No	Name	CNIC	Phone	Room No	Room type	Bed no
P1	Khalid	3345-1	042-1	R2	Normal	B1
P5	Ahmed	" -2	" -2	"	"	"
P7	Eman	" -3	" -3	Nill		Nill
P4	Mehmood	" -4	" -4	R2	"	B1
P9	Khawar	" -6	" -5			B5
P10	Tanweer	" -7	" -6	Nill		Nill
P11	Khabib	" -1	" -1	R5	special	B5
P12	Sahil	" -9	" -8	Nill		Nill
P13	Ahmed	" -0	" -9	R6	"	B9

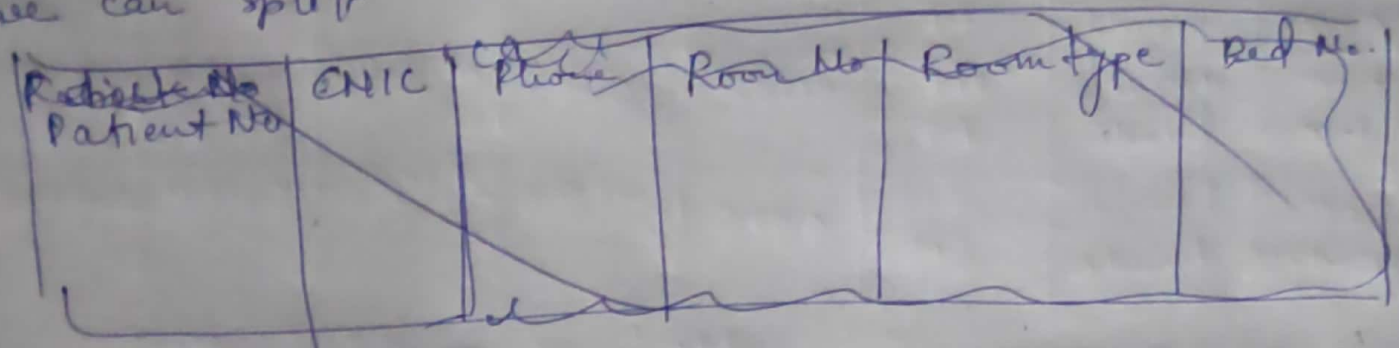
So to be in 3NF : Doc.no. → Name, Address, Dept Id, Designation
PatientNo → PatientName, CNIC, Phone, Room no., Room type, Bed no
Id → Doc No., Phone No.
Designation → charges

Now to convert into BCNF there should'nt be any ~~transitive dependency~~ prime or non prime attribute defining other prime attribute.
Like in above tables: ~~Doc no is defining Patient No. is defining CN~~

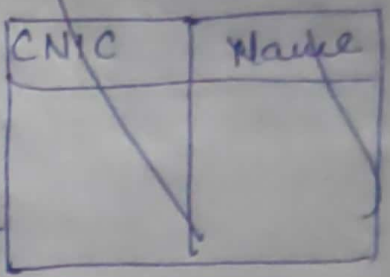
Patient No, Name, CNIC → CNIC

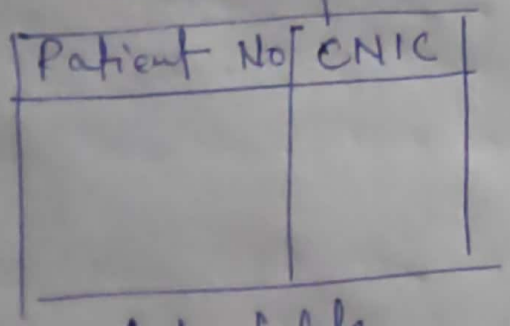
also CNIC → Patient No.

so we can split

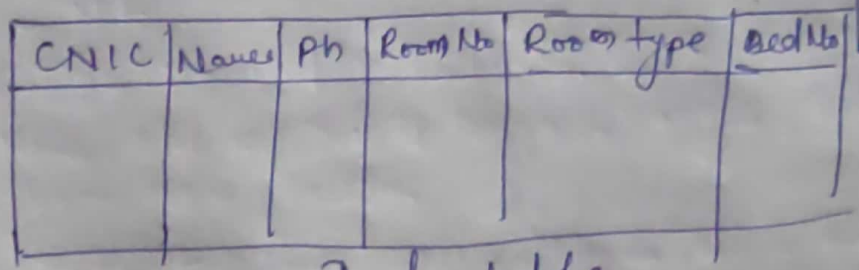


and





1st table



2nd table

So final functional dependency after BCNF : Doc No → Name, Add, Dept Id, Designation

Patient No → CNIC

CNIC → Name, Ph, Room No, Room type, Bed No.

Id → Doc No., Phone No.

Designation → charges