

Doc No.	Name	Address	Phone	Dept. Id	Deeg	Charges per hour	Patient No.	Patient Name	CNIC	Phone	Open no.	Rec. no. type
D1	Dr. Nadeem	ABC 123	0313-123, 042-123	Neurology	Professor	5000	P1	Khalid	12345-1	042-1	R2	Normal B
							P5	Ahmed	12345-2	042-2		
							P7	Anam	12345-3	042-3	NIL	NIL
D2	Dr. Nadeem	KB123	0334-124, 0300-123	Orthopedic	Professor	5000	P4	Mehmood	12345-4	042-4	R2	Normal B
							P7	Anam	12345-3	042-3	R4	Tue B5
							P9	Khawate	12345-6	042-5		bad B7
D4	Dr. F. Sum	AK123	0321-123	ENT / Neurology	Asst. Professor	3000	P10	Tamwar	12345-7	042-6	NIL	NIL
							P1	Khalid	12345-1	042-1	R5	Specimen B8
D5	Dr. Hafeez	NH123	0321-124	Skin / Orthopedic	Asst. Professor	3000	P12	Sohail	12345-9	042-8	NIL	NIL
							P13	Ahmed	12346-0	042-9	R3	Specimen B9

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Submitted by -

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Candidate Keys:- DocNo., Address, CNIC;

For first Normal Form

→ There should be no multivalued values in a column.

Doc No.	Name	Address	Desig.	Charges per hour	Phone
D1	Dr. Nadeem	Abc 123	Prof.	5000	
D2	Dr. Nadeem	Kb 13	Prof.	5000	
D4	Dr. Ezzam	AK 123	Asst Prof.	3000	
D5	Dr. Hafeez	Nd 123	Asst Prof.	13000	

Table - 1 Primary Key - Doc No.

Doc No.	Phone	Address	Doc No.	Dept Id
D1	0333-123		D1	Neurology
D1	042-123		D2	Orthopedic
D2	0334-124		D4	ENT
D2	0300-123		D4	Neurology
D4	0321-123		D5	Skin
D5	0321-124		D5	Orthopedic

Primary Key { Doc No., Phone }

Table - 2

Primary Key { Doc No., Dept Id }

Table - 3

Doc No	Patient No	Patient Name	CNIC	Phone	Room No	Room Type	Bed No.
D1	P1	Khalid	12345-1	042-1	R2	Normal	
D1	P5	Ahmed	12345-2	042-2	R2	Normal	
D1	P7	Anam	12345-3	042-3	Nil		Nil
D2	P4	Mehmoed	12345-4	042-4	R2	Normal	B1
D2	P9	Khawar	12345-6	042-5	R4	2 Bed	B5
D4	P10	Tanweer	12345-7	042-6			
D5	P12	Sohail	12345-9	042-8	Nil		Nil
D5	P13	Ahmed	12346-0	042-9	R6	Special	B9

Primary Key :- Patient No.

Ref Foreign Key - Doc No.

Table - 4

For Second Normal Form

- 1) Table should be in 2NF
- 2) No non-prime attribute should be dependant on subset of Primary or Candidate Key.

- Table 2 and Table 3 are already in 2NF
- Table 1 should ^{can} be further normalized.

Doc.No.	Name	Desig Designation	Charges/hr.
D1	Dr. Nadeem	Prof	5000
D2	Dr. Nadeem	Prof.	5000
D4	Dr. Ezzam	Asst. Prof	3000
D5	Dr. Hakeez	Asst Prof	3000

DocNo	Address
D1	Abc123
D2	Kb13
D3	AK123
D4	Nb123

Table 5

P.K. - DocNo.

Table 6

PK - DocNo, Address

From Table 4, CNIC and phone can be taken aside

CNIC	Phone
12345-1	042-1
12345-2	042-2
12345-3	042-3
12345-4	042-4
12345-6	042-5
12345-7	042-6
12345-9	042-8
12345-0	042-9

Table-7

PK - CNIC, Phone

For Third Normal Form

- 1) Table should be in 1 NF
- 2) Table should be in 2 NF
- 3) There should be no transitive dependency.

- Table 1 doesn't exist anymore
- Table 2 and Table 3 are in 3 NF
- Modified Table 4 (i.e. excluding CNIC and Phone)
No non-prime attribute determines another non-prime attribute
- Table 5: needs to be normalized.

Doc No	Name	Doc. No	Desig.	Doc. No	Charges/hr
D ₁	Dr. Nadeem	D ₁	Prof.	D ₁	5000
D ₂	Dr. Nadeem	D ₂	Prof.	D ₂	5000
D ₃	Dr. Usman	D ₃	Asst Prof.	D ₄	3000
D ₅	Dr. Waqar	D ₄	Asst Prof.	D ₅	3000

Table - 8
PK: Doc. No

Table - 9
PK: Doc. No.

Table - 10
PK: Doc. No.

- Table 5 doesn't exist anymore.
- Table 6 and Table 7 are in 3 NF.

BCNF

- Table should be in 3 NF.
- All attributes should be dependant on candidate keys.
- All tables 2, 3, 6, 7, 8, 9, 10 are in BCNF.
Table 4 needs to be normalized further

Doc No.	Patient No.	Room No.	Room Type	Bed No.
D1	P1	R2	Normal	B1
D1	P5	R2	Normal	B1
D1	P7	Nil		Nil
D2	P4	R2	Normal	B1
D2	P7	R4	2-Bed	B5
D4	P9	R4	2-Bed	B7
D4	P10	Nil		Nil
D4	P1	R5	special	B8
D5	P12	Nil		Nil
D5	P13	R6	special	B9

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Table - 11
P.K. { Patient No., Room No. }

Doc. No.	Patient No.	Patient Name
D1	P1	Khalid
D1	P5	Ahmed
D1	P7	Anam
D2	P4	Mehmood
D2	P9	Khawar
D4	P10	Tamwar
D5	P12	Sohail
D5	P13	Ahmed

#

Table - 12
P.K. = { Patient No., Patient Name }

Now all labels 2, 3, 6, 7, 8, 9, 10, 11, 12 are in BCNF

