

RDBMS ASSIGNMENT

ARUSHI BOHRA

arushi.bohra@accolitedigital.com

Given Table:

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	Nil		Nil
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
							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
							P13	Ahmed	12346-0	042-9	R6	Special	B9

First Normal Form:

- Atomicity needs to be achieved
 - Primary Key needs to be established
- Docno. , PatientNo. -> Name, Address, Phone, DepartmentId, Designation, ChargesPerHour, PatientName, CNIC, Phone, RoomNo., RoomType, BedNo.
 - Thus, Docno and PatientNo are candidate keys.
 - Removal of repeating groups.

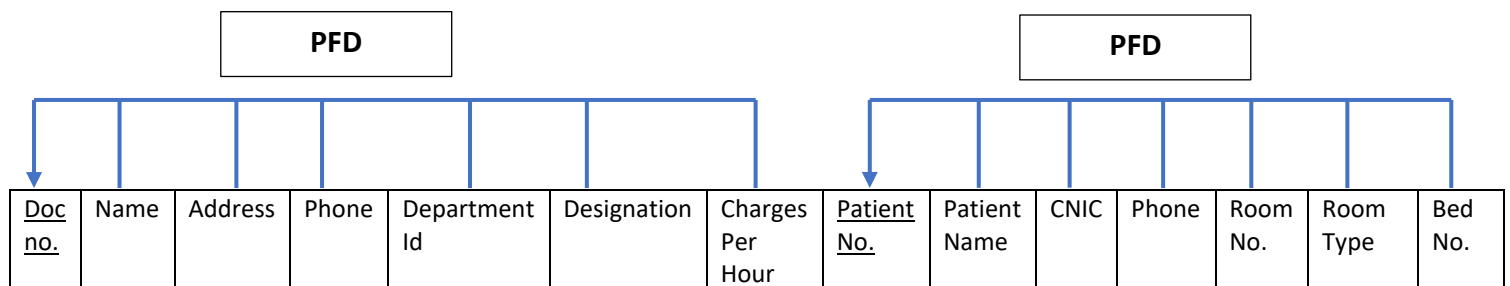
<u>Doc no.</u>	Name	Address	Phone	Department Id	Designation	Charges Per hour	<u>Patient No.</u>	Patient Name	CNIC	Phone	Room No.	Room Type	Bed No.
D1	Dr.Nadeem	Abc 123	0333-123	Neurology	Professor	5000	P1	Kahlid	12345-1	042-1	R2	Normal	B1
D1	Dr.Nadeem	Abc 123	042-123	Neurology	Professor	5000	P1	Kahlid	12345-1	042-1	R2	Normal	B1
D1	Dr.Nadeem	Abc 123	0333-123	Neurology	Professor	5000	P5	Ahmed	12345-2	042-2	R2	Normal	B1

D1	Dr.Nadeem	Abc123	042-123	Neurology	Professor	5000	P5	Ahmed	12345-2	042-2	R2	Normal	B1
D1	Dr.Nadeem	Abc123	0333-123	Neurology	Professor	5000	P7	Anum	12345-3	042-3	Nill		Nill
D1	Dr.Nadeem	Abc123	042-123	Neurology	Professor	5000	P7	Anum	12345-3	042-3	Nill		Nill
D2	Dr.Nadeem	Kb13	0334-124	Orthopedic	Professor	5000	P4	Mehmood	12345-4	042-4	R2	Normal	B1
D2	Dr.Nadeem	Kb13	0300-123	Orthopedic	Professor	5000	P4	Mehmood	12345-4	042-4	R2	Normal	B1
D2	Dr.Nadeem	Kb13	0334-124	Orthopedic	Professor	5000	P7	Anum	12345-3	042-3	R4	Two bed	B5
D2	Dr.Nadeem	Kb13	0300-123	Orthopedic	Professor	5000	P7	Anum	12345-3	042-3	R4	Two bed	B5
D2	Dr.Nadeem	Kb13	0334-124	Orthopedic	Professor	5000	P9	Khawar	12345-6	042-5	R4	Two bed	B7
D2	Dr.Nadeem	Kb13	0300-123	Orthopedic	Professor	5000	P9	Khawar	12345-6	042-5	R4	Two bed	B7
D4	Dr.Erum	Ak123	0321-123	ENT	Astt Professor	3000	P10	Tanweer	12345-7	042-6	Nill		Nill
D4	Dr.Erum	Ak123	0321-123	Neurology	Astt. Professor	3000	P10	Tanweer	12345-7	042-6	Nill		Nill
D4	Dr.Erum	Ak123	0321-123	ENT	Astt. Professor	3000	P1	Khalid	12345-1	042-1	R5	Special	B8
D4	Dr.Erum	Ak123	0321-123	Neurology	Astt. Professor	3000	P1	Khalid	12345-1	042-1	R5	Special	B8
D5	Dr.Hafeez	Nd123	0321-124	Skin	Astt. Professor	3000	P12	Sohail	12345-9	042-8	Nill		Nill
D5	Dr.Hafeez	Nd123	0321-124	Orthopedic	Astt. Professor	3000	P12	Sohail	12345-9	042-8	Nill		Nill
D5	Dr.Hafeez	Nd123	0321-124	Skin	Astt. Professor	3000	P13	Ahmed	12346-0	042-9	R6	Special	B9
D5	Dr.Hafeez	Nd123	0321-124	Orthopedic	Astt. Professor	3000	P13	Ahmed	12346-0	042-9	R6	Special	B9

Second Normal Form:

- All the relations in database must be 1st Normal form.
- No partial functional dependencies must be there in the relations
 - Redundancies and anomalies are still there in our relation.
 - If a patient needs to be added, we have to mandatorily enter Docno. as its part of the primary which results in insertion anomaly.

- If we delete a patient or a doctor, it should update all the occurrences to avoid inconsistency which will otherwise results in modification and deletion anomaly.
- Find partial functional dependencies and then decompose.
- Partial functional dependency is when a non-key attribute is dependent on only Docno. or PatientNo,



Decomposition into 2 relations

<u>Docno.</u>	Name	Address	Phone	DepartmentId	Designation	ChargesPerHour
D1	Dr.Nadeem	Abc 123	0333-123	Neurology	Professor	5000
D1	Dr.Nadeem	Abc 123	042-123	Neurology	Professor	5000
D1	Dr.Nadeem	Abc 123	0333-123	Neurology	Professor	5000
D1	Dr.Nadeem	Abc 123	042-123	Neurology	Professor	5000
D1	Dr.Nadeem	Abc 123	0333-123	Neurology	Professor	5000
D1	Dr.Nadeem	Abc 123	042-123	Neurology	Professor	5000
D2	Dr.Nadeem	Kb13	0334-124	Orthopedic	Professor	5000
D2	Dr.Nadeem	Kb13	0300-123	Orthopedic	Professor	5000
D2	Dr.Nadeem	Kb13	0334-124	Orthopedic	Professor	5000
D2	Dr.Nadeem	Kb13	0300-123	Orthopedic	Professor	5000
D2	Dr.Nadeem	Kb13	0334-124	Orthopedic	Professor	5000
D2	Dr.Nadeem	Kb13	0300-123	Orthopedic	Professor	5000
D4	Dr.Erum	Ak123	0321-123	ENT	Astt.Professor	3000
D4	Dr.Erum	Ak123	0321-123	Neurology	Astt.Professor	3000
D4	Dr.Erum	Ak123	0321-123	ENT	Astt.Professor	3000
D4	Dr.Erum	Ak123	0321-123	Neurology	Astt.Professor	3000
D5	Dr.Hafeez	Nd123	0321-124	Skin	Astt.Professor	3000
D5	Dr.Hafeez	Nd123	0321-124	Orthopedic	Astt.Professor	3000
D5	Dr.Hafeez	Nd123	0321-124	Skin	Astt.Professor	3000
D5	Dr.Hafeez	Nd123	0321-124	Orthopedic	Astt.Professor	3000

<u>Patient No.</u>	PatientName	CNIC	Phone	RoomNo.	RoomType	BedNo.
P1	Kahlid	12345-1	042-1	R2	Normal	B1
P1	Kahlid	12345-1	042-1	R2	Normal	B1
P5	Ahmed	12345-2	042-2	R2	Normal	B1
P5	Ahmed	12345-2	042-2	R2	Normal	B1
P7	Anum	12345-3	042-3	Nil		Nil
P7	Anum	12345-3	042-3	Nil		Nil
P4	Mehmood	12345-4	042-4	R2	Normal	B1
P4	Mehmood	12345-4	042-4	R2	Normal	B1
P7	Anum	12345-3	042-3	R4	Two bed	B5
P7	Anum	12345-3	042-3	R4	Two bed	B5
P9	Khawar	12345-6	042-5	R4	Two bed	B7
P9	Khawar	12345-6	042-5	R4	Two bed	B7
P10	Tanweer	12345-7	042-6	Nil		Nil
P10	Tanweer	12345-7	042-6	Nil		Nil
P1	Khalid	12345-1	042-1	R5	Special	B8
P1	Khalid	12345-1	042-1	R5	Special	B8
P12	Sohail	12345-9	042-8	Nil		Nil
P12	Sohail	12345-9	042-8	Nil		Nil
P13	Ahmed	12345-0	042-9	R6	Special	B9
P13	Ahmed	12345-0	042-9	R6	Special	B9

- The above 2 relations still have insertion,modification and deletion anomalies

Third Normal Form:

- All relations must be in second normal form.
- No transitive functional dependencies should be there

- Removing transitive functional dependencies:

- DocNo ->Name, Address, Phone, Departmentid, Designation, ChargesPerHour

Transitive dependencies are:

Designation -> Charges Per Hour

DocNo → Designation

DepartmentID → Designation

DocNo → Designation

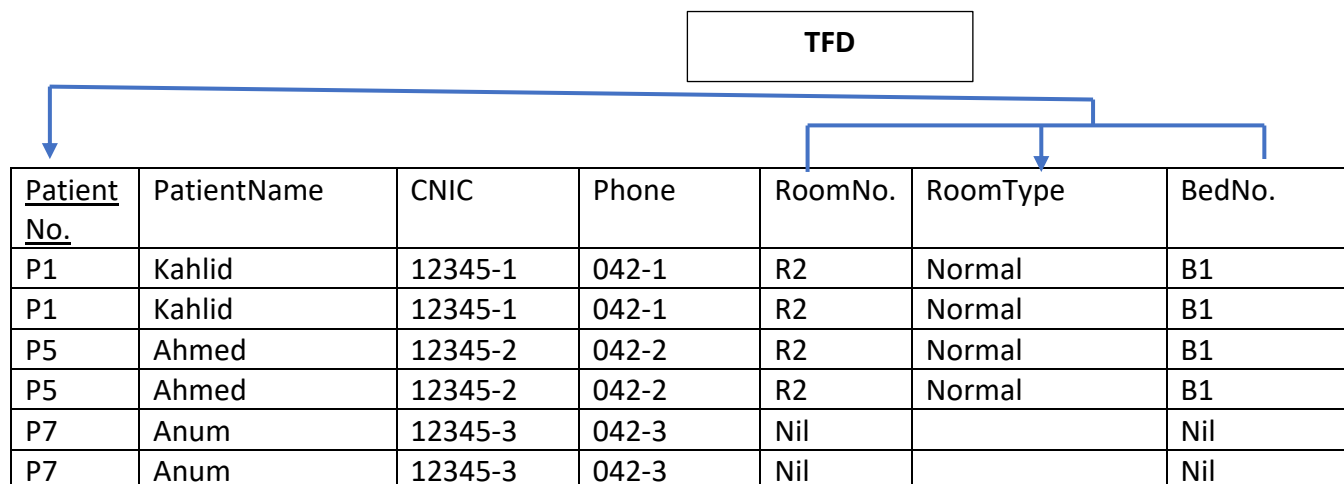
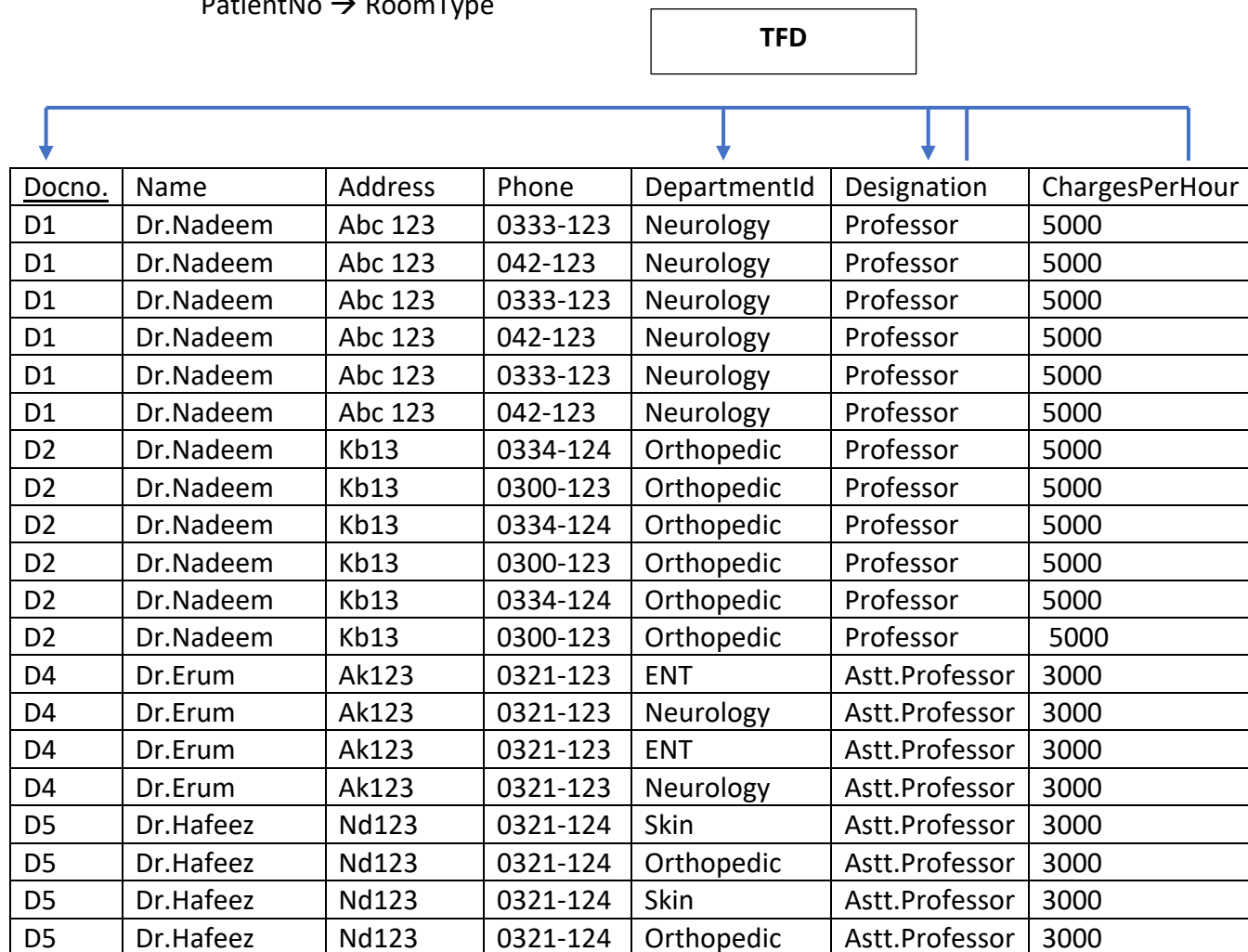
- PatientNo → Patient Name, CNIC, Phone, Room No., Room Type, Bed No.

Transitive dependencies are:

RoomType → RoomNo

RoomType → BedNo

PatientNo → RoomType



P4	Mehmood	12345-4	042-4	R2	Normal	B1
P4	Mehmood	12345-4	042-4	R2	Normal	B1
P7	Anum	12345-3	042-3	R4	Two bed	B5
P7	Anum	12345-3	042-3	R4	Two bed	B5
P9	Khawar	12345-6	042-5	R4	Two bed	B7
P9	Khawar	12345-6	042-5	R4	Two bed	B7
P10	Tanweer	12345-7	042-6	Nil		Nil
P10	Tanweer	12345-7	042-6	Nil		Nil
P1	Khalid	12345-1	042-1	R5	Special	B8
P1	Khalid	12345-1	042-1	R5	Special	B8
P12	Sohail	12345-9	042-8	Nil		Nil
P12	Sohail	12345-9	042-8	Nil		Nil
P13	Ahmed	12345-0	042-9	R6	Special	B9
P13	Ahmed	12345-0	042-9	R6	Special	B9

Decomposed by removing transitive dependencies:

Docno.	Name	Address	Phone
Designation	ChargesPerHour		
DepartmentID	Designation		
PatientNo	PatientName	CNIC	Phone
RoomType	RoomNo		
RoomType	BedNo		

Boyce-Codd Normal Form:

- Should be in third normal form.
- A table is in BCNF if every functional dependency $X \rightarrow Y$, X is the super key of the table.
 - Assumption: CNIC-> PatientNo.
 - Removed this dependency and decompose.

PatientNo.	PatientName	Phone
CNIC	PatientNo.	