1NF –

Splitting the rows to incorporate multiple values in phone number of docs.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Doc No. | Name | Address | Phone | Dept ID | Designation | Charges per hour | Patient No. | 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 | Abc 123 | 042-123 | Neurology | Professor | 5000 | P5 | Ahmed | 12345-2 | 042-2 | R2 | Normal | B1 |
| D1 | Dr. Nadeem | Abc 123 | 0333-123 | Neurology | Professor | 5000 | P7 | Anum | 12345-3 | 042-3 | Null | Null | Null |
| D1 | Dr. Nadeem | Abc 123 | 042-123 | Neurology | Professor | 5000 | P7 | Anum | 12345-3 | 042-3 | Null | Null | Null |
| 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/ Neurology | Asst. Professor | 3000 | P10 | Tanweer | 12345-7 | 042-6 | Null | Null | Null |
| D4 | Dr. Erum | Ak123 | 0321-123 | ENT/ Neurology | Asst. Professor | 3000 | P1 | Khalid | 12345-1 | 042-1 | R5 | Special | B8 |
| D5 | Dr. Hafeez | Nd123 | 0321-124 | Skin/ Orthopedic | Asst. Professor | 3000 | P12 | Sohail | 12345-9 | 042-8 | Null | Null | Null |
| D5 | Dr. Hafeez | Nd123 | 0321-124 | Skin/ Orthopedic | Asst. Professor | 3000 | P13 | Ahmed | 12346-0 | 042-9 | R6 | Special | B9 |

2NF-

Removing partial dependency in the table.

Splitting the table into multiple tables based on dependency of attributes and multiple values

Assuming that Doc No., Name, Address, Designation and Phone are attributes of Doctor but since phone has multiple values, it has to be made in a different table with Doc No.

Doctor

|  |  |  |  |
| --- | --- | --- | --- |
| Doc No. | Name | Address | Designation |
| D1 | Dr. Nadeem | Abc 123 | Professor |
| D2 | Dr. Nadeem | Kb13 | Professor |
| D4 | Dr. Erum | Ak123 | Asst. Professor |
| D5 | Dr. Hafeez | Nd123 | Asst. Professor |

Doc\_Phone

|  |  |  |
| --- | --- | --- |
| Doc No. | Phone 1 | Phone 2 |
| D1 | 0333-123 | 042-123 |
| D2 | 0334-124 | 0300-123 |
| D4 | 0321-123 | NULL |
| D5 | 0321-124 | NULL |

Dept

|  |  |
| --- | --- |
| Dept\_ID | Charges |
| Neurology | 5000 |
| Orthopedic | 5000 |
| ENT/ Neurology | 3000 |
| Skin/ Orthopedic | 3000 |

Assuming that Patient No., Patient Name, CNIC and phone are all attributes of a patient

Patient

|  |  |  |  |
| --- | --- | --- | --- |
| Patient No. | Patient Name | CNIC | Phone |
| P1 | Kahlid | 12345-1 | 042-1 |
| P4 | Mehmood | 12345-4 | 042-2 |
| P5 | Ahmed | 12345-2 | 042-3 |
| P7 | Anum | 12345-3 | 042-4 |
| P9 | Khawar | 12345-6 | 042-5 |
| P10 | Tanweer | 12345-7 | 042-6 |
| P12 | Sohail | 12345-9 | 042-8 |
| P13 | Ahmed | 12346-0 | 042-9 |

Assuming Room No., Type and Bed No. are all attributes of a room however beds are multivalued so have to made into a different table

Room

|  |  |
| --- | --- |
| Room No. | Room Type |
| R2 | Normal |
| R4 | Two Bed |
| R5 | Special |
| R6 | Special |

Room\_beds

|  |  |  |
| --- | --- | --- |
| Room No. | Bed 1 | Bed 2 |
| R2 | B1 | NULL |
| R4 | B5 | B7 |
| R5 | B8 | NULL |
| R6 | B9 | NULL |

3NF –

Removing Transitive Functional Dependencies in the table Patient as Phone and Patient Name can be uniquely identified using CNIC so making this into a separate table CNIC\_ID

Doctor

|  |  |  |  |
| --- | --- | --- | --- |
| Doc No. | Name | Address | Designation |
| D1 | Dr. Nadeem | Abc 123 | Professor |
| D2 | Dr. Nadeem | Kb13 | Professor |
| D4 | Dr. Erum | Ak123 | Asst. Professor |
| D5 | Dr. Hafeez | Nd123 | Asst. Professor |

Doc\_Phone

|  |  |  |
| --- | --- | --- |
| Doc No. | Phone 1 | Phone 2 |
| D1 | 0333-123 | 042-123 |
| D2 | 0334-124 | 0300-123 |
| D4 | 0321-123 | NULL |
| D5 | 0321-124 | NULL |

Dept

|  |  |
| --- | --- |
| Dept\_ID | Charges |
| Neurology | 5000 |
| Orthopedic | 5000 |
| ENT/ Neurology | 3000 |
| Skin/ Orthopedic | 3000 |

Patient

|  |  |
| --- | --- |
| Patient No. | CNIC |
| P1 | 12345-1 |
| P4 | 12345-4 |
| P5 | 12345-2 |
| P7 | 12345-3 |
| P9 | 12345-6 |
| P10 | 12345-7 |
| P12 | 12345-9 |
| P13 | 12346-0 |

CNIC\_ID

|  |  |  |
| --- | --- | --- |
| CNIC | Phone | Patient Name |
| 12345-1 | 042-1 | Kahlid |
| 12345-4 | 042-2 | Mehmood |
| 12345-2 | 042-3 | Ahmed |
| 12345-3 | 042-4 | Anum |
| 12345-6 | 042-5 | Khawar |
| 12345-7 | 042-6 | Tanweer |
| 12345-9 | 042-8 | Sohail |
| 12346-0 | 042-9 | Ahmed |

Room

|  |  |
| --- | --- |
| Room No. | Room Type |
| R2 | Normal |
| R4 | Two Bed |
| R5 | Special |
| R6 | Special |

Room\_Beds

|  |  |  |
| --- | --- | --- |
| Room No. | Bed 1 | Bed 2 |
| R2 | B1 | NULL |
| R4 | B5 | B7 |
| R5 | B8 | NULL |
| R6 | B9 | NULL |

BCNF-

The tables are already in BCNF form

Doctor

|  |  |  |  |
| --- | --- | --- | --- |
| Doc No. | Name | Address | Designation |
| D1 | Dr. Nadeem | Abc 123 | Professor |
| D2 | Dr. Nadeem | Kb13 | Professor |
| D4 | Dr. Erum | Ak123 | Asst. Professor |
| D5 | Dr. Hafeez | Nd123 | Asst. Professor |

Doc\_Phone

|  |  |  |
| --- | --- | --- |
| Doc No. | Phone 1 | Phone 2 |
| D1 | 0333-123 | 042-123 |
| D2 | 0334-124 | 0300-123 |
| D4 | 0321-123 | NULL |
| D5 | 0321-124 | NULL |

Dept

|  |  |
| --- | --- |
| Dept\_ID | Charges |
| Neurology | 5000 |
| Orthopedic | 5000 |
| ENT/ Neurology | 3000 |
| Skin/ Orthopedic | 3000 |

Patient

|  |  |
| --- | --- |
| Patient No. | CNIC |
| P1 | 12345-1 |
| P4 | 12345-4 |
| P5 | 12345-2 |
| P7 | 12345-3 |
| P9 | 12345-6 |
| P10 | 12345-7 |
| P12 | 12345-9 |
| P13 | 12346-0 |

CNIC\_ID

|  |  |  |
| --- | --- | --- |
| CNIC | Phone | Patient Name |
| 12345-1 | 042-1 | Kahlid |
| 12345-4 | 042-2 | Mehmood |
| 12345-2 | 042-3 | Ahmed |
| 12345-3 | 042-4 | Anum |
| 12345-6 | 042-5 | Khawar |
| 12345-7 | 042-6 | Tanweer |
| 12345-9 | 042-8 | Sohail |
| 12346-0 | 042-9 | Ahmed |

Room

|  |  |
| --- | --- |
| Room No. | Room Type |
| R2 | Normal |
| R4 | Two Bed |
| R5 | Special |
| R6 | Special |

Room\_Beds

|  |  |  |
| --- | --- | --- |
| Room No. | Bed 1 | Bed 2 |
| R2 | B1 | NULL |
| R4 | B5 | B7 |
| R5 | B8 | NULL |
| R6 | B9 | NULL |