Database Systems 10127
Homework Problem 2

HW02 – Shimon Desta 203670286

1. **Table Normalization:**
   1nf

DoctorID	DoctorName	PatientID	Patient First Name	Patient last Name	Month	Day	Hour	Room
8846	Dr. Cannon	DA3467	Del	Andrus	Feb	2	8:00	414
8846	Dr. Cannon	KM2235	Ken	Moore	Feb	2	8:30	414
5032	Dr. Khoury	KM2235	Ken	Moore	Feb	2	8:00	413
5032	Dr. Khoury	JD6729	Jill	Drake	Feb	5	9:00	412
1298	Dr. Hauser	KE6662	Kris	Eddy	Feb	5	9:00	413

2nf:

PatientID	Patient First Name	Patient Last Name
DA3467	Del	Andrus
KM2235	Ken	Moore
KM2235	Ken	Moore
JD6729	Jill	Drake
KE6662	Kris	Eddy

DoctorID	DoctorName
8846	Dr. Cannon
8846	Dr. Cannon
5032	Dr. Khoury
5032	Dr. Khoury
1298	Dr. Hauser

DoctorID	PatientID	Month	Day	Hour	Room
8846	DA3467	Feb	2	8:00	414
8846	KM2235	Feb	2	8:30	414
5032	KM2235	Feb	2	8:00	413
5032	JD6729	Feb	5	9:00	412
1298	KE6662	Feb	5	9:00	413

3nf:
That there is no attribute that depends on another attribute and therefore there is no need for tables

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a: $\pi_{sid}(\sigma_{productID = A15}(catalog \bowtie parts))$

b: $\pi_{name}((\sigma_{productID = A15}(catalog \bowtie parts)) \bowtie suppliers)$

c: $\pi_{name}((\sigma_{productName = \text{"Bicycle"}}((catalog \bowtie parts) \bowtie products)) \ldots$
$\text{rename} \rightarrow \ldots \bowtie suppliers)$

d: $\pi_{phone}(\sigma_{productID = c76}(parts))$

e: $\pi_{phone}(\sigma_{productName = \text{"Scooter"}}(parts \bowtie products))$

f: $\pi_{name}(\sigma_{productID = B52}(\sigma_{cost \leq 100}(catalog) \bowtie parts) \ldots$
$\text{rename} \rightarrow \ldots \bowtie suppliers)$

g: $\pi_{sid}(\sigma_{productID = B52 \text{ and } productID = F18}(\sigma_{cost < 100}(catalog)) \bowtie parts)$

h: $\pi_{name}(\sigma_{productID = F18 \text{ and } productID = B52}(\sigma_{cost < 100}(catalog) \bowtie parts) \bowtie \ldots$
$\text{rename} \rightarrow \ldots suppliers)$

i: $\pi_{catalog.sid, R.sid}(\sigma_{(catalog.cost < R.cost \text{ And } catalog.pid = R.pid)} \ldots$
$\text{rename} \rightarrow \ldots (catalog \times \rho_R(catalog)))$

j: $\pi_{pid}(catalog) - \pi_{catalog.pid}(\sigma_{R.cost < catalog.cost}(\rho_R(catalog) \times catalog))$