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Q1

Insertion Anamoly:-

If we insert a new Hotel, however no new staff member is hired, therefore the NIN cannot be NULL because NIN is PK, therefore we must provide details for NIN and contractNo but is inconsistent with our insertion. ~~Similarly if we hire~~

Deletion Anamoly:-

If we remove the records of C1024, then it will create an anamoly, because staff details and hotel Info will also be deleted in our case this would be, John Smith and Diane Hocine. If we remove the staffName John Smith then, the contractNo would get affected for other records.

Updation Anamoly:-

If we change contractNo, or hotelLocation, or hotelNo, or staffdetails such as eName, then multiple records would have to be changed. ~~e.g.~~ i.e. if contractNo C1024 changes then all occurences of contractNo C1024 would have to get changed.

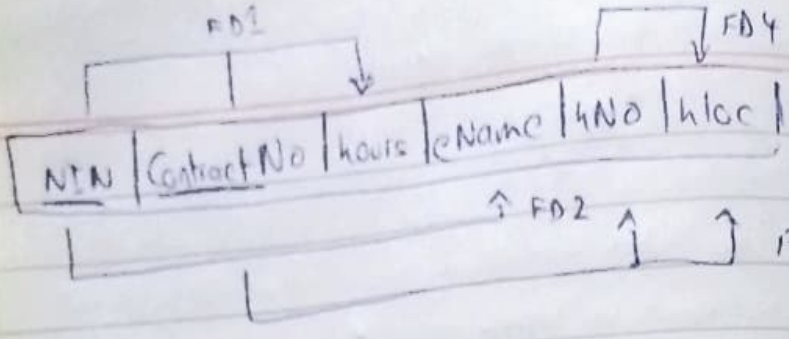
Q2

A	B	C	D	E	F
NIN	contractNo	hours	eName	hotelNo	hotelLocation

It is already in 1NF because there are no multi-valued attributes.

FDs:

FD2 ~~NIN~~ A→D	E→B	F→B	D→A	AB: {ABCDEF}
FD3 B→E	E→F	F→E		therefore
FD4 B→F				NIN and ContractNo will be candidate key



Both FD2 & FD3 violates 2NF because it has partial dependency. therefore we divide the table

| NIN | ContractNo | hours |

| ContractNo | hNo | hloc |

FD3

| NIN | eName |

for 3NF we must eliminate FD3 because it holds the transitive dependency i.e ContractNO → hNO

hNO → hLOC

ContractNO → hLOC

Therefore we further divide the tables and name them

FK	FK	
NIN	ContractNo	hours

Work_hours(NIN, contractNo, hrs)

NIN	eName

Staff_details(NIN, ename)

FK	
ContractNO	hotelNO

Contract(contractNo, hotelNO)

hotelNo	hotel Locality

Hotel_details(hotelNo, hotelLocality)

PatientNo → FullName

WardNo → WardName

DrugNo → Name, Description, Dosage, Method of Admin.

PatientNo, DrugNo, StartDate → Units per Day, FinishDate.

b

1st NF

PatientNo, DrugNo, StartDate, FullName, WardNo, WardName, BedNo, Name, Description, Dosage, MethodOfAdmin, Units Per Day, Finish Date

2ND NF

PatientNo, DrugNo, StartDate, WardNo, WardName, BedNo, Units Per Day, Finish Date.

DrugNo, Name, Description, Dosage, Method of Admin

PatientNo, FullName

3rd NF

PatientNo DrugNo, StartDate, WardNo, BedNo, Units Per day, Finish Date

DrugNo, Name, Description, Dosage, Method of Admin.

PatientNo, FullName. WardNo, WardName.

PatientNo (PK) DrugNo (FK), startDate, WardNo (FK)
BedNo, UnitsPerDay, FinishDate

DrugNo, Name, Description, Package, Method of Admin

PatientNo, FullName

WardNo, WardName. Primary keys are underlined.

3.3 Relations with Attributes.

Student (SSN, Snum, Sname, Sc-addr, Sc_phone, Sp-addr, Sp-phone, Bdate, Sex, Class, Major_code, Minor-code, Prog)

Department (Dname, Dcode, Doffice, Dphone, Dcollege)

Course (name, Cdesc, Cnum, Credit, level, Cdept)

Section (Tname, semester, Year, sec-course, sec-num)

Grade (SSN, Semester, Sec-Course, Sec Num, Grade)

FD's

FD1: SNum → SName, Sc_addr, Sc_phone, Sp-addr, Sp-Phone, Bdate, Sex, Class, Major-code, Minor-code, Prog.

FD2:- SSN → Sname, Sc-addl, Sc-phone, Sp-addl, Sp-phone, Bdate, Sex, Class, Major-code, Minor-code, Price

PA = {SSN, SNum but not both}

Department.

FD1: Dname → Doffice, Dphone, Dcollege

FD2: Dcode → Doffice, Dphone, Dcollege

FD3: Doffice → Dphone

FD4: Dcollege → Doffice

PA = {Dname}, {Dcode} but not both.

Course. FD1 = {Num → {Name, Codex, Cdept, Credit, Level

PN = {{Num}}

Section

FD2: Sec-Num, Sec-course, semester → Inname

PA = {sec-num, sec-course, semester}

Grade.

FD1: Sec-num, SSN, semester, Sec-course → Grade

PA = {Sec-Num, SSN, semester, sec-course}.

Normalization

Student

1NF assumed no multiple values are given.
2NF normalized no partial dependency
3NF normalized no transitive dependency.

Department

1NF assumed)
2NF normalised
3NF not normalized as FD3 & FD4 are transitive.

Department (Dname, Dcode, Dcollege)
Dep-college (Dcollege, Doffice)
Dep-office (D office, Dphone).

Grade

1NF normalized assumed
2NF normalized
3NF normalized

Course

1NF Normalized)
2NF Normalized)
3NF Normalized).

Section

1NF Normalized (Assumed)
2NF Normalized
3NF Normalized.

Student.