DATABASE SYSTEMS

Date 14/12-0154

ASSIGNMENT .3

Section .D

M. Iqaha Ajaz

ANSWER. 1

(d)

INSERTION ;

Example If a new employee joins then only his/her NIN will be entered into the database & everything else will be NULL which we do not want.

UPDATION ;

If we were to update the hno of some hotel to a new number then we must change the hNO in every employees' contract working in that hotel.

DELETION ;

Similarly if were to delete a contract of a certain hotel then we would have to delete that hotel from every employee's contract who is working in that hotel individually.

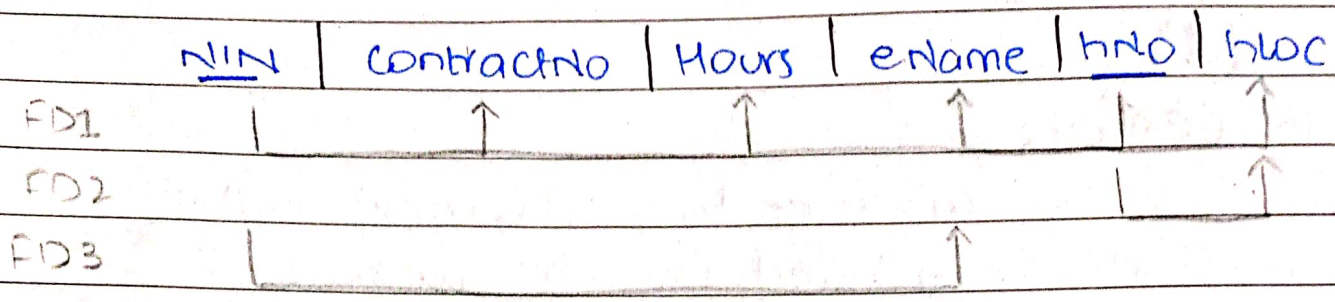
(b)

The table in question belongs to 1NF b/c there are no composite attributes, multi-valued columns are well as nested relations. Now let us analyze it for 2NF & 3NF.

Date

& HNO together form composite

considering NIN is Primary key.



FD2 → ∵ a part of prime attribute determines a non-prime attribute ∴ Partial dependency.

To remove → Decomposition.

R_1 → NIN | ContractNo | Hours | eName | hNo |

R_2 → hNo | hLoc |

FD3 → Also Partial Dependency.

R_1 → NIN | ContractNo | Hours | hNo

R_3 → NIN | eName | .

∵

R_1 → NIN | ContractNo | Hours | hNo |

R_2 → hNo | hLoc |

R_3 → NIN | eName |

By doing normalization the redundancy has not been totally removed but rather reduced.

ANSWER. 2

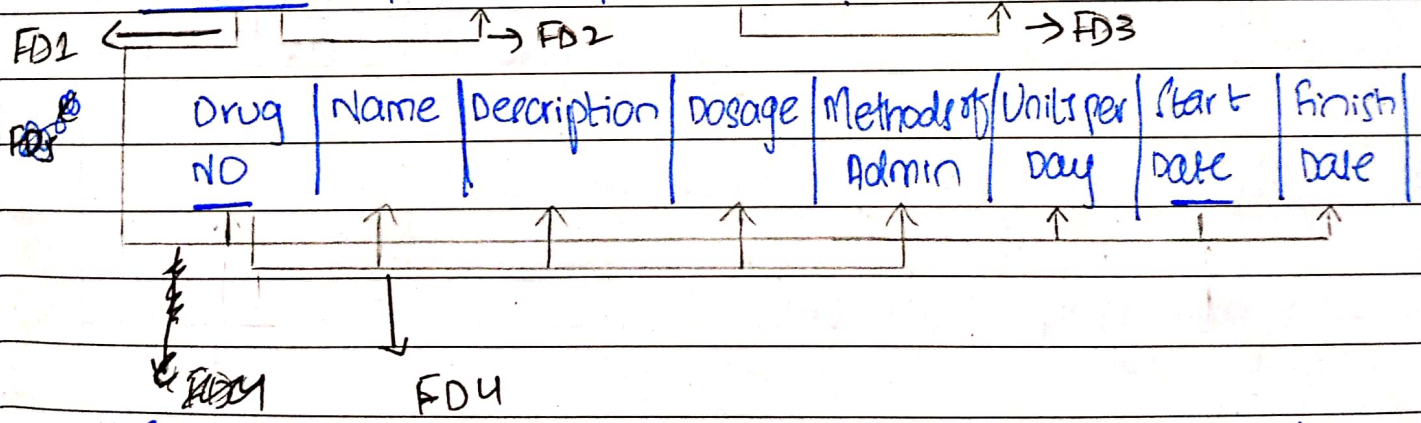
(a)

- Patien Number → Full Name
- Ward Number → Ward Name
- Drug Number → Name | Description | Dosage | Method of Admin
- PatientNumber | DrugNumber | Stard Date | → units per Day | FinishDate

for Bed Number I am going to assume that numbering of each bed is unique for each ward & medication is given based on bed number & in case of emergency some beds have been prepared that gives all medications But there are alot of unknown factors.

~~PatientNumber | DrugNumber | WardNumber | StartDate → BedNo.~~

(b)



// More Tuples will be included for remove multiple values !

FD1 → PatientNumber | Drug NO | StartDate | → UnitsPerDay | FinishDate
→ Already in 3NF : NO Functional Dependency.

FD2 → PatientNumber → Full Name → Partial Dependency

∴ R1 → PatientNumber | Ward Number | Ward Name | Bed NO |
Drug NO | Name | Desc | Methods | Dosage | Units | StartD | FinishD

R2 → PatientNumber | Full Name.

Date

Transitive

FD3 → WardNo → WardName . → Partial Dependency

∴ R_3 → PatientNo | WardNo | BedNo | DrugNo | Name | Descr | Dosage | Methods | Units | StartD | FinishD .

R_4 → WardNo | WardName .

FD4 → DrugNo → Name | Descr | Dosage | Methods → Partial Dependency

∴ R_5 → PatientNo | WardNo | BedNo | DrugNo | Units | StartD | FinishD

R_6 → DrugNo | Name | Descr | Dosage | Methods .

∴ Combining All Relations .

R_1 → PatientNo | WardNo | BedNo | DrugNo | Units | StartDate | FinishDate |

R_2 → PatientNo | FullName |

R_3 → WardNo | WardName |

R_4 → DrugNo | Name | Description | Dosage | Methods |

(c)

R_1 → Primary key → {PatientNo | DrugNo | StartDate |} → Composite

Foreign key → PatientNo, DrugNo, WardNo

R_2 → Primary key → PatientNo

R_3 → Primary key → WardNo

R_4 → Primary key → DrugNo .

ANSWER.3

Functional Dependencies

FD1 → Ssn → {Fname | Snum | Sc_addr | Sc_Phone | Sp_Addr | Sp_Phone | Bdate | Sex | Class | Major_Code | Minor_Code | Prog |

FD2 → Snum → {Sname | Ssn | Sc_addr | Sc_Phone | Sp_Addr | Sp_Phone | Bdate | Sex | Class | Major_Code | Minor_Code | Prog |.

FD3 → Dname → {Dcode | Doffice | Dphone | Dcollege |

FD4 → Dcode → {Dname | Doffice | Dphone | Dcollege |

FD5 → Cnum → {Cname | Cdesc | Credit | Level | Cdept |

~~FD6 → {Ssn | Sec_Num | Semester | Year | Sec_Course} → Grade~~

FD6 → {Sec_Num | Semester | Year | Sec_Course} → Iname

FD7 → {Ssn | Sec_Num | Semester | Year | Sec_Course} → Grade

FD1 → Already in 3NF

FD2 → Already in 3NF.

We'll choose Ssn as Primary key & name the table ~~relational Database~~ as STUDENT.

FD3 → Already in 3NF

FD4 → Already in 3NF.

Here we'll use Dcode as Primary & name this table as DEPARTMENT.

FD5 → Already in 3NF

Primary key ⇒ Cnum & name of Table is Course

FD6 → Composite Primary key : Sec_Num, Semester, Year, Sec_Course & table name is SECTION.

FD7 → Already in 3NF if Primary key : Ssn, Sec_Num, Semester, Year, Sec_Course & table name is GRADE.

RELATIONAL DATABASE SCHEMA

STUDENT

Sname | Snum | Ssn | Sc_addr | Sc_Phone | Sp_addr | Sp_phone | Bdate | Class |

(F.K) (F.K)

Major_Code | Minor_Code | Prog |

DEPARTMENT

Dname | Dcode | Doffice | Dphone | Dcollege |

COURSE

(F.K)

Cname | Cdesc | Cnum | Credit | Level | Cdept |

SECTION

(F.K)

Iname | Semester | Year | Sec_Course | Sec_num |

GRADE

(F.K) (F.K) (F.K) (F.K) (F.K)

Ssn | Sec_Num | Semester | Year | Sec_Course | Grade |