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ID 109695

1. [5] Consider a relation with following attributes:

EmpNo   : Employee Number unique across all employees
EmpName   : Employee Name
EmpEmail   : Employee Email unique across all employees
ProjNo   : Project Number unique across all projects
ProjName   : Project Name
EmpGrade   : Employee Grade
HrlyRate   : Hourly rate of compensation.
Employees of the same grade receive the same hourly compensation
HrsWorked   : Hours a particular employee worked on a particular project.

- EmpGrade is like "s/w developer", "QA tester", etc. One employee will have only one grade.
- An employee can work on many different projects and a project can have many different   employees   working   on   it.

a. **Create this table and some sample data** (either on paper or in SQL Server)**. There must be at least 6 rows. There must be 2 to 4 Employees and 2 to 4 projects. Your submission must show all the rows from this table.**

EmpNo	EmpName	EmpEmail	ProjNo	ProjName	EmpGrade	HrlyRate	HrsWorked
1	yaried	yaredsonj@gamil.com	2	Banking System	senior	50	150
2	Sali	sali_simon@gmail.com	1	Soccer Managment System	junior	35	160
3	Hani	hani@gmail.com	3	Library System	professional	60	170
4	Samri	samri_berhane@gamil.com	2	Banking System	junior	35	160
2	Sali	sali_simon@gmail.com	3	Library System	junior	35	185
1	yaried	yaredsonj@gamil.com	1	Soccer Managment System	senior	50	170

b. **Find all functional dependencies.**

fd1- EmpNo – EmpName

fd2 – EmpNo – EmpEmail

fd3 – EmpNo – EmpGrade

fd4 – ProjNo – ProjName

fd5 – EmpGrade – HrlyRate

fd6 – EmpName – EmpEmail

fd7 – EmpEmail – EmpName

fd8 – (EmpNo, ProjNo) - HrsWorked

fd9 – (EmpNo , ProjNo, EmpGrade) – HrsWoked

c. **Find all Candidate Keys.**

 (EmpNo, ProjNo)

(EmpNo , ProjNo, EmpGrade)

d. **Find a Primary Key**

 (EmpNo, ProjNo)

e. **Find all partial dependencies.**

fd1- EmpNo – EmpName

fd2 – EmpNo – EmpEmail

fd3 – EmpNo – EmpGrade

fd4 – ProjNo – ProjName

f. **Normalize to 2NF.**

Employee(EmpNo, ProjNo, EmpName, EmpEmail, EmpGrade, HrlyRate, HrsWorked)

Project(ProjNo, ProjName)

g. **Show new tables** (based on the sample data you created in 1 above)**.**

EmpNo	ProjNo	EmpName	EmpEmail	EmpGrade	HrlyRate	HrsWorked
1	1	yaried	yaredsonj@gamil.com	senior	50	170
1	2	yaried	yaredsonj@gamil.com	senior	50	150
2	1	Sali	sali_simon@gmail.com	junior	35	160
2	3	Sali	sali_simon@gmail.com	junior	35	185
3	3	Hani	hani@gmail.com	professional	60	170
4	2	Samri	samri_berhane@gamil.com	junior	35	160

ProjNo	ProjName
1	Soccer Managment System
2	Banking System
3	Library System

h. **Normalize to 3NF.**

Tansitive Dependency : EmpGrade – HrlyRate

Employee(EmpNo, ProjNo, EmpName, EmpEmail, EmpGrade, HrsWorked)

Project(ProjNo, ProjName)

EmployeeGrade(EmpGrade, HrlyRate)

i. **Show new tables** (based on the sample data you created in 1 above)**.**

EmpNo	ProjNo	EmpName	EmpEmail	EmpGrade	HrsWorked
1	1	yaried	yaredsonj@gamil.com	senior	170
1	2	yaried	yaredsonj@gamil.com	senior	150
2	1	Sali	sali_simon@gmail.com	junior	160
2	3	Sali	sali_simon@gmail.com	junior	185
3	3	Hani	hani@gmail.com	professional	170
4	2	Samri	samri_berhane@gamil.com	junior	160

ProjNo	ProjName
1	Soccer Managment System
2	Banking System
3	Library System

EmpGrade	HrlyRate
junior	35
professional	60
senior	50

j. **With the help of an example, explain why a relation must be in 3NF.**

A Relation must be in a 3NF to avoid data inconsistency. For example if you want to update the hourly rate of Junior Employee's we need to update three tuples in the Employee table, unless other wise our data will be in inconsistent state.

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2. **[5] Solve exercise 14.14 (a, b, c) on page 428 from the course text book (6th edition).**

A.

Identify the functional dependencies represented by the attributes shown in the form in Figure 14.18. State any assumptions that you make about the data and the attributes shown in this form

fd1 PatientNo – PatientName

fd2 DrugNo – DrugName

fd3 DrugNo – Discription

fd4 DrugNo – MethodOfAdmin

fd5 DrugnNo – Dosage

fd6 WardNo – WardName

fd7 WardName – WardNo

fd8 (PatientNo, DrugNo) – BedNo, UnityPerDay

fd9 (PatientNo, DrugNo, StartDate) – FinishDate

B.

Frist Normal Form

WellmeadowsHospital(<u>PatientNo</u>, <u>DrugNo</u>, <u>StartDate</u>, PatientName, DrugName, Discription,

   MethodOfAdmin, Dosage, UnityPerDay , FinishDate WardNo, BedNo , WardName)

Second Normal Form

Partial Dependent:

PatientNo – PatientName

DrugNo – DrugName

DrugNo – Discription

DrugNo – MethodOfAdmin

DrugnNo – Dosage

Candidate Keys :

(PatientNo, DrugNo) – BedNo, UnityPerDay

(PatientNo, DrugNo, StartDate) – FinishDate

Primary key:

(PatientNo, DrugNo, StartDate) – FinishDate

WellmeadowsHospital(<u>PatientNo</u>, <u>DrugNo</u>, <u>StartDate</u>, UnityPerDay , FinishDate WardNo, BedNo , WardName)

Patient(<u>PatientNo</u>, PatientName)

Drug(<u>DrugNo</u>, DrugName, Discription, MethodOfAdmin, MethodOfAdmin)

Third Normal Form

Transitive Dependent:

WardNo – WardName

WellmeadowsHospital(<u>PatientNo</u>, <u>DrugNo</u>, <u>StartDate</u>, UnityPerDay , FinishDate, BedNo)

Patient(<u>PatientNo</u>, PatientName)

Drug(<u>DrugNo</u>, DrugName, Discription, MethodOfAdmin, MethodOfAdmin)

Ward(<u>WardNo</u>, WardName)

WellmeadowsHospital

PatientNo	DrugNo	StartDate	UnitPerDay	FinishDate	BedNo	WardNo
P10034	10223	24/03/13	50	24/04/14	84	ward11
P10045	10334	24/03/13	10	17/04/13	67	ward11
P10009	10223	25/04/14	10	2/5/15	23	ward09

Drug

DrugNo	DrugName	Description	MethodOFAdmin	Dosage
10223	Morphine	Pain Killer	Oral	10mg/ml
10334	Tetracyclene	Antibiotic	IV	0.5mg/ml

Patient   Ward

PatientNo	PatientName
P10034	Robert MacDonald
P10045	Sara Robinson
P10009	Mike Ferrer

C.

WellmeadowsHospital(PatientNo(FK), DrugNo(FK), StartDate, UnityPerDay , FinishDate, WardNo(FK), BedNo)

Patient(PatientNo, PatientName)

Drug(DrugNo, DrugName, Discription, MethodOfAdmin, MethodOfAdmin)

Ward(WardNo, WardName)

WardNo	WardName
Ward11	Orthopaedic
Ward09	dentist