Database Management System – cs422 DE

Lab 2 – Week 5

This Lab is based on lecture 5 (chapters 14).

o Submit your *own work* on time. No credit will be given if the lab is submitted after the due date.
o Note that the completed lab should be submitted in .doc, .docx, .rtf or .pdf format only.
o If you think that your answer needs more explanation to get credit then please write it down.

Consider a relation with following attributes:

EmpNo: Employee Number
EmpName   : Employee Name
EmpEmail   : Employee Email
ProjNo : Project Number
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

1. Create this table and sample data in SQL Server. There must be at least 10 rows. There must be 3 to 6 Employees and 3 to 6 projects. You need to add the screenshot of the table showing all the rows.

EmpNo	EmpName	EmpEmail	ProjNo	ProjName	EmpGrade	HrlyRate	HrsWorked
1	Gopal	gopalkunwa...	1	CSI	A	60	40
2	James	james@gm...	1	CSI	A	60	40
3	Micheal	micheal@g...	2	RedHat	A-	58	40
4	Julia	julia@gmail...	2	RedHat	A-	58	40
5	Hana	hana@gmai...	3	LocationFin...	B-	52	89
6	Saraha	saraha@gm...	3	LocationFin...	B+	56	80
7	Kashi	kashi@gmai...	4	NLP	B	54	110
8	Kushal	kushal@gm...	4	NLP	B	54	130
9	Ram	ram@gmail...	5	LearningCur...	B+	56	140
10	Nursa	nursa@gma...	5	LearningCur...	B+	56	145
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

2. Find all functional dependencies.
ANS:

EmpNo->EmpName, EmpEmail, EmpGrade, HrlRate
EmpEmail->EmpName, EmpNo, EmpGrade, HrlRate
ProjNo-> ProjName
(EmpNo, ProjNo)-> HrsWorked
(EmpEmail, ProjNo)->HrsWorked

3. Find all Candidate Keys.
    ANS:
    (EmpNo, ProjectNo)
    (EmpEmail, ProjectNo)

4. Find a Primary Key.
    ANS:
    (EmpNo, ProjectNo)

5. Find all partial dependencies.
    ANS:
    EmpNo-> EmpName,EmpEmail, EmpGrade, HrlyRate
    EmpEmail-> EmpName, EmpNo, EmpGrade, HrlyRate
    ProjNo-> ProjName

6. Normalize to 2NF.
    ANS:

    Employee:

EmpNo	EmpName	EmpEmail	EmpGrade	HrlyRate

    Project:

ProjNo	ProjName

    Employee_Project

EmpNO	ProjNo	HrsWorked

7. Show new tables after 2NF (based on the sample data you created in 1 above). Screenshots of all the tables are required.

Employee:

	EmpNo	EmpName	EmpEmail	EmpGrade	HrlyRate
▶	1	Gopal	gopalkunwa...	A	60
	2	James	james@gm...	A	60
	3	Micheal	micheal@g...	A-	58
	4	Julia	julia@gmail...	A-	58
	5	Hana	hana@gmai...	B-	52
	6	Saraha	saraha@gm...	B+	56
	7	Kashi	kashi@gmai...	B	54
	8	Kushal	kushal@gm...	B	54
	9	Ram	ram@gmail....	B+	56
	10	Nursa	nursa@gma...	B+	56
*	NULL	NULL	NULL	NULL	NULL

Project:

	ProjNo	ProjName
▶	1	CSI
	2	RedHat
	3	LocationFin...
	4	NLP
	5	LearningCur...
*	NULL	NULL

Employee_Project:

EmpNo	ProjNo	HrsWorked
1	1	40
2	1	40
3	2	40
4	2	40
5	3	89
6	3	80
7	4	110
8	4	130
9	5	140
10	5	145
*	NULL	NULL	NULL

8. Normalize to 3NF.
   ANS:
   To convert 3NF there shouldn't be transitive dependency. There is one transitive dependency i.e.
   EmpGrade->HrlyRate
   For this we must create a new table Grade with these two attributes and keep one attribute
   EmpGrade of this Grade table to Employee table.

   Grade:

EmpGrade	HrlyRate

   Employee:

EmpNo	EmpName	EmpEmail	EmpGrade

   Project:

ProjNo	ProjName

   Employee_Project:

EmpNo	ProjNo	HrsWorked

9. Show new tables after 3NF (based on the sample data you created in 1 above). Screenshots of all the tables are required.

Ans:

Grade:

EmpGrade	HrlyRate
A	60
A-	58
B+	56
B	54
B-	52
NULL	NULL

Employee:

EmpNo	EmpName	EmpEmail	EmpGrade
1	Gopal	gopalkunwar@gmail.com	A
2	James	james@gmail.com	A
3	Micheal	micheal@gmail.com	A-
4	Julia	julia@gmail.com	A-
5	Hana	hana@gmail.com	B-
6	Saraha	saraha@gmail.com	B+
7	Kashi	kashi@gmail.com	B
8	Kushal	kushal@gmail.com	B
9	Ram	ram@gmail.com	B+
10	Nursa	nursa@gmail.com	B+
NULL	NULL	NULL	NULL

Project:

ProjNo	ProjName
1	CSI
2	RedHat
3	LocationFin…
4	NLP
5	LearningCur…
NULL	NULL

Employee_Project:

EmpNo	ProjNo	HrsWorked
1	1	40
2	1	40
3	2	40
4	2	40
5	3	89
6	3	80
7	4	110
8	4	130
9	5	140
10	5	145
NULL	NULL	NULL