Database Management System – cs422 DE

Lab 2 – Week 5

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

- Submit your *own work* on time. No credit will be given if the lab is submitted after the due date.
- Note that the completed lab should be submitted in .doc, .docx, .rtf or .pdf format only.
- 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.

```
1 SELECT * FROM EmployeeProject
```

EmpNo	EmpName	EmpEmail	ProjNo	ProjName	EmpGrade	HrlyRate	HrsWorked
1	John Doe	john.doe@exam…	101	Employee Mana…	A	20	40
2	Jane Smith	jane.smith@exa…	102	Software Devel…	B	18.5	35
3	Alice Johnson	alice.johnson@…	102	Software Devel…	A	20	45
4	Bob Brown	bob.brown@exa…	101	Employee Mana…	C	16.75	30
5	Emily Davis	emily.davis@ex…	103	Data Analysis	B	18.5	40
6	Michael Wilson	michael.wilson…	103	Data Analysis	C	16.75	35
7	Sophia Martinez	sophia.martinez…	101	Employee Mana…	A	20	38
8	William Taylor	william.taylor@e…	102	Software Devel…	B	18.5	42
9	Olivia Anderson	olivia.anderson…	103	Data Analysis	C	16.75	37
10	Daniel Thomas	daniel.thomas@…	104	Project Manage…	A	20	40

2. Find all functional dependencies.
   ANS:
   - EmpNo -> EmpName, EmpEmail, EmpGrade, HrlyRate
   - ProjNo -> ProjName
   - EmpGrade -> HrlyRate
   - (EmpNo, ProjNo) -> HrsWorked

3. Find all Candidate Keys.
   ANS:
   - EmpNo
   - (EmpNo, ProjNo)

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

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

6. Normalize to 2NF.
   ANS:
   - Table Employee (EmpNo, EmpName, EmpEmail, EmpGrade, HrlyRate)
   - Table Project (ProjNo, ProjName)
   - Table Emp_Proj (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.

```
1 SELECT * FROM Employee;
2
```

EmpNo	EmpName	EmpEmail	EmpGrade	HrlyRate
1	John Doe	john.doe@example.com	A	20
2	Jane Smith	jane.smith@example.com	B	18.5
3	Alice Johnson	alice.johnson@example.com	A	20
4	Bob Brown	bob.brown@example.com	C	16.75
5	Emily Davis	emily.davis@example.com	B	18.5
6	Michael Wilson	michael.wilson@example.com	C	16.75
7	Sophia Martinez	sophia.martinez@example.c…	A	20
8	William Taylor	william.taylor@example.com	B	18.5
9	Olivia Anderson	olivia.anderson@example.com	C	16.75
10	Daniel Thomas	daniel.thomas@example.com	A	20

```
1 SELECT * FROM Project;
2
```

ProjNo	ProjName
101	Employee Management System
102	Software Development
103	Data Analysis
104	Project Management

```
1 SELECT * FROM Emp_Proj;
2
```

EmpNo	ProjNo	HrsWorked
1	101	40
2	102	35
3	102	45
4	101	30
5	103	40
6	103	35
7	101	38
8	102	42
9	103	37
10	104	40

8. Normalize to 3NF.
   ANS:
   - Table Employee (EmpNo, EmpName, EmpEmail, EmpGrade)
   - Table Geade (EmpGrade, HrlyRate)
   - Table Project (ProjNo, ProjName)
   - Table Emp_Proj (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.

```
1 SELECT * FROM Employee
```

EmpNo	EmpName	EmpEmail	EmpGrade
1	John Doe	john.doe@example.com	A
2	Jane Smith	jane.smith@example.com	B
3	Alice Johnson	alice.johnson@example.com	A
4	Bob Brown	bob.brown@example.com	C
5	Emily Davis	emily.davis@example.com	B
6	Michael Wilson	michael.wilson@example.com	C
7	Sophia Martinez	sophia.martinez@example.com	A
8	William Taylor	william.taylor@example.com	B
9	Olivia Anderson	olivia.anderson@example.com	C
10	Daniel Thomas	daniel.thomas@example.com	A

```
1 SELECT * FROM Project
```

ProjNo	ProjName
101	Employee Management System
102	Software Development
103	Data Analysis
104	Project Management

```
1 SELECT * FROM Grade
```

EmpGrade	HrlyRate
A	20
B	18.5
C	16.75

```
1 SELECT * FROM Emp_Proj
```

EmpNo	ProjNo	HrsWorked
1	101	40
2	102	35
3	102	45
4	101	30
5	103	40
6	103	35
7	101	38
8	102	42
9	103	37
10	104	40