Jimmy Tran

He

CSC 4710

2 October 2017

Assignment 1

1) See last sheet attached.

2.1) Key constraint is violated. The data to be inserted has a Super\_ssn that already exists in the Employee tuple when SSNs of any kind should be unique to each entity.

2.2) Key constraint is violated as the department number already exists for the Administration department. Referential integrity constraint is also violated as no one in the Employee database has the Mgr\_ssn given by the data to be inserted.

2.3) Referential integrity constraint is violated as we do not know if Mgr\_ssn is referring to the Ssn or Super\_ssn in the Employee tuple.

3.1)

Query (Probably not the best way, but I think it works):

data=SELECT Salary, Dno FROM EMPLOYEE

IF Dno=5 FROM data THEN

avg5=AVG(Salary FROM data)

END IF

IF Dno=4 FROM data THEN

avg4=AVG(Salary FROM data)

END IF

IF Dno=1 FROM data THEN

avg1=AVG(Salary FROM data)

END IF

IF avg5>30000 THEN

result5=SELECT Dname FROM DEPARTMENT WHERE Dnumber=5

UNION

count5=SELECT COUNT(Salary) FROM data WHERE Dno=5

END IF

UNION

IF avg4>30000 THEN

result4=SELECT Dname FROM DEPARTMENT WHERE Dnumber=4

UNION

count4=SELECT COUNT(Salary) FROM data WHERE Dno=4

END IF

UNION

IF avg1>30000 THEN

result1=SELECT Dname FROM DEPARTMENT WHERE Dnumber=1

UNION

count1=SELECT COUNT(Salary) FROM data WHERE Dno=1

END IF

Result:

|  |  |
| --- | --- |
| Department | Number of Employees |
| Research | 4 |
| Administration | 3 |
| Headquarters | 1 |

4.1)

Query:

Workers🡨πEssn(σPno=1(WORKS\_ON))

Result🡨πFname,Lname(σSsn=Workers(EMPLOYEE))

Result:

|  |  |
| --- | --- |
| Fname | Lname |
| John | Smith |
| Joyce | English |

4.2)

Query:

Projects🡨ρProject(πPname(PROJECT))

P1Hours🡨FSUM(πHours(σPno=1(WORKS\_ON)))

P2Hours🡨FSUM(πHours(σPno=2(WORKS\_ON)))

P3Hours🡨FSUM(πHours(σPno=3(WORKS\_ON)))

P10Hours🡨FSUM(πHours(σPno=10(WORKS\_ON)))

P20Hours🡨FSUM(πHours(σPno=20(WORKS\_ON)))

P30Hours🡨FSUM(πHours(σPno=30(WORKS\_ON)))

PHours🡨ρProject\_Hours(P1Hours (JOIN) P2Hours (JOIN) P3Hours (JOIN) P10Hours (JOIN) P20Hours (JOIN) P30Hours)

Result🡨Projects (JOIN) PHours

Result:

|  |  |
| --- | --- |
| Project | Project\_Hours |
| ProductX | 52.5 |
| ProductY | 37.5 |
| ProductZ | 50.0 |
| Computerization | 55.0 |
| Reorganzation | 25.0 |
| Newbenefits | 55.0 |

4.3)

Query: (Don’t have a join symbol so just used (JOIN) instead)

DeptName🡨ρDepartment(πDname(DEPARTMENT))

Dept5Avg🡨FAVG(πSalary(σDno=5(EMPLOYEE)))

Dept4Avg🡨FAVG(πSalary(σDno=4(EMPLOYEE)))

Dept1Avg🡨FAVG(πSalary(σDno=1(EMPLOYEE)))

Avgs🡨ρAverage\_Salary(Dept5Avg (JOIN) Dept4Avg (JOIN) Dept1Avg)

Result🡨DeptName (JOIN) Avgs

Result:

|  |  |
| --- | --- |
| Department | Average\_Salary |
| Research | 33250 |
| Administration | 31000 |
| Headquarters | 55000 |

5) Relational Schema (Organization looks a bit weird for my convenience. Arrows are hard to do in Word)

SHIP

|  |  |  |  |
| --- | --- | --- | --- |
| Sname | Owner | Stype | Pname |

SHIP\_TYPE

|  |  |  |  |
| --- | --- | --- | --- |
| Type | Tonnage | Hull | Sname |

SHIP\_MOVEMENT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sname | Time | Date | Longitude | Latitude |

PORT

|  |  |  |  |
| --- | --- | --- | --- |
| Sname | SCname | Seaname | Pname |

PORT\_VISIT

|  |  |  |  |
| --- | --- | --- | --- |
| Sname | Start\_date | End\_date | Pname |

STATE/COUNTRY

|  |  |  |
| --- | --- | --- |
| Name | Continent | Pname |

SEA/OCEAN/LAKE

|  |  |
| --- | --- |
| Name | Pname |