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**190905522 CSE D 62**

**DBS Lab 5 (Week 5) ER Model and SQL**

**Question: Design the database for the following ER Diagram**

**Diagram

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**Solution:** We create the schema of this ER Diagram as such:

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To create and populate the database, we run the command:

**@"D:\CSE\CSE Labs\DBS Lab\DbDDL"**

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**The DbDDL.sql file consists of the following code:**

drop table employeeER;

drop table departmentER;

drop table locationsER;

drop table dependentsER;

drop table projectsER;

drop table worksER;

create table employeeER(

    fname varchar(20),

    minit varchar(1),

    lname varchar(20),

    bdate varchar(20),

    address varchar(50),

    ssn number(20),

    sex char(1),

    supervisor number(20),

    salary number(10),

    dept\_no number(20),

    primary key(ssn)

);

*--*

insert into employeeER values('Dipesh','S','Chauhan','14-01-2002','Winterfell',190905520,'M',190900000,100000,11111111);

insert into employeeER values('Hemangi','J','Jain','28-06-2001','Winterfell',190905486,'F',190905520,40000,11111111);

insert into employeeER values('Shreya','F','Srikrishna','29-06-2000','King''s Landing',180905154,'F',190905520,25000,11111111);

insert into employeeER values('Ayush','F','Goyal','01-01-2000','King''s Landing',190905522,'M',180905154,10000,11111111);

insert into employeeER values('Ina','G','Goel','17-06-2000','Dorne',190911224,'F',190900000,200000,22222222);

insert into employeeER values('Kaushikee','D','Agnihotri','02-09-2000','Dorne',190907160,'F',190911224,30000,22222222);

insert into employeeER values('Parikalp','A','Singh','01-01-2000','Arryn',190905356,'M',190907160,6000,22222222);

insert into employeeER values('Naman','I','Goel','01-01-2001','Arryn',190905521,'M',190911224,20000,22222222);

insert into employeeER values('Abheesht','R','Roy','11-10-2000','Winterfell',190911066,'M',190900000,400000,33333333);

insert into employeeER values('Vedant','R','Das','01-01-1999','Winterfell',190905160,'M',190911066,20000,33333333);

insert into employeeER values('Nishika','N','Agarwal','01-01-2002','Arryn',190905523,'F',190911066,30000,33333333);

insert into employeeER values('Pritima','C','Singh','28-03-1976','Winterfell',190900000,'F',190900000,900000,11111111);

*--*

alter table employeeER add foreign key (supervisor) references employeeER(ssn);

*--*

create table departmentER(

    name varchar(20),

    dept\_no number(20),

    emp\_count number(10),

    manager number(20),

    start\_date varchar(20),

    primary key(dept\_no),

    foreign key(manager) references employeeER(ssn)

);

*--*

insert into departmentER values('Web Development',11111111,5,190905520,'02-06-2021');

insert into departmentER values('CyberSecurity',22222222,4,190911224,'02-04-2021');

insert into departmentER values('Machine Learning',33333333,3,190911066,'24-03-2021');

*--*

alter table employeeER add foreign key (dept\_no) references departmentER(dept\_no);

*--*

create table locationsER(

    dept\_no number(20),

    area varchar(20),

    primary key (dept\_no, area),

    foreign key (dept\_no) references departmentER(dept\_no)

);

*--*

insert into locationsER values(11111111, 'Winterfell');

insert into locationsER values(11111111, 'King''s Landing');

insert into locationsER values(22222222, 'Dorne');

insert into locationsER values(22222222, 'Arryn');

insert into locationsER values(33333333, 'Wintefell');

insert into locationsER values(33333333, 'Arryn');

*--*

create table dependentsER(

    ssn number(20),

    name varchar(20),

    sex char(1),

    bdate varchar(20),

    relationship varchar(20),

    primary key (ssn, name),

    foreign key (ssn) references employeeER(ssn)

);

*--*

insert into dependentsER values(190905520,'Pritima','F','28-03-1976','Mother');

insert into dependentsER values(190905520,'Harshita','F','18-09-2002','Sister');

*--*

create table projectsER(

    dept\_no number(20),

    location varchar(20),

    name varchar(20),

    project\_code number(20),

    primary key(project\_code),

    foreign key(dept\_no) references departmentER(dept\_no)

);

*--*

insert into projectsER values(11111111, 'Winterfell', 'Web Scraper', 123456);

insert into projectsER values(11111111, 'King''s Landing', 'Forms', 1234567);

insert into projectsER values(22222222, 'Winterfell', 'Password Hashing', 123);

insert into projectsER values(33333333, 'Winterfell', 'DCGANS', 1234);

*--*

create table worksER(

    ssn number(20),

    project\_code number(20),

    hours number(10),

    primary key(ssn, project\_code),

    foreign key(ssn) references employeeER(ssn),

    foreign key(project\_code) references projectsER(project\_code)

);

*--*

insert into worksER values(190905520, 123456, 12);

insert into worksER values(190905520, 1234567, 30);

insert into worksER values(180905154, 123456, 24);

insert into worksER values(190905486, 1234567, 56);

insert into worksER values(190911224, 123, 105);

insert into worksER values(190905521, 123, 30);

insert into worksER values(190911066, 1234, 300);

insert into worksER values(190905523, 1234, 41);

**Implement the following queries:**

**1.Retrieve the birth date and address of the employee(s) whose name is ‘John B. Smith’. Retrieve the name and address of all employees who work for the ‘Research’ department.**

select bdate, address

from employeeER

where fname = 'Ayush' and minit = 'F' and lname = 'Goyal';

select fname, minit, lname, address

from employeeER natural join departmentER

where name = 'CyberSecurity';

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**2.For every project located in ‘Stanford’, list the project number, the controlling department number, and the department manager’s last name, address, and birth date.**

select project\_code, p.dept\_no, lname, address, bdate

from employeeER e, (select \* from projectsER inner join departmentER using(dept\_no) where location = 'Winterfell' ) p

where manager = ssn;

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**3.Find all distinct salaries of employees.**

select distinct salary

from employeeER;

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**4.For each employee, retrieve the employee’s first and last name and thefirst and last name of his or her immediate supervisor.**

select a.fname, a.lname, b.fname, b.lname

from employeeER a, employeeER b

where a.supervisor = b.ssn;

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**5.Make a list of all project numbers for projects that involve an employee whose last name is ‘Smith’, either as a worker or as a manager of the department that controls the project.**

select distinct project\_code

from projectsER

where project\_code in ( select project\_code

from worksER natural join employeeER

where lname = 'Chauhan' ) or project\_code in ( select project\_code

from projectsER inner join ( select d.dept\_no, lname

from departmentER d, employeeER e

where manager = ssn ) using(dept\_no)

where lname = 'Chauhan' );

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**6.Retrieve all employees who reside is in Houston, Texas.**

select \*

from employeeER

where address = 'Winterfell';

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**7.Show the resulting salaries if every employee working on the ‘ProductX’ project is given a 10 percent raise.**

select fname, lname, salary\*1.01 as increasedsalary

from employeeER e, worksER w, projectsER p

where e.ssn = w.ssn and w.project\_code = p.project\_code and p.name = 'DCGANS';

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**8.Retrieve all employees in department 5 whosesalary is between 30,000 and 40,000.**

select \*

from employeeER

where dept\_no = 11111111 and salary between 30000 and 40000;

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**9.Retrieve a list of employees and the projects they are working on, ordered by department and, within each department, ordered alphabetically by last name, then first name.**

select fname, lname, project\_code, dept\_no

from employeeER natural join worksER order by dept\_no, lname, fname;

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**10.Retrieve the names of all employees who do not have supervisors.**

select \*

from employeeER

where supervisor is null;

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**11.Retrieve the name of each employee who has a dependent with the same first name and is the same sex as the employee.**

select fname, lname

from employeeER e inner join dependentsER d using(ssn)

where fname = name and d.sex = e.sex;

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**12.Retrieve the names of employees who have no dependents.**

select fname, lname

from employeeER left outer join dependentsER using(ssn)

where name is null;

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**13.List the names of managers who have at least one dependent.**

select distinct fname, lname

from ( select \*

from employeeER, departmentER

where manager = ssn ) left outer join dependentsER d using(ssn)

where d.name is not null;

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**14.Retrieve the Social Security numbers of all employees who work on project numbers 1, 2, or 3.**

select ssn

from worksER

where project\_code = 123456 or project\_code = 1234 or project\_code = 1234567;

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**15.Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary.**

select sum(salary) as sumsalary, max(salary) as maxsalary, min(salary) as minsalary, avg(salary) as avgsalary

from employeeER;

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**16.Find the sum of the salaries of all employees of the ‘Research’ department, as well as the maximum salary, the minimum salary, and the average salary in this department.**

select sum(salary) as sumsalary, max(salary) as maxsalary, min(salary) as minsalary, avg(salary) as avgsalary

from ( select \*

from employeeER inner join departmentER using(dept\_no) ) group by name having name = 'CyberSecurity';

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**17.For each project, retrieve the project number, the project name, and the number of employees who work on that project.**

with proj(project\_code, no\_of\_emp)

as (select project\_code, count(\*)

from worksER group by project\_code )

select project\_code, name, no\_of\_emp

from proj inner join projectsER using(project\_code);

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**18.For each project on which more than two employees work, retrieve the project number, the project name, and the number of employees who work on the project.**

with proj(project\_code, no\_of\_emp)

as (select project\_code, count(\*)

from worksER group by project\_code )

select project\_code, name, no\_of\_emp

from proj inner join projectsER using(project\_code)

where no\_of\_emp > 2;

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**19.For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than 40,000.**

with firsts(dept\_no, no) as (select dept\_no, count(\*)

from employeeER group by dept\_no ),

second(dept\_no, no) as (select dept\_no, count(\*)

from employeeER

where salary > 40000 group by dept\_no )

select a.dept\_no, b.no

from firsts a, second b

where a.dept\_no = b.dept\_no and a.no > 5;

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