

VIETNAM NATIONAL UNIVERSITY, HO CHI MINH CITY
UNIVERSITY OF TECHNOLOGY
FACULTY OF COMPUTER SCIENCE AND ENGINEERING



DATABASE SYSTEM (CO2014)

Lab Assignment

Lab 5

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```
CREATE DATABASE COMPANY;  
GO  
USE COMPANY;
```

1 Exercise 1

First, we use the script from database lab 4 to create and populate the database.

```
USE master;  
CREATE DATABASE COMPANY;  
GO  
USE COMPANY;  
  
CREATE TABLE EMPLOYEE (  
    FNAME          VARCHAR(15)      NOT NULL,  
    MINIT          CHAR,            NOT NULL,  
    LNAME          VARCHAR(15)      NOT NULL,  
    SSN            CHAR(9),         NOT NULL,  
    BDATE          DATE,            NOT NULL,  
    ADDRESS        VARCHAR(50),     NOT NULL,  
    SEX            CHAR,            NOT NULL,  
    SALARY         DECIMAL(10,2),    NOT NULL,  
    SUPER_SSN      CHAR(9),         NOT NULL,  
    DNO            INT,             NOT NULL,  
    PRIMARY KEY (SSN),  
    FOREIGN KEY (SUPER_SSN) REFERENCES EMPLOYEE (SSN)  
);  
  
CREATE TABLE DEPARTMENT (  
    DNAME          VARCHAR(15)      NOT NULL UNIQUE,  
    DNUMBER        INT,             NOT NULL,  
    MGR_SSN        CHAR(9),         NOT NULL,  
    MGR_START_DATE DATE,            NOT NULL,  
    PRIMARY KEY (DNUMBER)  
);  
  
CREATE TABLE DEPT_LOCATIONS (  
    DNUMBER        INT,             NOT NULL,  
    DLOCATION        VARCHAR(15),     NOT NULL,  
    PRIMARY KEY (DNUMBER, DLOCATION),  
    FOREIGN KEY (DNUMBER) REFERENCES DEPARTMENT (DNUMBER)  
);  
  
CREATE TABLE PROJECT (  
    PNAME          VARCHAR(15)      NOT NULL,  
    PNUMBER        INT,             NOT NULL,  
    PLOCATION        VARCHAR(15),     NOT NULL,  
    DNUM           INT,             NOT NULL,  
    PRIMARY KEY (PNUMBER),  
    FOREIGN KEY (DNUM) REFERENCES DEPARTMENT (DNUMBER)  
);  
  
CREATE TABLE WORKS_ON (  
    ESSN           CHAR(9),         NOT NULL,  
    PNO            INT,             NOT NULL,  
    HOURS          DECIMAL(3,1),    NOT NULL,  
    PRIMARY KEY (ESSN, PNO),  
    FOREIGN KEY (ESSN) REFERENCES EMPLOYEE (SSN),  
    FOREIGN KEY (PNO) REFERENCES PROJECT (PNUMBER)
```



```
);  
  
CREATE TABLE DEPENDENT (  
    ESSN          CHAR(9),  
    DEPENDENT_NAME VARCHAR(15),  
    SEX           CHAR,  
    BDATE         DATE,  
    RELATIONSHIP  VARCHAR(15),  
    PRIMARY KEY (ESSN, DEPENDENT_NAME),  
    FOREIGN KEY (ESSN) REFERENCES EMPLOYEE (SSN)  
);  
  
ALTER TABLE EMPLOYEE  
ADD FOREIGN KEY (DNO) REFERENCES DEPARTMENT (DNUMBER);  
  
ALTER TABLE DEPARTMENT  
ADD FOREIGN KEY (MGR_SSN) REFERENCES EMPLOYEE (SSN);
```

Listing 1: Create database

```
USE COMPANY;  
  
INSERT INTO EMPLOYEE VALUES  
    ('John', 'B', 'Smith', '123456789', '1965-01-09', '731 Fondren, Houston, TX',  
     'M', 30000, NULL, NULL),  
    ('Franklin', 'T', 'Wong', '333445555', '1955-12-08', '638 Voss, Houston, TX',  
     'M', 40000, NULL, NULL),  
    ('Alicia', 'J', 'Zelaya', '999887777', '1968-07-19', '3321 Castle, Spring, TX',  
     'F', 25000, NULL, NULL),  
    ('Jennifer', 'S', 'Wallace', '987654321', '1941-06-20', '291 Berry, Bellaire,  
     TX', 'F', 43000, NULL, NULL),  
    ('Ramesh', 'K', 'Narayan', '666884444', '1962-09-15', '975 Fire Oak, Humble,  
     TX', 'M', 38000, NULL, NULL),  
    ('Joyce', 'A', 'English', '453453453', '1972-07-31', '5631 Rice, Houston, TX',  
     'F', 25000, NULL, NULL),  
    ('Ahmad', 'V', 'Jabbar', '987987987', '1969-03-29', '980 Dallas, Houston, TX',  
     'M', 25000, NULL, NULL),  
    ('James', 'E', 'Borg', '888665555', '1937-11-10', '450 Stone, Houston, TX', 'M',  
     55000, NULL, NULL);  
  
INSERT INTO DEPARTMENT VALUES  
    ('Research', 5, 333445555, '1988-05-22'),  
    ('Administration', 4, 987654321, '1995-01-01'),  
    ('Headquarters', 1, 888665555, '1981-06-19');  
  
UPDATE EMPLOYEE SET SUPER_SSN = '333445555', DNO = 5 WHERE SSN = '123456789';  
UPDATE EMPLOYEE SET SUPER_SSN = '888665555', DNO = 5 WHERE SSN = '333445555';  
UPDATE EMPLOYEE SET SUPER_SSN = '987654321', DNO = 4 WHERE SSN = '999887777';  
UPDATE EMPLOYEE SET SUPER_SSN = '888665555', DNO = 4 WHERE SSN = '987654321';  
UPDATE EMPLOYEE SET SUPER_SSN = '333445555', DNO = 5 WHERE SSN = '666884444';  
UPDATE EMPLOYEE SET SUPER_SSN = '333445555', DNO = 5 WHERE SSN = '453453453';  
UPDATE EMPLOYEE SET SUPER_SSN = '987654321', DNO = 4 WHERE SSN = '987987987';  
UPDATE EMPLOYEE SET SUPER_SSN = NULL, DNO = 1 WHERE SSN = '888665555';  
  
INSERT INTO DEPT_LOCATIONS VALUES  
    (1, 'Houston'),  
    (4, 'Stafford'),  
    (5, 'Bellaire'),  
    (5, 'Sugarland'),  
    (5, 'Houston');
```

```
INSERT INTO PROJECT VALUES
('ProductX', 1, 'Bellaire', 5),
('ProductY', 2, 'Sugarland', 5),
('ProductZ', 3, 'Houston', 5),
('Computerization', 10, 'Stafford', 4),
('Reorganization', 20, 'Houston', 1),
('Newbenefits', 30, 'Stafford', 4);

INSERT INTO WORKS_ON VALUES
('123456789', 1, 32.5),
('123456789', 2, 7.5),
('666884444', 3, 40.0),
('453453453', 1, 20.0),
('453453453', 2, 20.0),
('333445555', 2, 10.0),
('333445555', 3, 10.0),
('333445555', 10, 10.0),
('333445555', 20, 10.0),
('999887777', 30, 30.0),
('999887777', 10, 10.0),
('987987987', 10, 35.0),
('987987987', 30, 5.0),
('987654321', 30, 20.0),
('987654321', 20, 15.0),
('888665555', 20, NULL);

INSERT INTO DEPENDENT VALUES
('333445555', 'Alice', 'F', '1986-04-05', 'DAUGHTER'),
('333445555', 'Theodore', 'M', '1983-10-25', 'SON'),
('333445555', 'Joy', 'F', '1958-05-03', 'SPOUSE'),
('987654321', 'Abner', 'M', '1942-02-28', 'SPOUSE'),
('123456789', 'Michael', 'M', '1988-01-04', 'SON'),
('123456789', 'Alice', 'F', '1988-12-30', 'DAUGHTER'),
('123456789', 'Elizabeth', 'F', '1967-05-05', 'SPOUSE');
```

Listing 2: Populate database

1.1 VIEW

```
USE COMPANY;
GO

-- a. A view that has the department name, manager name, and manager salary for
    every department.
CREATE VIEW VIEW_A
AS
    SELECT DNAME, FNAME, MINIT, LNAME, SALARY
    FROM DEPARTMENT JOIN EMPLOYEE ON MGR_SSN = SSN;
GO

-- b. A view that has the employee name, supervisor name, and employee salary for
    each employee who works in the 'Research' department.
CREATE VIEW VIEW_B
AS
    SELECT
        E1.FNAME AS EMPLOYEE_FNAME,
        E1.MINIT AS EMPLOYEE_MINIT,
        E1.LNAME AS EMPLOYEE_LNAME,
        E2.FNAME AS SUPER_FNAME,
```



```
        E2.MINIT AS SUPER_MINIT,
        E2.LNAME AS SUPER_LNAME,
        E1.SALARY
    FROM (EMPLOYEE E1 JOIN EMPLOYEE E2 ON E1.SUPER_SSN = E2.SSN) JOIN DEPARTMENT
    D1 ON E1.DNO = D1.DNUMBER
    WHERE D1.DNAME = 'Research';
GO

-- c. A view that has the project name, controlling department name, number of
    employees, and total hours worked per week on the project for each project.
CREATE VIEW VIEW_C
AS
    SELECT
        PNAME,
        DNAME, COUNT(ESSN) AS NUM_EMPLOYEE,
        SUM([HOURS]) AS TOTAL_HOUR
    FROM
        (PROJECT JOIN DEPARTMENT ON DNUM = DNUMBER) JOIN WORKS_ON ON PNUMBER = PNO
    GROUP BY PNAME, DNAME;
GO

-- d. A view that has the project name, controlling department name, number of
    employees, and total hours worked per week on the project for each project
    with more than two employees working on it.
CREATE VIEW VIEW_D
AS
    SELECT
        PNAME,
        DNAME, COUNT(ESSN) AS NUM_EMPLOYEE,
        SUM([HOURS]) AS TOTAL_HOUR
    FROM
        (PROJECT JOIN DEPARTMENT ON DNUM = DNUMBER) JOIN WORKS_ON ON PNUMBER = PNO
    GROUP BY PNAME, DNAME
    HAVING COUNT(ESSN) > 2;
GO

-- e. A view (SSN, Full Name of employee, Number of dependents) that includes
    information about employees who have the number of dependents greater than 2.
CREATE VIEW VIEW_E
AS
    SELECT
        SSN,
        CONCAT(FNAME, ' ', MINIT, ' ', LNAME) AS FULL_NAME,
        COUNT(DEPENDENT_NAME) AS NUM_DEPENDENT
    FROM EMPLOYEE JOIN DEPENDENT ON SSN = ESSN
    GROUP BY SSN, FNAME, MINIT, LNAME
    HAVING COUNT(DEPENDENT_NAME) > 2;
GO

-- f. A view (Full Name of employee, date of birth, gender) for those employees
    who have their birthdate in July.
CREATE VIEW VIEW_F
AS
    SELECT
        CONCAT(FNAME, ' ', MINIT, ' ', LNAME) AS FULL_NAME,
        BDATE,
        SEX
    FROM EMPLOYEE
    WHERE MONTH(BDATE) = 7;
GO

-- g. A view (Name of dependent, SSN of employee, date of birth of dependent) that
```

```
includes information on all dependents who are less than 18 years old.
CREATE VIEW VIEW_G
AS
SELECT DEPENDENT_NAME, ESSN, BDATE
FROM DEPENDENT
WHERE BDATE > DATEADD(YEAR, -18, GETDATE());
GO
```

Output results: See figure 1, 2, 3, 4, 5, 6, 7.

	DNAME	FNAME	MINIT	LNAME	SALARY
1	Headquarters	James	E	Borg	55000.00
2	Administration	Jennifer	S	Wallace	43000.00
3	Research	Franklin	T	Wong	40000.00

Figure 1: Result of VIEW_A

	EMPLOY...	EMPLOY...	EMPLOY...	SUPER...	SUPER...	SUPER...	SALARY
1	John	B	Smith	Franklin	T	Wong	30000.00
2	Franklin	T	Wong	James	E	Borg	40000.00
3	Joyce	A	English	Franklin	T	Wong	25000.00
4	Ramesh	K	Narayan	Franklin	T	Wong	38000.00

Figure 2: Result of VIEW_B

	PNAME	DNAME	NUM_E...	TOTAL...
1	Computerization	Administration	3	55.0
2	Newbenefits	Administration	3	55.0
3	Reorganization	Headquarters	3	25.0
4	ProductX	Research	2	52.5
5	ProductY	Research	3	37.5
6	ProductZ	Research	2	50.0

Figure 3: Result of VIEW_C

1.2 TRIGGER, FUNCTION, STORE PROCEDURE, CURSOR

- Create a database trigger
- Alter table Department
- Write a function
- Create a stored procedure

	PNAME	DNAME	NUM_E...	TOTAL_...
1	Computerization	Administration	3	55.0
2	Newbenefits	Administration	3	55.0
3	Reorganization	Headquarters	3	25.0
4	ProductY	Research	3	37.5

Figure 4: Result of VIEW_D

	SSN	FULL_NA...	NUM_D...
1	123456789	John B Smith	3
2	333445555	Franklin T Wong	3

Figure 5: Result of VIEW_E

	FULL_N...	BDATE	SEX
1	Joyce A English	1972-07-31	F
2	Alicia J Zelaya	1968-07-19	F

Figure 6: Result of VIEW_F

	DEPENDENT_...	ESSN	BDATE
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Figure 7: Result of VIEW_G

- (e) Write a trigger
- (f) Write a stored procedure

2 Exercise 2