1.

CREATE TABLE STUDENT

(

Name VARCHAR(15) NOT NULL,

Student\_number INT NOT NULL,

Class INT NOT NULL,

Major VARCHAR(5) NOT NULL,

PRIMARY KEY(Student\_number)

)

CREATE TABLE COURSE

(

Course\_name VARCHAR(20) NOT NULL,

Course\_number VARCHAR(15) NOT NULL,

Credit\_hours INT NOT NULL,

Department VARCHAR(15) NOT NULL,

PRIMARY KEY(Course\_number)

)

CREATE TABLE SECTION

(

Section\_identifier INT NOT NULL,

Course\_number VARCHAR(15) NOT NULL,

Semester VARCHAR(7) NOT NULL,

Year INT NOT NULL,

Instructor VARCHAR(15) NOT NULL,

PRIMARY KEY(Section\_identifier)

)

CREATE TABLE GRADE\_REPORT

(

Student\_number INT NOT NULL,

Section\_identifier INT NOT NULL,

Grade CHAR,

PRIMARY KEY(Student\_number)

)

CREATE TABLE PREREQUISITE

(

Course\_number VARCHAR(15) NOT NULL,

Prerequisite\_number VARCHAR(15) NOT NULL,

PRIMARY KEY(Prerequisite\_number)

)

2.

CREATE TABLE EMPLOYEE

(

Fname VARCHAR(15) NOT NULL,

Minit CHAR,

Lname VARCHAR(15) NOT NULL,

Ssn CHAR(9) NOT NULL,

Bdate DATE,

Address VARCHAR(30),

Sex CHAR,

Salary DECIMAL(10,2),

Super\_ssn CHAR(9),

Dno INT NOT NULL,

PRIMARY KEY(Ssn)

)

CREATE TABLE DEPARTMENT

(

Dname VARCHAR(15) NOT NULL,

Dnumber INT NOT NULL,

Mgr\_ssn CHAR(9) NOT NULL,

Mgr\_start\_date DATE,

PRIMARY KEY(Dnumber),

UNIQUE(Dname),

FOREIGN KEY(Mgr\_ssn) REFERENCES EMPLOYEE(Ssn)

)

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) ,

Dnum INT NOT NULL,

PRIMARY KEY(Pnumber),

UNION(Pname),

FOREIGN KEY (Dnum) REFERENCES DEPARTMENT(Dnumber)

)

CREATE TABLE WORK\_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)NOT NULL,

Dependent\_name VARCHAR(15) NOT NULL,

Sex CHAR,

Bdate DATE,

Relationship VARCHAR(8),

PRIMARY KEY (Essn, Dependent\_name),

FOREIGN KEY (Essn) REFERENCES EMPLOYEE(Ssn) )

3.

a)Query:

SELECT FNAME,MINIT,LNAME

FROM EMPLOYEE E, PROJECT P, WORKS\_ON W

WHERE E.SSN=W.ESSN

AND       W.PNO=P.PNUMBER

AND       DNO=5

AND       HOURS >10

AND       PNAME='ProductX';

Result)

|  |  |
| --- | --- |
| FNAME | LNAME |
| John | Smith |
| Joyce | English |

b) Query:

SELECT FNAME,MINIT,LNAME

FROM EMPLOYEE E, DEPENDENT D

WHERE E.SSN=D.ESSN

AND E. FNAME=D.DEPENDENT\_NAME;

|  |  |
| --- | --- |
| FNAME | LNAME |
|  |  |

c) Query:

SELECT E.FNAME,E.MINIT,E.LNAME

FROM EMPLOYEE E, EMPLOYEE S

WHERE E.SUPERSSN=S.SSN

AND       S.FNAME='Franklin'

AND       S.LNAME='Wong';

Result:

|  |  |
| --- | --- |
| FNAME | LNAME |
| John | Smith |
| Ramesh | Narayan |
| Joyce | English |

4.

(a) Insert < 'Robert', 'F', 'Scott', '943775543', '21-JUN-42', '2365 Newcastle Rd, Bellaire, TX', M, 58000, '888665555', 1 > into EMPLOYEE.

INSERT INTO EMPLOYEEVALUES ('Robert', 'F', 'Scott', '943775543', '21-JUN-42', '2365 Newcastle Rd, Bellaire, TX', M, 58000, '888665555', 1)

1. Insert < 'ProductA', 4, 'Bellaire', 2 > into PROJECT. INSERT INTO PROJECT

VALUES ('ProductA', 4, 'Bellaire', 2)

1. Insert < 'Production', 4, '943775543', '01-OCT-88' > into DEPARTMENT. INSERT INTO DEPARTMENT

VALUES ('Production', 4, '943775543', '01-OCT-88')

1. Insert < '677678989', null, '40.0' > into WORKS\_ON. INSERT INTO WORKS\_ON

VALUES ('677678989', NULL, '40.0')

1. Insert < '453453453', 'John', M, '12-DEC-60', 'SPOUSE' > into DEPENDENT. INSERT INTO DEPENDENT

VALUES ('453453453', 'John', M, '12-DEC-60', 'SPOUSE')

1. Delete the WORKS\_ON tuples with ESSN= '333445555'. DELETE FROM WORKS\_ON

WHERE ESSN= '333445555'

1. Delete the EMPLOYEE tuple with SSN= '987654321'. DELETE FROM EMPLOYEE

WHERE SSN= '987654321'

1. Delete the PROJECT tuple with PNAME= 'ProductX'. DELETE FROM PROJECT

WHERE PNAME= 'ProductX'

1. Modify the MGRSSN and MGRSTARTDATE of the DEPARTMENT tuple with DNUMBER= 5 to '123456789' and '01-OCT-88', respectively.

UPDATE DEPARTMENT

SET MGRSSN = '123456789', MGRSTARTDATE = '01-OCT-88'

WHERE DNUMBER= 5

1. .Modify the SUPERSSN attribute of the EMPLOYEE tuple with SSN=’999887777’

to ‘943775543’

UPDATE EMPLOYEE SET SUPERSSN=’943775543’ WHERE SSN=’999887777’

1. .Modify the HOURS attribute of the WORKS\_ON tuple with ESSN=’999887777’ and pno=10 to ‘5

’UPDATE WORKS\_ON SET HOURS=’5.0’ WHERE ESSN=’999887777’ AND PNO=10

5.

a)

SELECT Name

FROM STUDENT

WHERE Major='CS'

b)

SELECT Course\_Name

FROM COURSE, SECTION

WHERE COURSE.Course\_Number=SECTION.Course\_Number AND Instructor='King'

AND (Year='07' OR Year=’08’)

c)

SELECT Course\_Number, Semester, Year, COUNT(\*)

FROM SECTION, GRADE\_REPORT

WHERE Instructor='King' AND SECTION.SectionIdentifier=GRADE\_REPORT.SectionIdentifier

GROUP BY Course\_Number, Semester, Year

d)

SELECT Name, Course\_Name, C.Course\_Number, Credit\_Hours, Semester, Year, Grade

FROM STUDENT ST, COURSE C, SECTION S, GRADE\_REPORT G

WHERE Class=4 AND Major='CS' AND ST.Student\_Number=G.Student\_Number AND

G.Section\_Identifier=S.Section\_Identifier AND S.Course\_Number=C.Course\_Number

6.

a)

INSERT INTO STUDENT

VALUES ('Johnson', 25, 1, 'MATH')

b)

UPDATE STUDENT

SET CLASS = 2

WHERE Name='Smith'

c)

INSERT INTO COURSE

VALUES ('Knowledge Engineering','CS4390', 3,'CS')

d)

DELETE FROM STUDENT

WHERE Name='Smith' AND Student\_Number=17

7.

(a) SELECT DNAME, COUNT (\*)

FROM DEPARTMENT, EMPLOYEE

WHERE DNUMBER=DNO

GROUP BY DNAME

HAVING AVG (SALARY) > 30000

Result:

DNAME DNUMBER COUNT(\*)

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(b) The query may still be specified in SQL by using a nested query as follows (not all

implementations may support this type of query):

SELECT DNAME, COUNT (\*)

FROM DEPARTMENT, EMPLOYEE

WHERE DNUMBER=DNO AND SEX='M' AND DNO IN ( SELECT DNO

FROM EMPLOYEE

GROUP BY DNO

HAVING AVG (SALARY) > 30000 )

GROUP BY DNAME

Result:

DNAME DNUMBER COUNT(\*)

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