Section 7 Worksheet: E/R Diagrams and Closures

Problem 1: Convert the following SQL CREATE TABLE statements to an E/R diagram

```
CREATE TABLE Studios(
   name VARCHAR(50),
   address VARCHAR(100),
   PRIMARY KEY(name))

CREATE TABLE Movies(
   title VARCHAR(50),
   year INT,
   genre VARCHAR(50),
   length INT,
   ownedBy VARCHAR(50) NOT NULL,
   PRIMARY KEY(title, year),
   FOREIGN KEY (ownedBy) REFERENCES Studios(name))
```
Problem 2: Convert the following E/R diagram into a set of tables. Gives SQL queries to create those tables and all of the constraints implied by the diagram.

CREATE TABLE Department(
    name varchar(100) PRIMARY KEY,
    chair varchar(100));

CREATE TABLE Course(
    dept_name varchar(100) NOT NULL REFERENCES Department,
    number INT,
    room int,
    PRIMARY KEY (dept_name, number));

CREATE TABLE CodingCourse(
    dept_name varchar(100) REFERENCES Department,
    number INT,
    language varchar(100) PRIMARY KEY (dept_name, number)
    FOREIGN KEY (dept_name, number) REFERENCES Course);
**Problem 3:** Convert the following E/R diagram into a set of tables. Gives SQL queries to create those tables and all of the constraints implied by the diagram.

```
CREATE TABLE Customer(cid int PRIMARY KEY, name text);
CREATE TABLE Product(  
    pid int PRIMARY KEY,  
    name text,  
    price float);
CREATE TABLE Sale(    
    sid int PRIMARY KEY,  
    date text,  
    buyer int NOT NULL REFERENCES Customer);
CREATE TABLE InStoreSale(  
    sid int PRIMARY KEY REFERENCES Sale,  
    store text);
CREATE TABLE OnlineSale(  
    sid int PRIMARY KEY REFERENCES Sale,  
    browser text,  
    OS text);
CREATE TABLE SaleItem(    
    pid int REFERENCES Product,  
    sid int REFERENCES Sales,  
    discount float,  
    PRIMARY KEY (pid, sid));
```
Problem 4: Given the relation R(A,B,C,D,E,F,G) and the following functional dependencies

A -> D
D -> C
F -> EG
DC -> BF

Find the following closures and indicate which are superkeys:

\{A\}^+: \{A, D, C, B, F, E, G\} and is a superkey

\{D\}^+: \{D, C, B, F, E, G\}

\{F\}^+: \{F, E, G\}

\{D, C\}^+: \{D, C, B, F, E, G\}

\{C\}^+: \{C\}

\{E, G\}^+: \{E, G\}

\{B, F\}^+: \{B, F, E, G\}

\{A, B, C\}^+: \{A, B, C, D, F, E, G\} and is a superkey