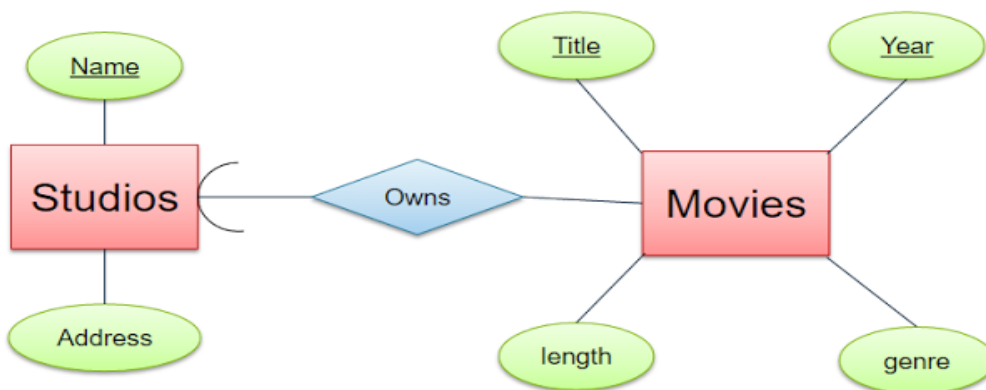


Section 7 Worksheet: E/R Diagrams and Closures

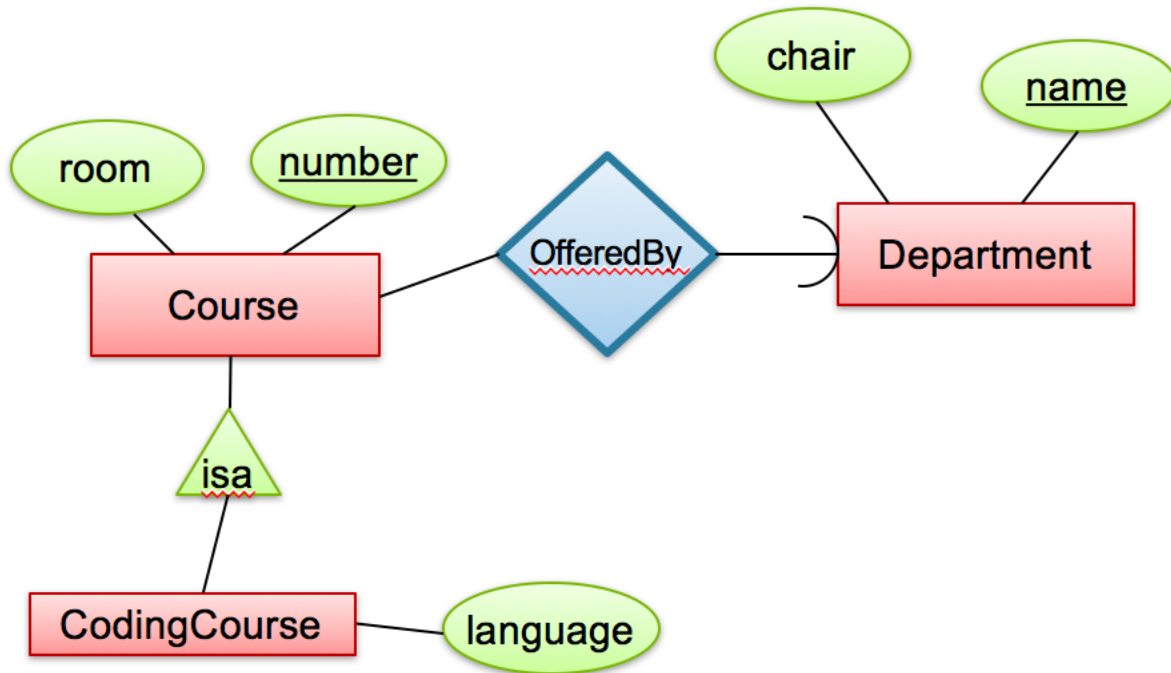
Problem 1: Convert the following SQL CREATE TABLE statements to an E/R diagram

```
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.

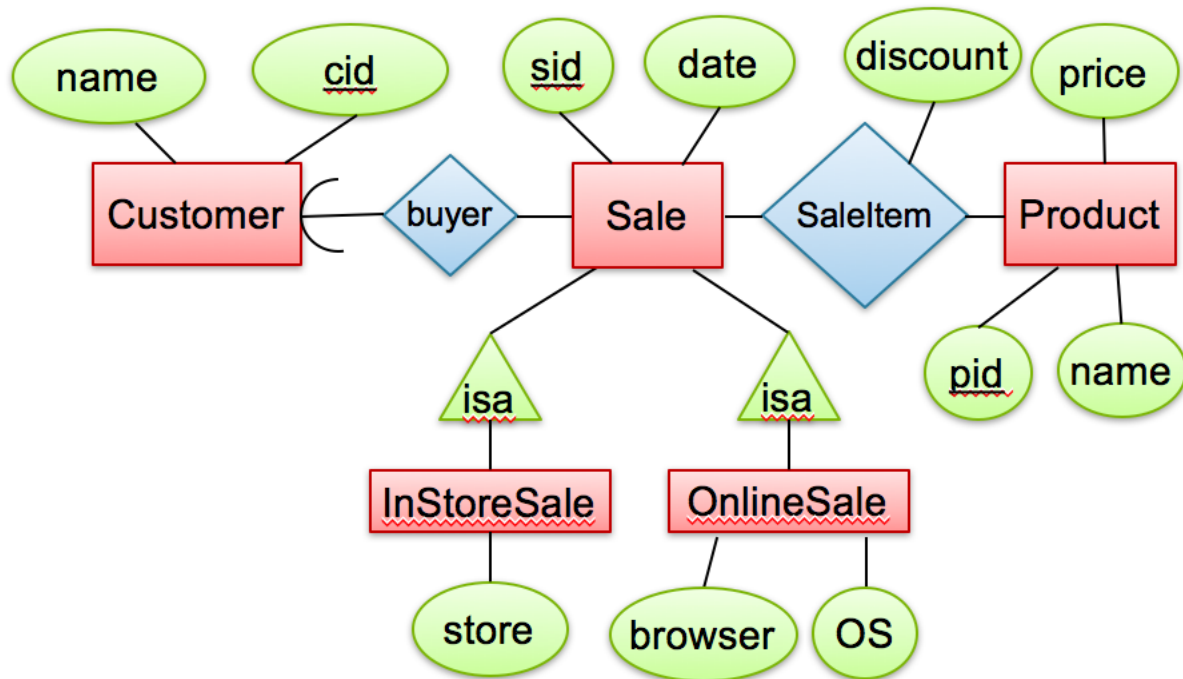


```
CREATE TABLE Department(
    name varchar(100) PRIMARY KEY,
    chair varchar(100));
```

```
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

$A \rightarrow D$

$D \rightarrow C$

$F \rightarrow EG$

$DC \rightarrow BF$

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