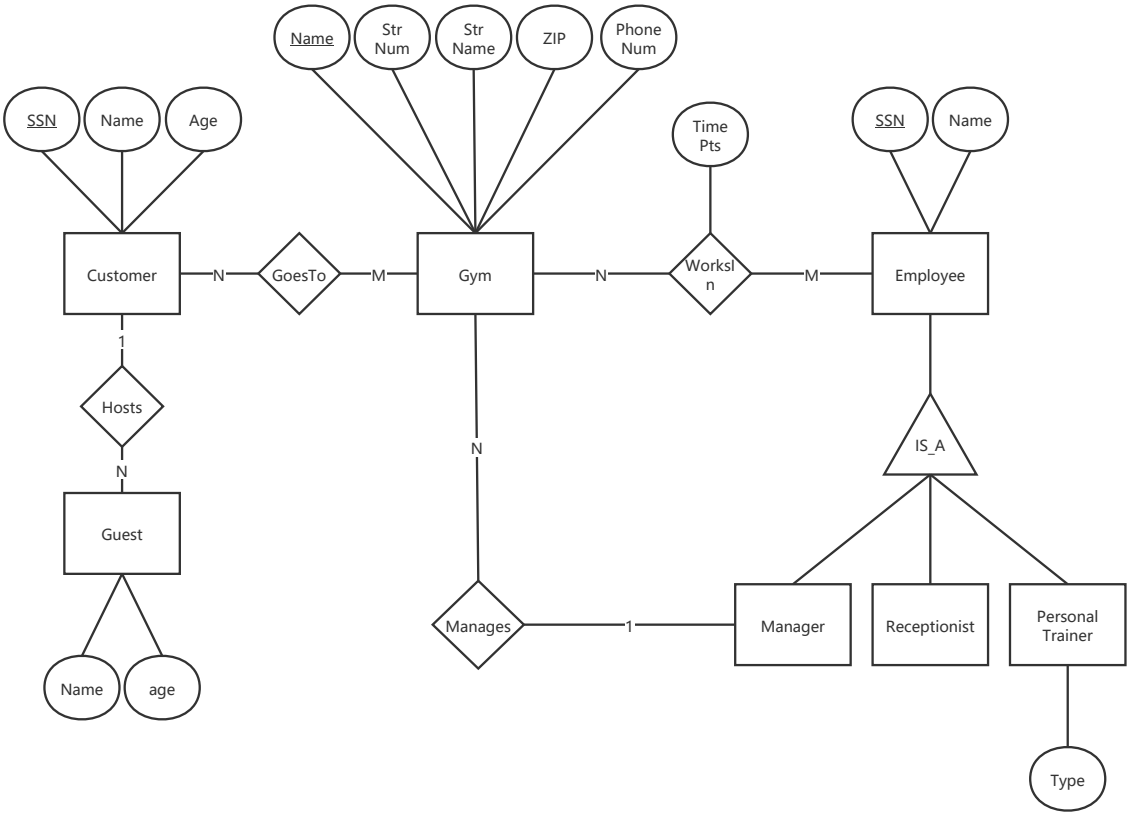
HW1

Q1

(1)

ER Diagram is as follow:



No overlap constraint, for every *employee* has at most one specialization.

No covering constraint, for some *employees* may have zero specialization.

(2)

The SQL statements are as follow:

```
CREATE TABLE gym(
    name char(20),
    strNum integer,
    strName char(20)
    ZIP integer,
    PRIMARY KEY (name)
);
CREATE TABLE phoneNum(
    phoneNum long integer,
    gymName char(20),
    PRIMARY KEY (phoneNum),
    FOREIGN KEY (gymName) REFERENCES gym
);
```

```
CREATE TABLE employee(
    SSN char(11),
    name char(20),
    specialization char(20),
    PRIMARY KEY (SSN)
);
CREATE TABLE workIn(
    gymName char(20),
    employeeSSN char(11),
    timePts integer,
    PRIMARY KEY (gymName,employeeSSN),
    FOREIGN KEY (gymName) REFERENCES gym,
    FOREIGN KEY (employeeSSN) REFERENCE employee
);
CREATE TABLE manages(
    gymName char(20),
    employeeSSN char(11),
    PRIMARY KEY (gymName),
    FOREIGN KEY (gymName) REFERENCES gym,
    FOREIGN KEY (employeeSSN) REFERENCE employee
);
CREATE TABLE customer(
    SSN char(11),
    name char(20),
    age integer,
    PRIMARY KEY (SSN)
);
CREATE TABLE goesTo(
    gymName char(20),
    customerSSN char(11),
    PRIMARY KEY (gymName,customerSSN),
    FOREIGN KEY (gymName) REFERENCES gym,
    FOREIGN KEY (customerSSN) REFERENCE customer
);
CREATE TABLE guest(
    name char(20),
    age integer,
    hostSSN char(11),
    PRIMARY KEY (name,age),
    FOREIGN KEY (hostSSN) REFERENCES customer
);
```

Q2

(1)

```
SELECT s.sname
FROM Suppliers s, Catalog c
WHERE s.sid=c.sid
GROUP BY s.sid
HAVING COUNT(c.pid) = (SELECT COUNT(*) FROM parts);
```

(2)

```
SELECT DISTINCT C.sid
FROM Catalog C
WHERE C.cost > (SELECT AVG(C1.cost)
                FROM Catalog C1
                WHERE C1.pid = C.pid);
```

(3)

```
SELECT S.sname
FROM Suppliers S, Parts P, Catalog C
WHERE C.sid = S.sid AND C.pid = P.pid
        AND C.cost = (SELECT MAX(C1.cost)
                      FROM Catalog C1
                      WHERE C1.pid = C.pid);
```

(4)

```
SELECT DISTINCT C.sid
FROM Catalog C, Parts P
WHERE C.pid = P.pid AND P.color = "red";
```

(5)

```
SELECT DISTINCT C.sid
FROM Catalog C, Parts P
WHERE C.pid = P.pid AND (P.color = "red" OR P.color = "green");
```

(6)

```
SELECT S.sname, MAX(C.cost)
FROM Suppliers S, Catalog C, Parts P
WHERE S.sid = C.sid AND C.pid = P.pid
      AND P.color IN ("red","green");
```

Q3

(1)

```
SELECT MS.MovieID
FROM MovieSupplier MS, Suppliers S
WHERE MS.SupplierID = S.SupplierID
      AND S.SupplierName IN ("Ben's Video","Video Clubhouse");
```

(2)

```
SELECT I.MovieID
FROM Inventory I, Rentals R
WHERE I.TapeID = R.TapeID AND R.Duration = (SELECT MAX(Duration)
                                            FROM Rentals);
```

(3)

```
SELECT MS.SupplierID
FROM Inventory I LEFT JOIN MovieSupplier MS ON I.MovieID=MS.MovieID
GROUP BY MS.SupplierID
HAVING COUNT(MS.MovieID) = (SELECT COUNT(DISTINCT MovieID)
                            FROM Inventory);
```

(4)

```
SELECT MS.SupplierID, COUNT(I.MovieID)
FROM MovieSupplier MS, Inventory I
WHERE MS.MovieID = I.MovieID
GROUP BY MS.SupplierID;
```

(5)

```
SELECT O.MovieID
FROM Orders O
WHERE SUM(O.Copies) > 4
GROUP BY O.MovieID;
```

(6)

```
SELECT R.CustomerID
FROM Rentals R, Inventory I, Movies M
WHERE R.TapeID = I.TapeID AND I.MovieID = M.MovieID
      AND M.MovieName = "Kung Fu Panda"
UNION
SELECT R.CustomerID
FROM Rentals R, Inventory I, MovieSupplier MS, Suppliers S
WHERE R.TapeID = I.TapeID AND I.MovieID = MS.MovieID
      AND MS.SupplierID = S.SupplierID
      AND S.SupplierName = "Palm Video";
```

(7)

```
SELECT I.MovieID
FROM Inventory I
WHERE COUNT(I.TapeID) > 1
GROUP BY I.MovieID;
```

(8)

```
SELECT R.CustomerID
FROM Rentals R
WHERE R.Duration >= 5;
```

(9)

```
SELECT MS.SupplierID
FROM MovieSupplier MS, Movies M
WHERE MS.MovieID = M.MovieID AND M.MovieName = "Cinderella 2015"
      AND MS.Price = MIN(SELECT Price
                         FROM MovieSupplier
                         WHERE MovieID = M.MovieID);
```

(10)

```
SELECT MovieID
FROM Movies
EXCEPT
SELECT MovieID
FROM Inventory;
```

Q4

(1)

First, it would set (111,4) to (111,1.5), because 4>3>1 which meets the trigger requirement:

```
  (OldTuple.price > NewTuple.price AND NewTuple.price > 1)
```

And then, it would complete the original update statement to set (111,1.5) to (111,3), because the trigger is run *BEFORE* the update

(2)

First, (111,4) --> (111,3)

Then, (111,3) --> (111,1.5)

(3)

It would only do (111,4) --> (111,1.5)