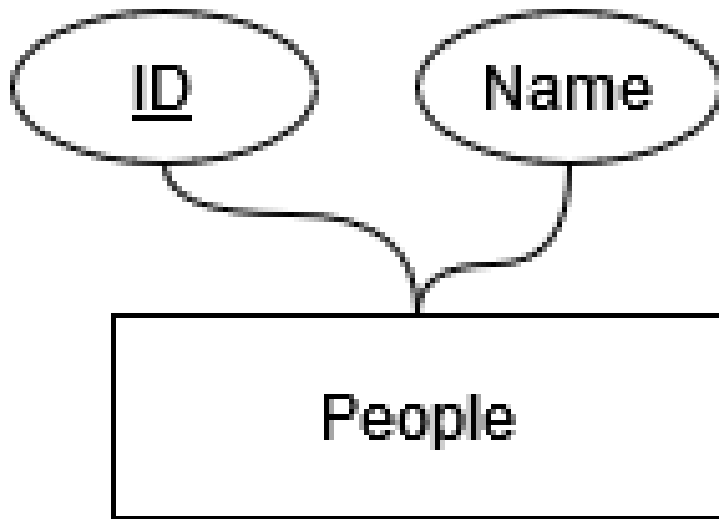


Handbook on ER-diagram to DDL translations.

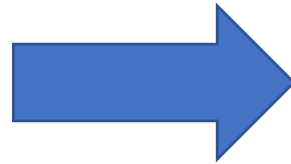
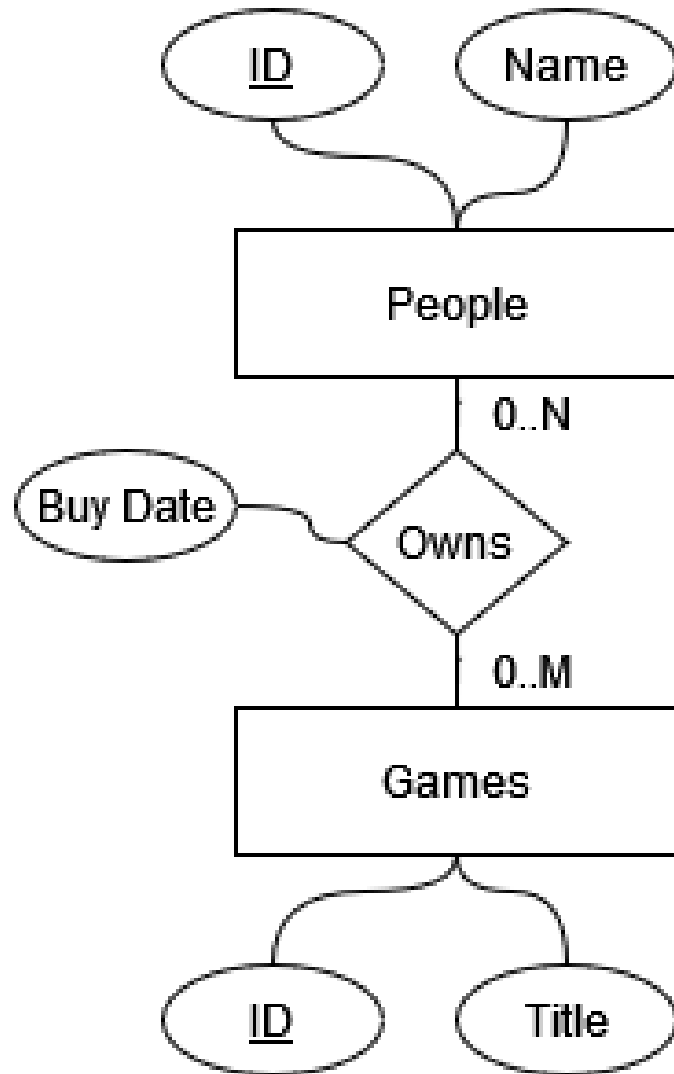
Entities



```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);
```

Relations

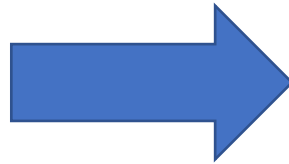
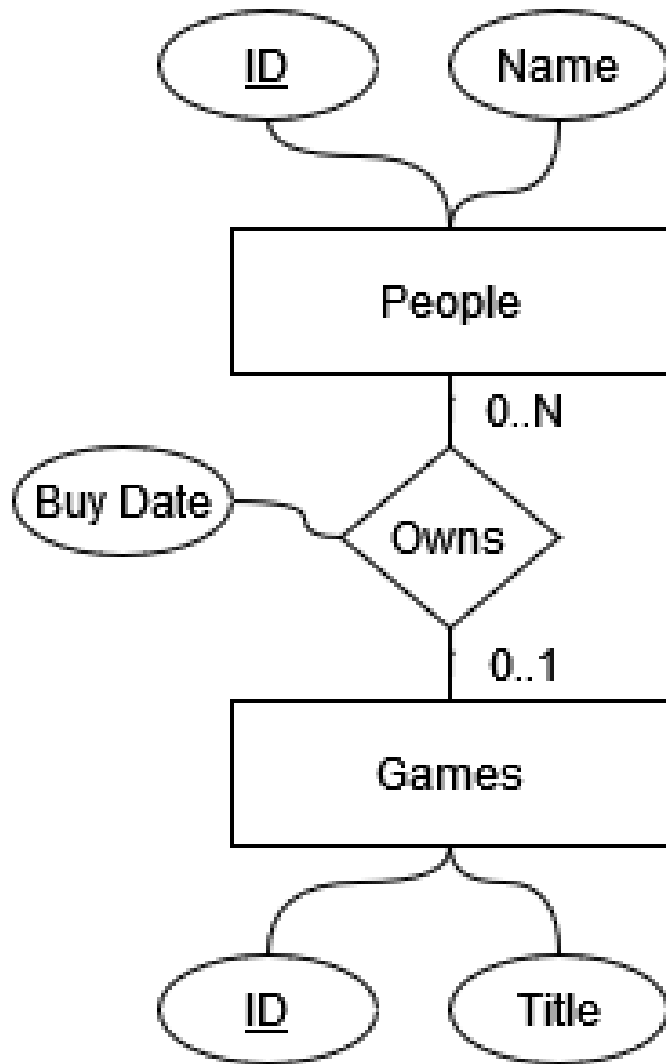
Basic



```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Owns (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    BuyDate DATE NOT NULL,  
    PRIMARY KEY (PeopleID, GameID)  
);
```

Relations

Maximum 1 with attributes



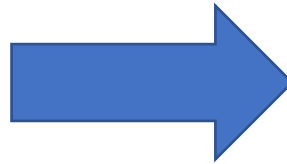
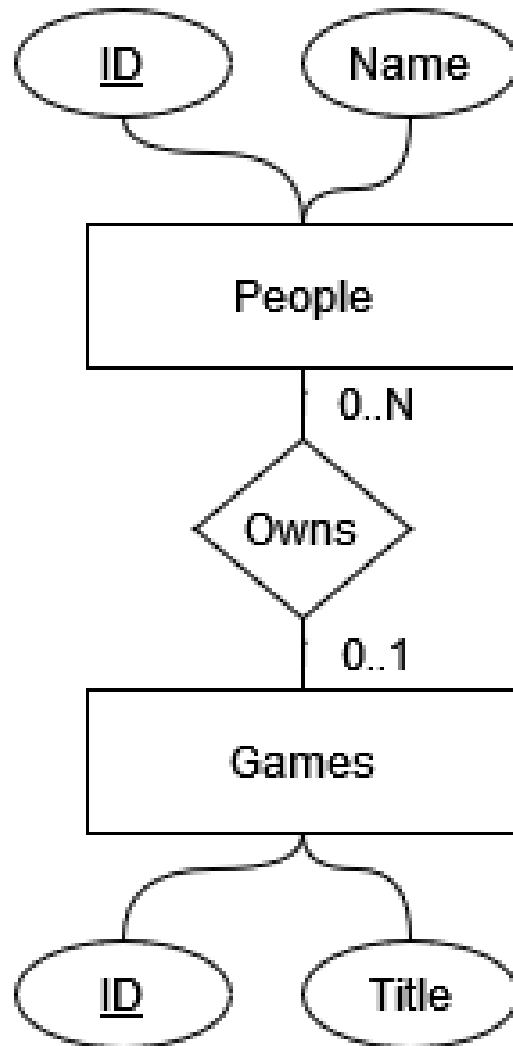
NOTE: In the Owns table, GameID should have NOT NULL

...
GameID INT NOT NULL REFERENCES Games(ID),
...

```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Owns (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    BuyDate DATE NOT NULL,  
    PRIMARY KEY (PeopleID)  
);
```

Relations

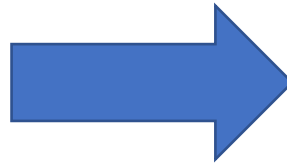
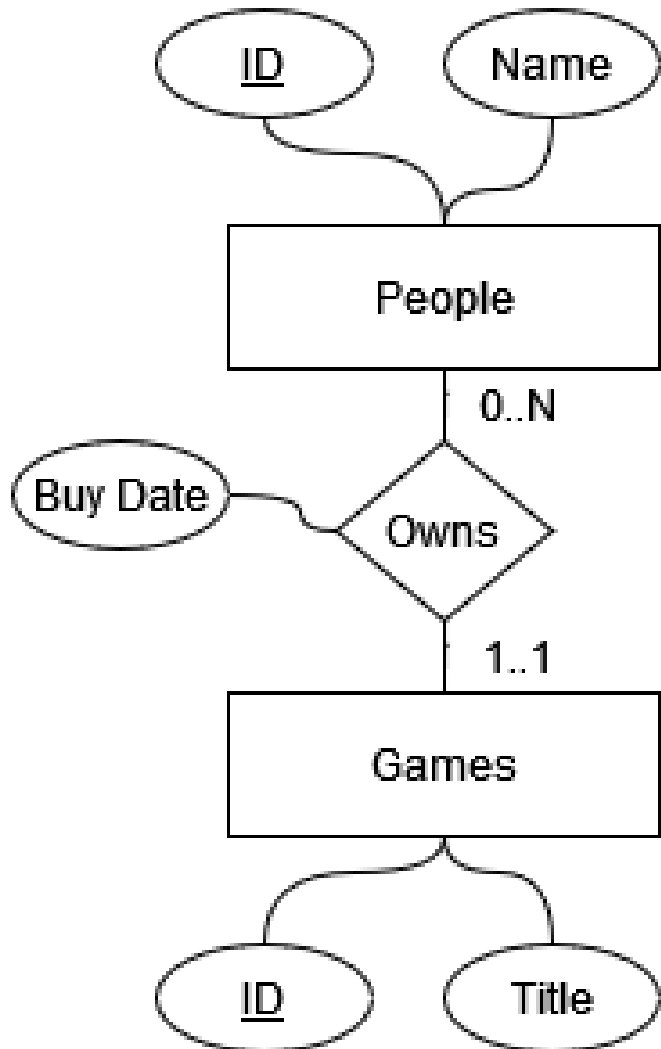
Maximum 1 without attributes



```
CREATE TABLE Games (  
  ID INT PRIMARY KEY,  
  Title VARCHAR NOT NULL  
);  
  
CREATE TABLE People (  
  ID INT PRIMARY KEY,  
  GameID INT REFERENCES Games(ID),  
  Name VARCHAR NOT NULL  
);
```

Relations

Exactly 1

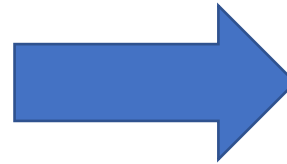
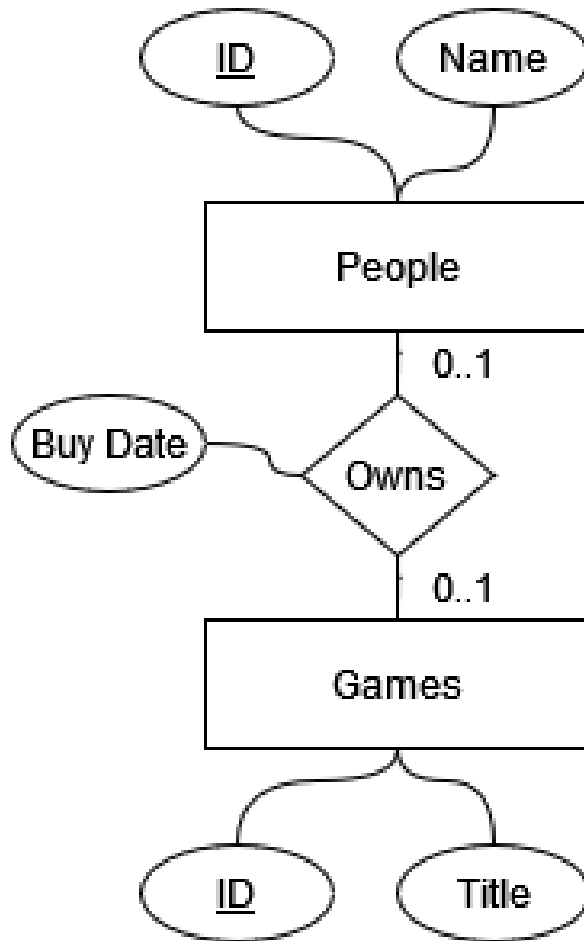


```
CREATE TABLE Games (  
  ID INT PRIMARY KEY,  
  Title VARCHAR NOT NULL  
);  
  
CREATE TABLE People (  
  ID INT PRIMARY KEY,  
  GameID INT NOT NULL REFERENCES Games(ID),  
  BuyDate DATE NOT NULL,  
  Name VARCHAR NOT NULL  
);
```

Relations

Maximum 1 in both directions

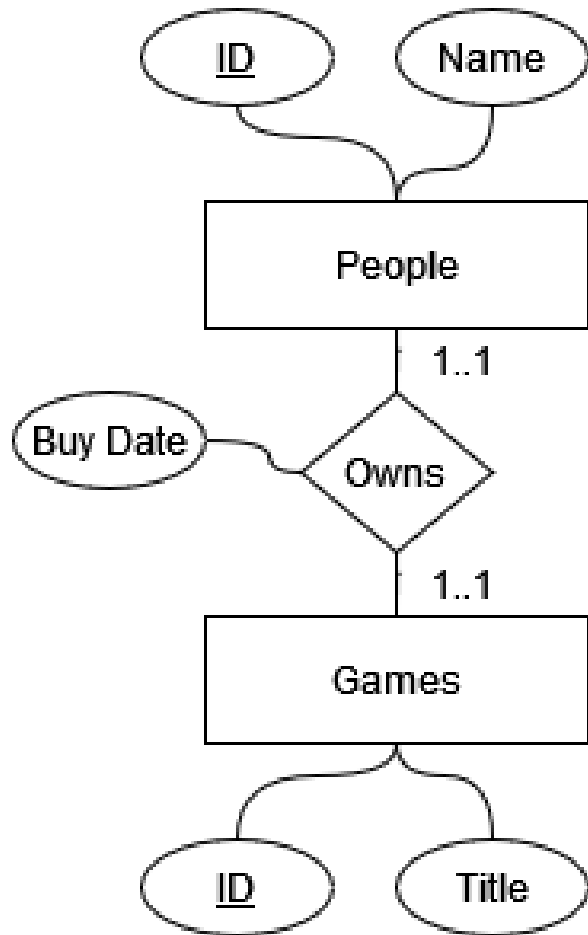
NOTE: GameID should have NOT NULL so it would be
...
GameID INT NOT NULL REFERENCES Games(ID),
...



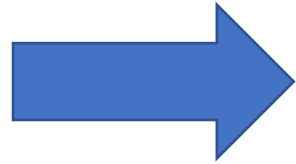
```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Owns (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    BuyDate DATE NOT NULL,  
    PRIMARY KEY (PeopleID),  
    UNIQUE (GameID)  
);
```

Relations

Exactly 1 in both directions



Alternative 2:
Merge tables



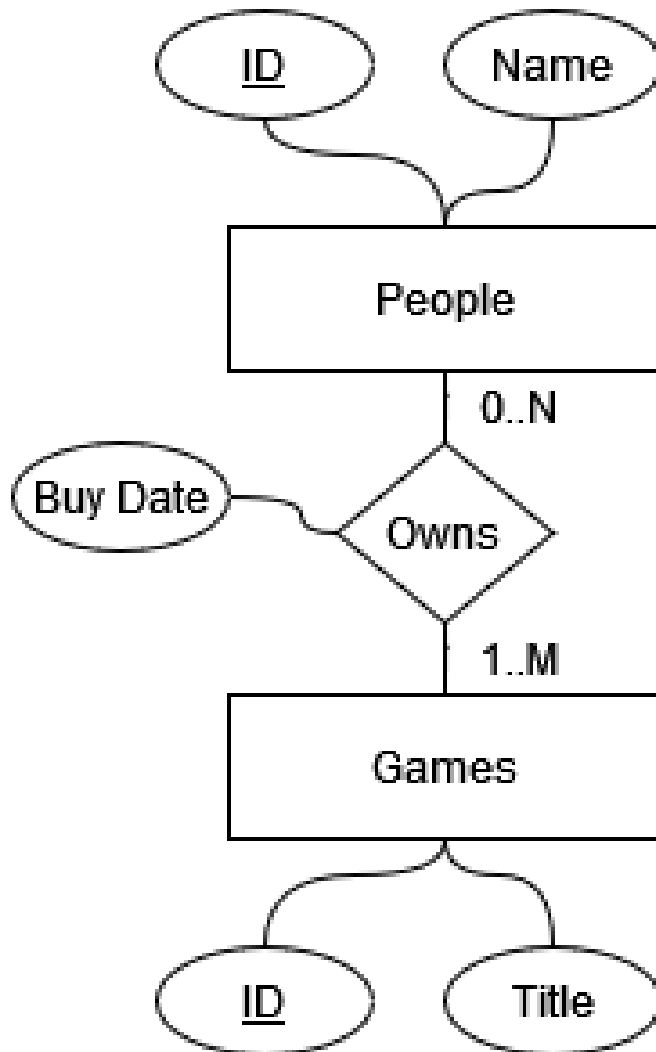
Alternative 3:
Pick one FK

```
CREATE TABLE People (  
  ID INT PRIMARY KEY,  
  Name VARCHAR NOT NULL,  
  GameTitle VARCHAR NOT NULL,  
  BuyDate DATE NOT NULL  
);
```

```
CREATE TABLE Games (  
  ID INT PRIMARY KEY,  
  Title VARCHAR NOT NULL  
);  
  
CREATE TABLE People (  
  ID INT PRIMARY KEY,  
  Name VARCHAR NOT NULL,  
  GameID INT NOT NULL REFERENCES Games(ID),  
  BuyDate DATE NOT NULL  
);
```

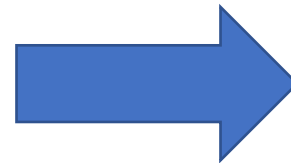
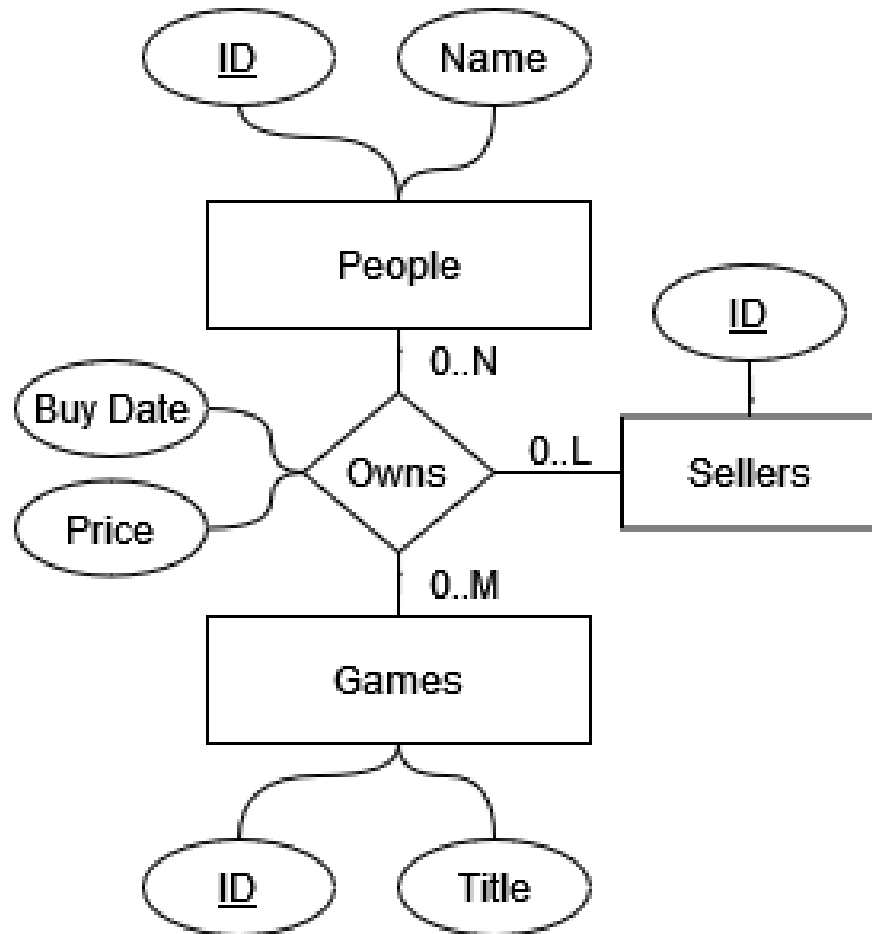

Relations

Minimum 1 - Not Supported in DDL!



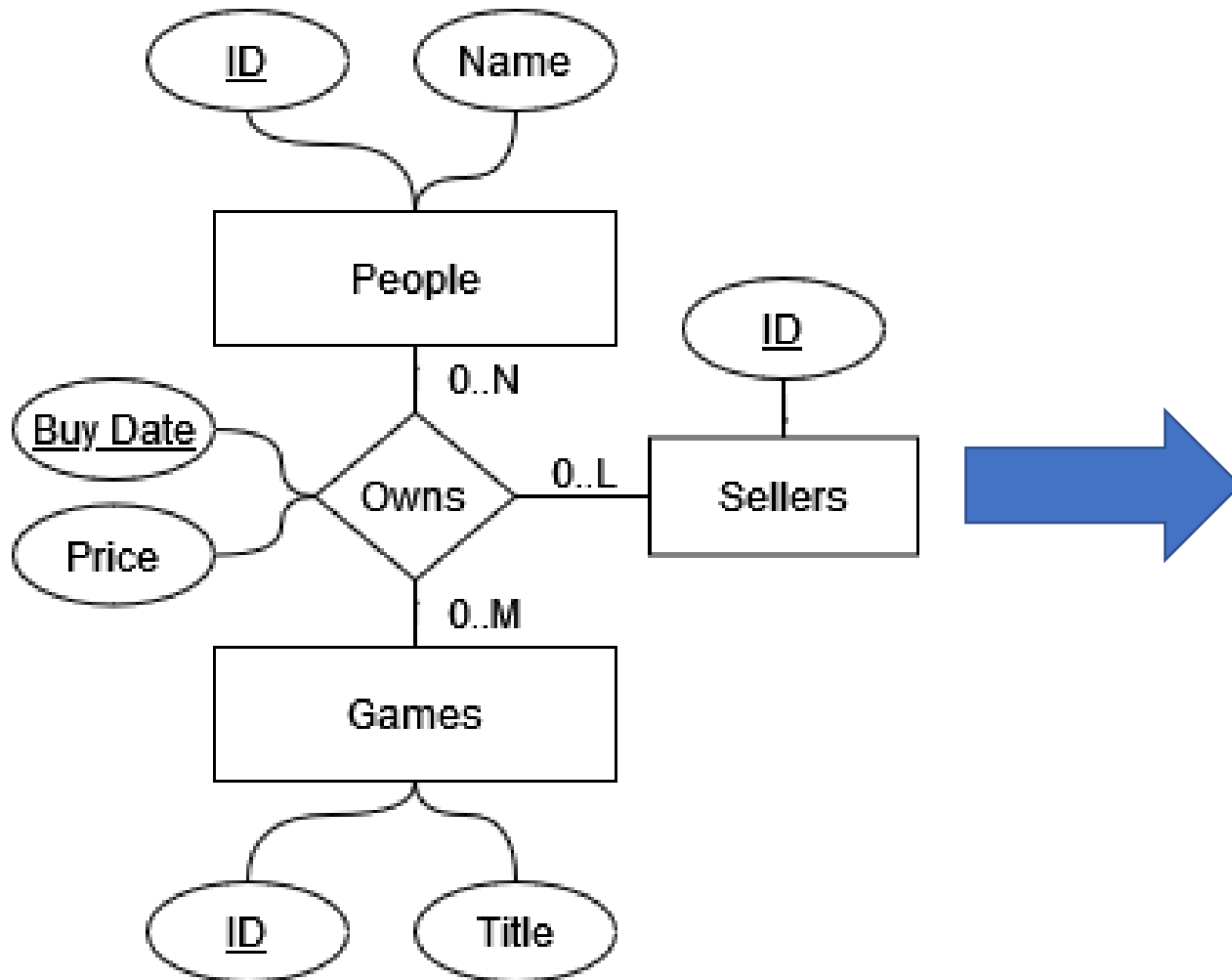
```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Owens (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    BuyDate DATE NOT NULL,  
    PRIMARY KEY (PeopleID, GameID)  
);
```

Tertiary Relations



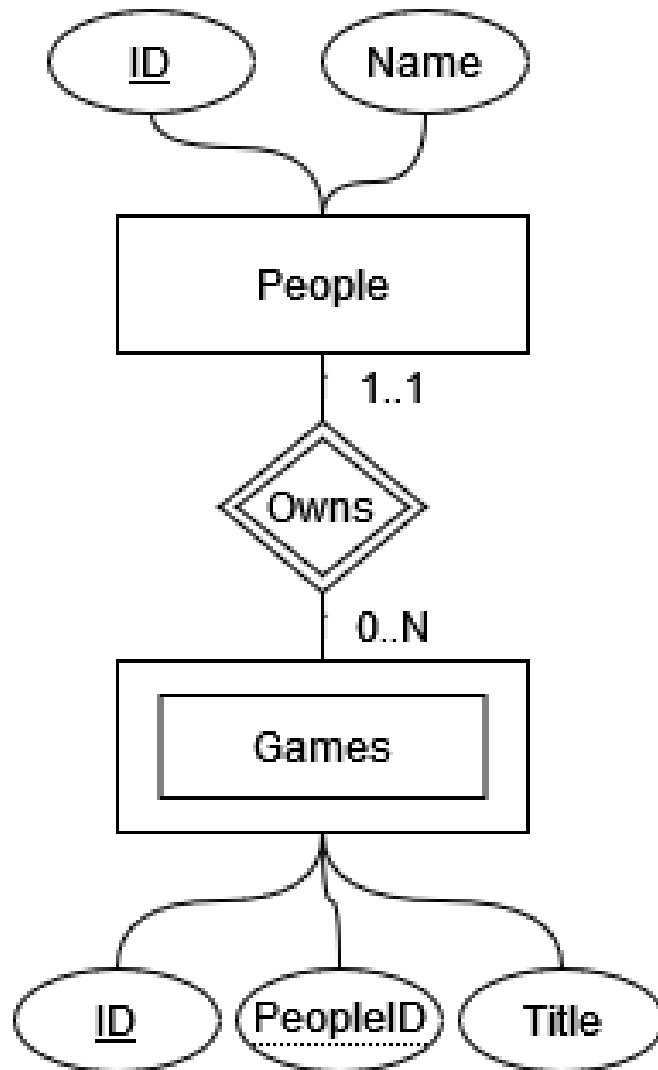
```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Sellers (  
    ID INT PRIMARY KEY  
);  
  
CREATE TABLE Owns (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    SellerID INT REFERENCES Sellers(ID),  
    BuyDate DATE NOT NULL,  
    Price FLOAT NOT NULL,  
    PRIMARY KEY (PeopleID, GameID, SellerID)  
);
```

Tertiary Relations / Partial Keys



```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Sellers (  
    ID INT PRIMARY KEY  
);  
  
CREATE TABLE Owns (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    SellerID INT REFERENCES Sellers(ID),  
    BuyDate DATE,  
    Price FLOAT NOT NULL,  
    PRIMARY KEY (PeopleID, GameID, SellerID, BuyDate)  
);
```

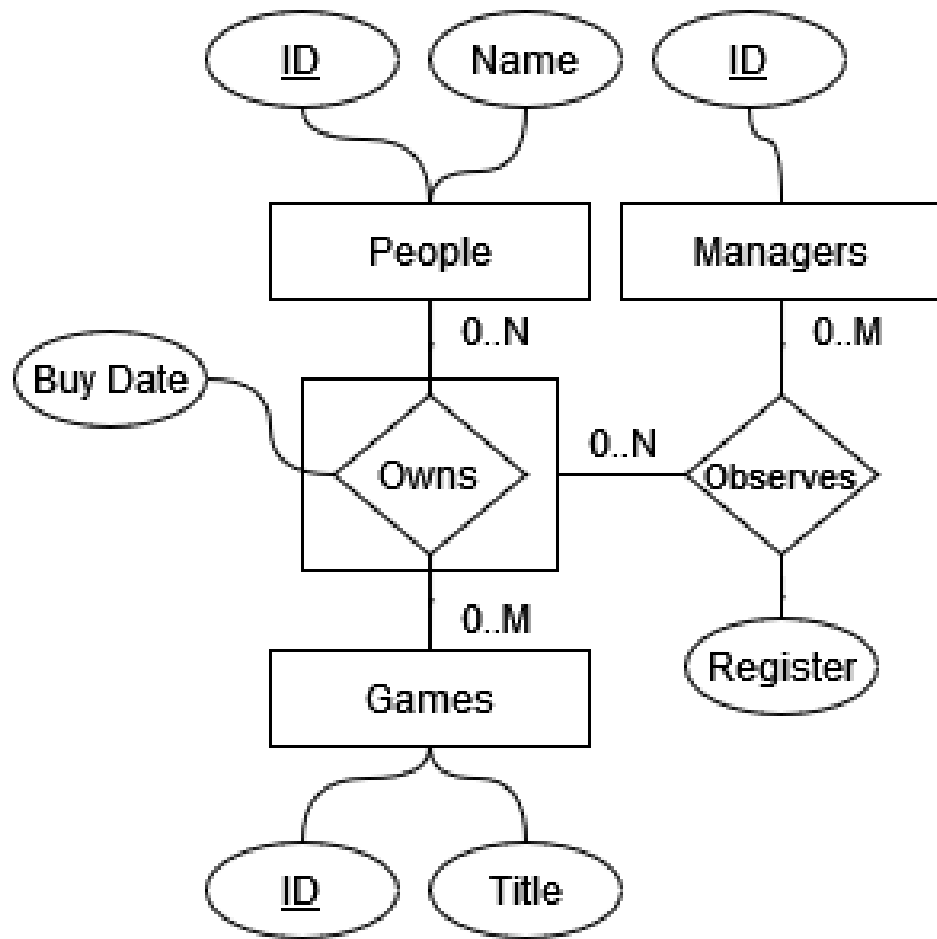
Weak Entities



```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT,  
    PeopleID INT REFERENCES People(ID),  
    Title VARCHAR NOT NULL,  
    PRIMARY KEY(ID, PeopleID)  
);
```

Aggregation

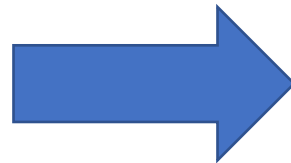
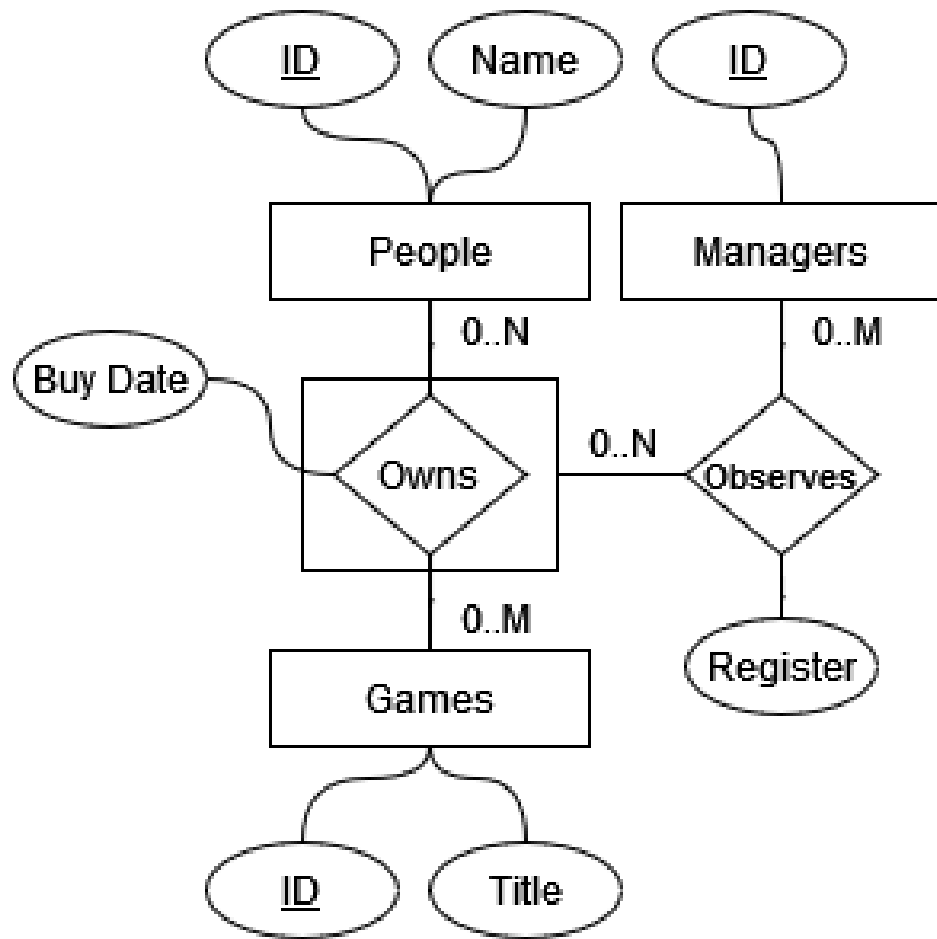
Option 1: Relationship Key



```
CREATE TABLE People (  
  ID INT PRIMARY KEY,  
  Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
  ID INT PRIMARY KEY,  
  Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Owns (  
  PeopleID INT REFERENCES People(ID),  
  GameID INT REFERENCES Games(ID),  
  BuyDate DATE NOT NULL,  
  PRIMARY KEY (PeopleID, GameID)  
);  
  
CREATE TABLE Managers (  
  ID INT PRIMARY KEY  
);  
  
CREATE TABLE Observes (  
  ManagerID INT REFERENCES Managers(ID),  
  PeopleID INT,  
  GameID INT,  
  Register INT NOT NULL,  
  FOREIGN KEY (PeopleID, GameID)  
    REFERENCES Owns(PeopleID, GameID),  
  PRIMARY KEY (ManagerID, PeopleID, GameID)  
);
```

Aggregation

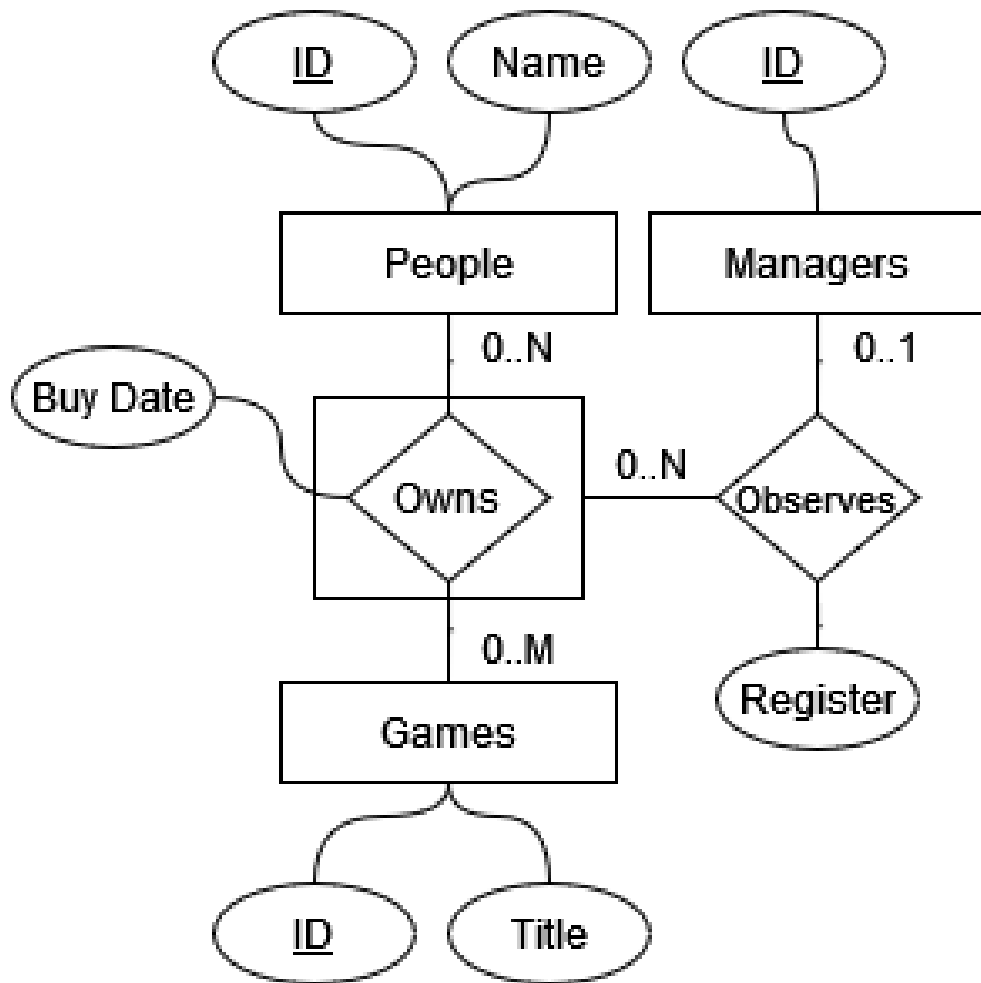
Option 2: New Relationship Key



```
CREATE TABLE People (  
  ID INT PRIMARY KEY,  
  Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
  ID INT PRIMARY KEY,  
  Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Owns (  
  ID INT PRIMARY KEY,  
  PeopleID INT NOT NULL REFERENCES People(ID),  
  GameID INT NOT NULL REFERENCES Games(ID),  
  BuyDate DATE NOT NULL,  
  UNIQUE (PeopleID, GameID)  
);  
  
CREATE TABLE Managers (  
  ID INT PRIMARY KEY  
);  
  
CREATE TABLE Observe (  
  ManagerID INT REFERENCES Managers(ID),  
  OID INT REFERENCES Owns(ID),  
  Register INT NOT NULL,  
  PRIMARY KEY (ManagerID, OID)  
);
```

Aggregation

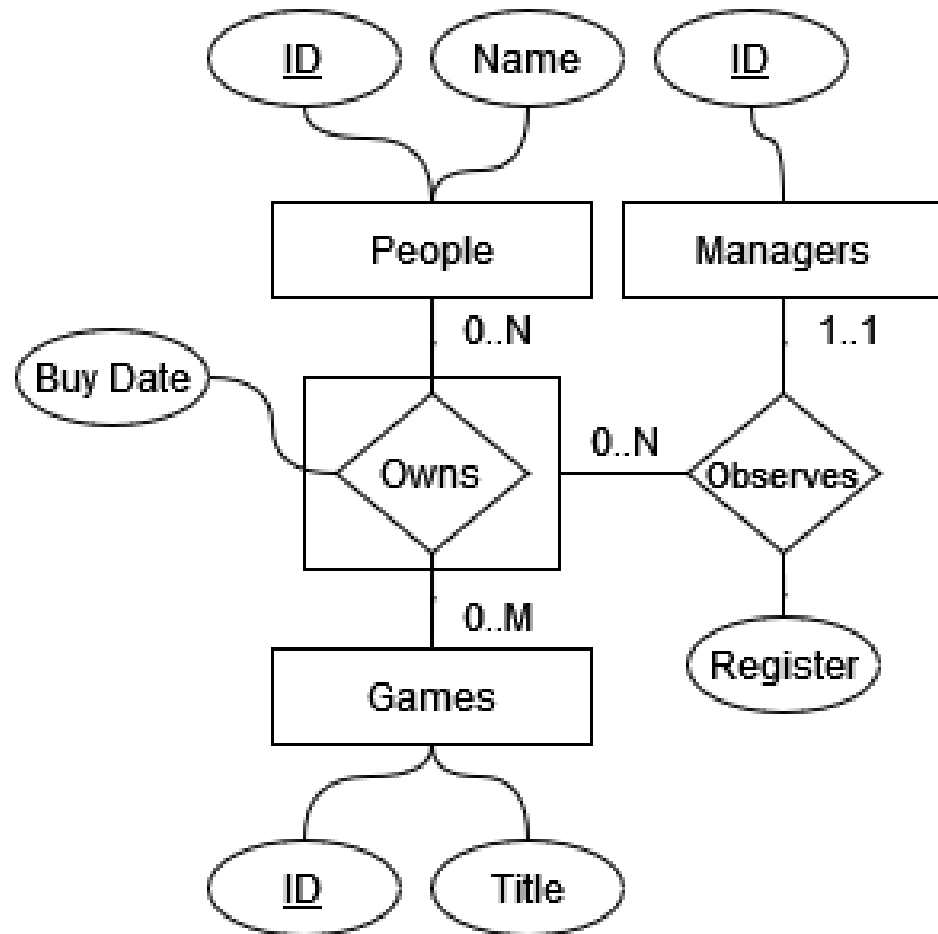
Maximum 1



```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Owns (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    BuyDate DATE NOT NULL,  
    PRIMARY KEY (PeopleID, GameID)  
);  
  
CREATE TABLE Managers (  
    ID INT PRIMARY KEY  
);  
  
CREATE TABLE Observes (  
    ManagerID INT NOT NULL REFERENCES Managers(ID),  
    PeopleID INT,  
    GameID INT,  
    Register INT NOT NULL,  
    FOREIGN KEY (PeopleID, GameID)  
        REFERENCES Owns(PeopleID, GameID),  
    PRIMARY KEY (PeopleID, GameID)  
);
```

Aggregation

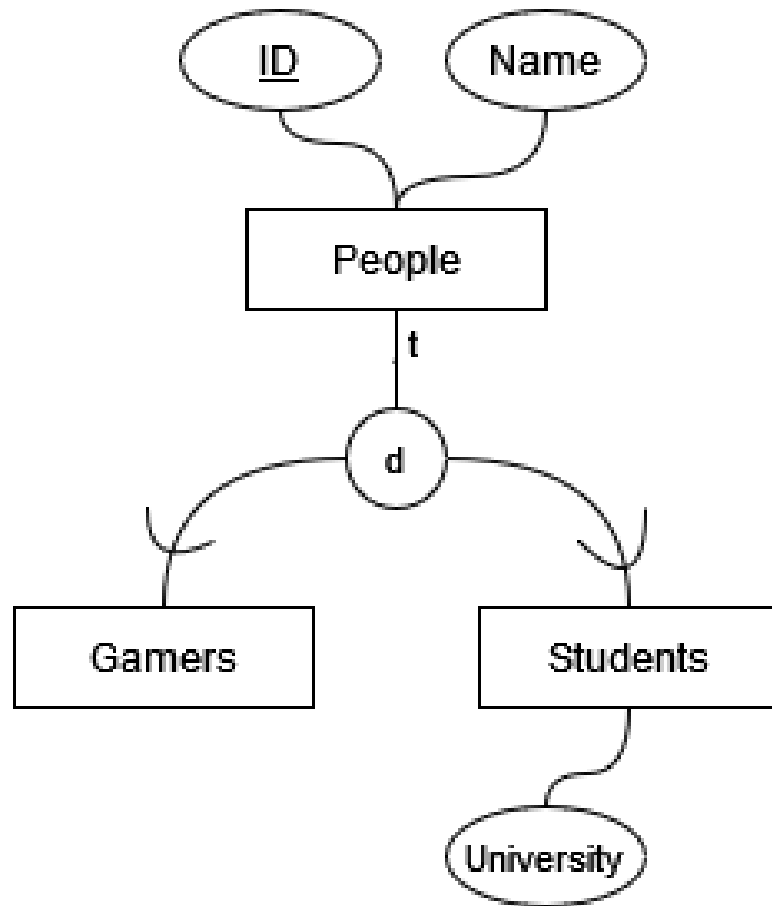
Exactly 1



```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Games (  
    ID INT PRIMARY KEY,  
    Title VARCHAR NOT NULL  
);  
  
CREATE TABLE Managers (  
    ID INT PRIMARY KEY  
);  
  
CREATE TABLE Owns (  
    PeopleID INT REFERENCES People(ID),  
    GameID INT REFERENCES Games(ID),  
    ManagerID INT NOT NULL REFERENCES Managers(ID),  
    BuyDate DATE NOT NULL,  
    Register INT NOT NULL,  
    PRIMARY KEY (PeopleID, GameID)  
);
```


Specialization

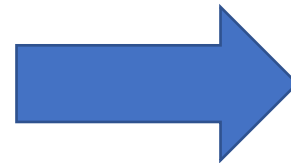
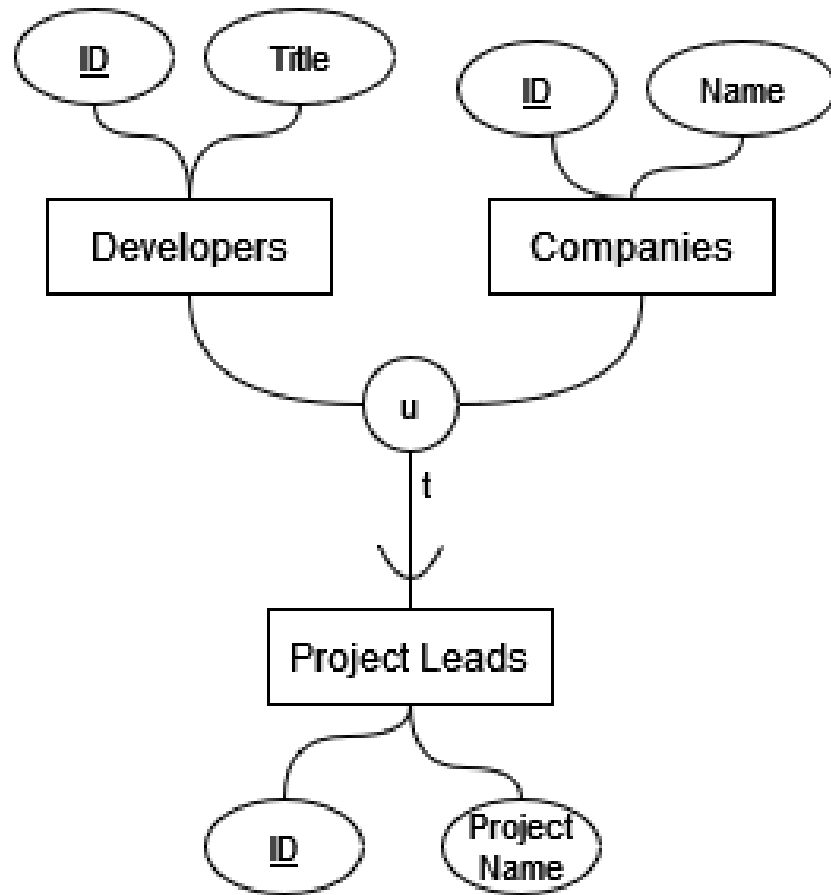
This is the same for partial and overlapping specialization



```
CREATE TABLE People (  
    ID INT PRIMARY KEY,  
    Name VARCHAR NOT NULL  
);  
  
CREATE TABLE Gamers (  
    ID INT PRIMARY KEY REFERENCES People(ID)  
);  
  
CREATE TABLE Students (  
    ID INT PRIMARY KEY REFERENCES People(ID),  
    University VARCHAR NOT NULL  
);
```

Categorization

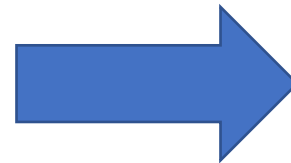
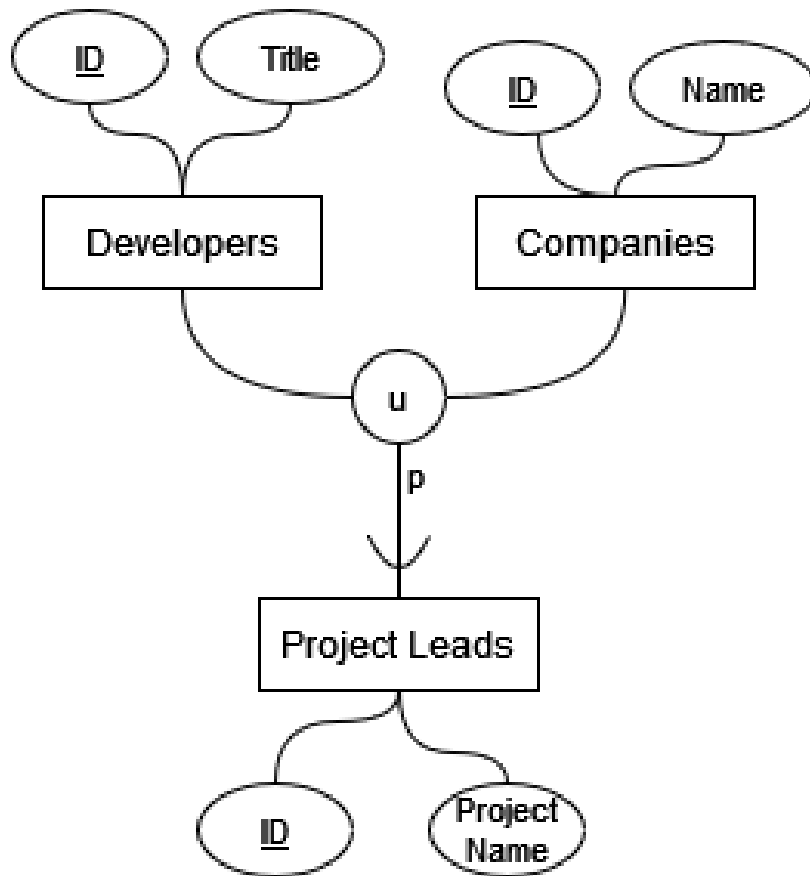
Total



```
CREATE TABLE ProjectLeads (  
  ID INT PRIMARY KEY,  
  ProjectName VARCHAR NOT NULL  
);  
  
CREATE TABLE Developers (  
  ID INT PRIMARY KEY,  
  Title VARCHAR NOT NULL,  
  PLID INT NOT NULL REFERENCES ProjectLeads(ID)  
);  
  
CREATE TABLE Companies (  
  ID INT PRIMARY KEY,  
  Name VARCHAR NOT NULL,  
  PLID INT NOT NULL REFERENCES ProjectLeads(ID)  
);
```

Categorization

Partial



```
CREATE TABLE ProjectLeads (  
  ID INT PRIMARY KEY,  
  ProjectName VARCHAR NOT NULL  
);  
  
CREATE TABLE Developers (  
  ID INT PRIMARY KEY,  
  Title VARCHAR NOT NULL,  
  PLID INT REFERENCES ProjectLeads(ID)  
);  
  
CREATE TABLE Companies (  
  ID INT PRIMARY KEY,  
  Name VARCHAR NOT NULL,  
  PLID INT REFERENCES ProjectLeads(ID)  
);
```