Project 1

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**Step 1) Determine and list your entities. Then create relationship sentence pairs between those entities that are related. You should not have any many-to-many relationships.**

I defined 13 entities with 61 attributes for the Mom and Pop Johnson video store as shown in Table 1. Since all entities should have one-to-many relationships as shown in Figure 1, I created four intermediate entities.
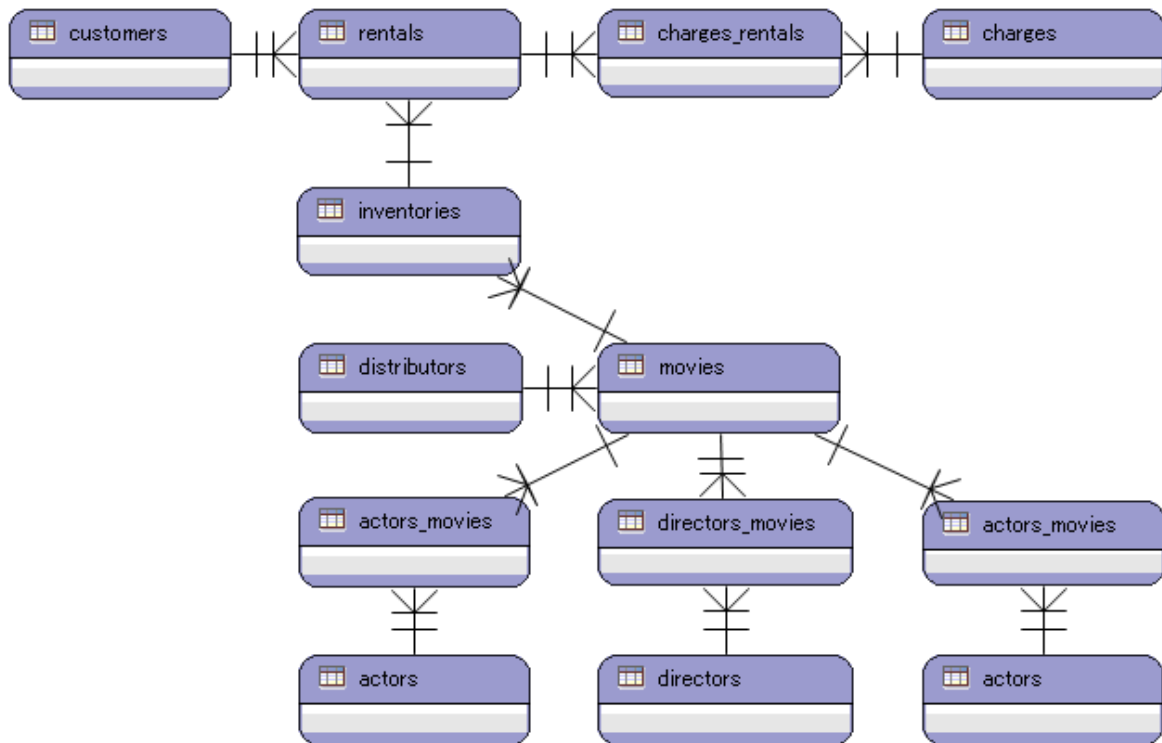
Table 1: List of Entities

| Entity name | Attribute name | Type | Entity Description |
|---|---|---|---|
| academy_awards | id | smallint | An entity for storing academic awards, their categories, and years. |
| | category | char | |
| | year | smallint | |
| | is_winner | boolean | |
| | is_nominee | boolean | |
| academy_awards_movies | id | integer | An intermediate entity between academiy_awards entity and movies entity. |
| | academy_award_id | smallint | |
| | movie_id | smallint | |
| actors | id | smallint | An entity for storing names of actors and actresses. |
| | first_name | char | |
| | middle_name | char | |
| | last_name | char | |
| actors_movies | id | integer | An intermediate entity between actors' entity and movies entity. |
| | actor_id | smallint | |
| | movie_id | smallint | |
| charges | id | tinyint | An entity for storing customer charges and charge types such as standard and extra charges. |
| | type | char | |
| | charge | money | |
| charges_rentals | id | integer | An intermediate entity between charges entity and rentals entity. |
| | rental_id | integer | |
| | charge_id | tinyint | |
| customers | id | smallint | An entity for storing customer names and addresses. |
| | first_name | char | |

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| | middle_name | char | |
|---|---|---|---|
| | last_name | char | |
| | street_address | char | |
| | city | char | |
| | state | char | |
| | zip_code | char | |
| | phone_number | smallint | |
| directors | id | smallint | An entity for storing names of directors. |
| | first_name | char | |
| | middle_name | char | |
| | last_name | char | |
| directors_movies | id | integer | An intermediate entity between directors' entity and movies entity. |
| | director_id | smallint | |
| | movie_id | smallint | |
| distributors | id | tinyint | An entity for storing information on distributors. |
| | name | char | |
| | shipment_quantity | smallint | |
| inventories | id | integer | An entity for storing inventories which are copies of movies. |
| | movie_id | smallint | |
| movies | id | smallint | An entity for storing information on movies provided by distributors. |
| | distributor_id | tinyint | |
| | title | char | |
| | type | char | |
| | running_length | smallint | |
| | rating | tinyint | |
| | year_released | smallint | |
| | is_video | boolean | |
| | is_dvd | boolean | |
| | wholesale_price | money | |
| rentals | id | integer | An entity for storing information on rental records including rental dates and return due dates, rented or returned statuses, and total customer charges. |
| | inventory_id | integer | |
| | customer_id | smallint | |
| | rental_date | date | |
| | return_due_date | date | |
| | is_rented | boolean | |
| | is_returned | boolean | |
| | total_charge | money | |
| | tax | money | |

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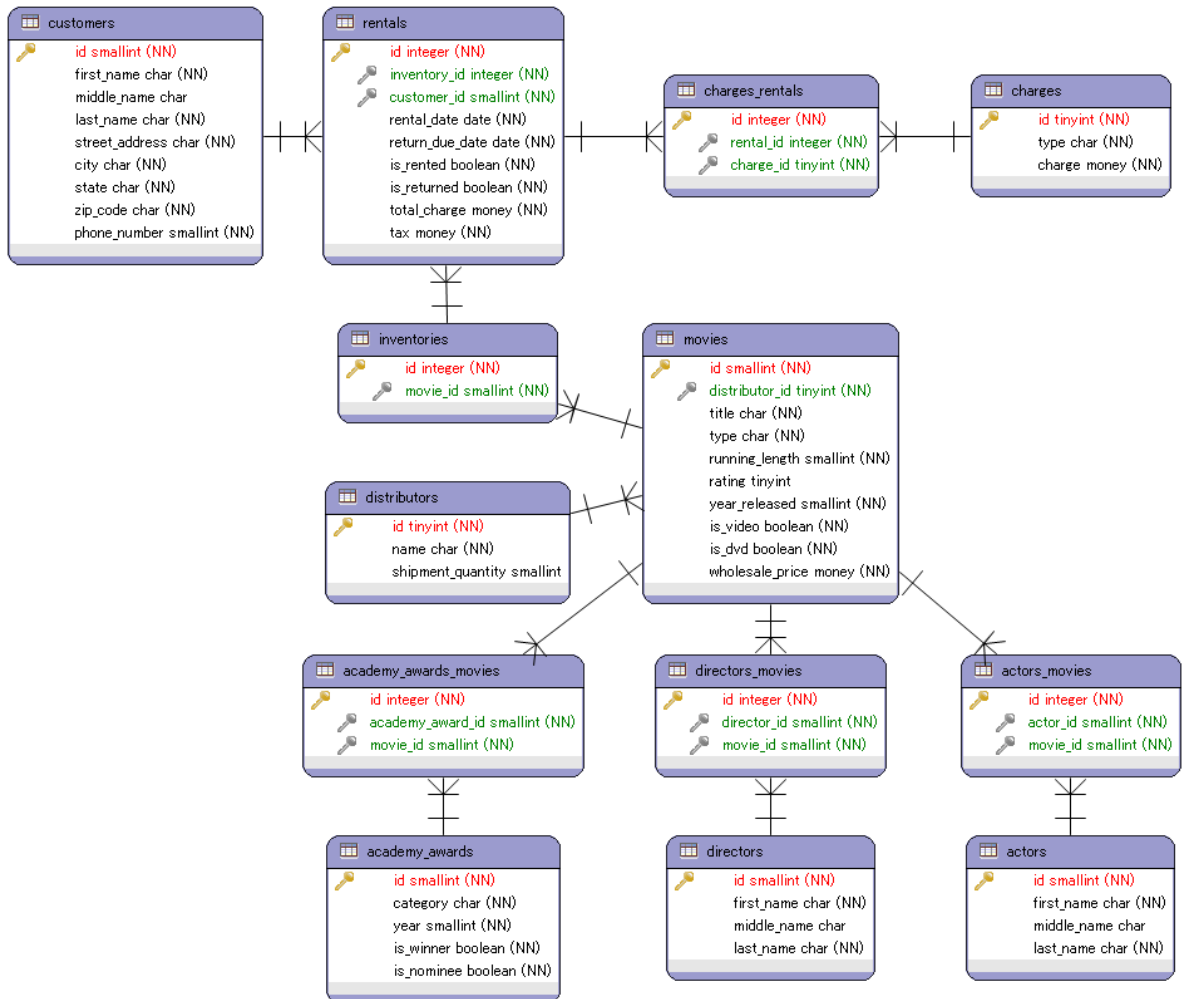Figure 1: Entity-Relationship Model



**Step 2) Create an entity/relationship diagram (ERD) showing all your entities, attributes, and relationships. Sketch your ERD by hand or use a drawing program. Your diagram must be on a single page. All entities should be related to at least one other entity. Your ERD should have all one-to-many relationships and not have any many-to-many relationships.**

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I created an entity-relationship diagram by developing the entity-relationship model from

Step 1 as shown in Figure 2. All entities are related to at least one other entity, and they all are

one-to-many relationships.

Figure 2: Entity-Relationship Diagram

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**Step 3) Create metadata that describes the table created from each entity and the column created from each attribute in the ERD. Particular attention will be given to the proper specification of all primary key (via "PK") and foreign key (via "FK") columns in the table layouts. These should match your ERD exactly.**

I created metadata that describes detailed information on the each entity including PKs and FKs as shown in the tables below.

Table 2: academy_awards

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| id | smallint | * | * | | |
| category | char | | * | | |
| year | Smallint | | * | | |
| is_winner | Boolean | | * | | |
| is_nominee | Boolean | | * | | |

Table 3: academy_awards_movies

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | Integer | * | * | | |
| academy_award_id | Smallint | | * | -> academy_awards.id | |
| movie_id | Smallint | | * | -> movies.id | |

| FOREIGN KEY | | |
|---|---|---|
| Column name | Reference Table | Reference Key |
| academy_award_id | academy_awards | id |
| movie_id | Movies | id |

Table 4: actors

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | smallint | * | * | | |
| first_name | char | | * | | |

| | | | | | |
|---|---|---|---|---|---|
| middle_name | char | | | | |
| last_name | char | | * | | |

## Table 5: actors_movies

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | integer | * | * | | |
| actor_id | smallint | | * | -> actors.id | |
| movie_id | smallint | | * | -> movies.id | |

| FOREIGN KEY | | |
|---|---|---|
| Column name | Reference Table | Reference Key |
| actor_id | actors | id |
| movie_id | movies | id |

## Table 6: charges

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | tinyint | * | * | | |
| Type | char | | * | | standard_charge late_fee damaged_fee failure_to_rewind_fee other |
| Charge | money | | * | | |

## Table 7: charges_rentals

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| id | integer | * | * | | |
| rental_id | integer | | * | -> rentals.id | |
| charge_id | tinyint | | * | -> charges.id | |

| FOREIGN KEY | | |
|---|---|---|
| Column name | Reference Table | Reference Key |
| rental_id | rentals | id |
| charge_id | charges | id |

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## Table 8: customers

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| id | smallint | * | * | | |
| first_name | char | | * | | |
| middle_name | char | | | | |
| last_name | char | | * | | |
| street_address | char | | * | | |
| city | char | | * | | |
| state | char | | * | | |
| zip_code | char | | * | | |
| phone_number | smallint | | * | | |

## Table 9: directors

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | smallint | * | * | | |
| first_name | char | | * | | |
| middle_name | char | | | | |
| last_name | char | | * | | |

## Table 10: directors_movies

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | integer | * | * | | |
| director_id | smallint | | * | -> directors.id | |
| movie_id | smallint | | * | -> movies.id | |

| FOREIGN KEY | | |
|---|---|---|
| Column name | Reference Table | Reference Key |
| director_id | directors | id |
| movie_id | movies | id |

## Table 11: distributors

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | tinyint | * | * | | |
| Name | char | | * | | |
| shipment_quantity | smallint | | | | |

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## Table 12: inventories

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | integer | * | * | | |
| movie_id | smallint | | * | -> movies.id | |

| FOREIGN KEY | | |
|---|---|---|
| Column name | Reference Table | Reference Key |
| movie_id | movies | id |

## Table 13: movies

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| Id | smallint | * | * | | |
| distributor_id | tinyint | | * | -> distributors.id | |
| Title | char | | * | | |
| Type | char | | * | | suspense<br>horror<br>mystery<br>comedy<br>other |
| running_length | smallint | | * | | |
| Rating | tinyint | | | | |
| year_released | smallint | | * | | |
| is_video | boolean | | * | | |
| is_dvd | boolean | | * | | |
| wholesale_price | money | | * | | |

| FOREIGN KEY | | |
|---|---|---|
| Column name | Reference Table | Reference Key |
| distributor_id | distributors | id |

## Table 14:

| Column name | Type | PK | NOT NULL | FK | Description |
|---|---|---|---|---|---|
| id | integer | * | * | | |
| inventory_id | integer | | * | -> inventories.id | |
| customer_id | smallint | | * | -> customers.id | |
| rental_date | date | | * | | |
| return_due_date | date | | * | | |
| is_rented | boolean | | * | | |
| is_returned | boolean | | * | | |
| total_charge | money | | * | | |

| tax | money | | * | | |
|-----|-------|---|---|---|---|

| FOREIGN KEY | | |
|-------------|-----------------|---------------|
| Column name | Reference Table | Reference Key |
| inventory_id | inventories | id |
| customer_id | customers | id |