**Johnson Video Store Database**

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With the Johnson Video Store still keeping records in stacks of invoices and rental forms, they decided to automate their record keeping with a relational database. When designing a database, it is important to define all entities, attributes, relationships, and cardinalities.

**Entities and Attributes**

Each database should have clearly defined entities and attributes. An entity is a member or instance of an entity type that is “uniquely identified to allow tracking across business processes” (Mannino, 2019, p. 144). Attributes are properties of entity types or relationships and has data that defines the kind of values and permissible operations on the attribute (Mannino, 2019, p. 145). Each entity should also contain an attribute that is the primary key for that entity, which uniquely identifies each record of the database and is unique to any other entry for that attribute (Chapple, 2019).

**Movies**

One entity type would be movies. Attributes of this entity types would include the MovieID, Director, Format, Genre, ActorsActresses, RunningLength, Rating, YearReleased, AcademyAwardsWon, RentalPrice, DVDQuantity, VHSQuantity, and DistributorSerialNumber. The primary key would be the MovieID.

**Customer**

Customer is another entity that would need to be recorded as basic customer information would need to be kept. Attributes of Customer would include CustomerID, LastName, FirstName, DateOfBirth, Address, City, State, ZipCode, TelephoneNumber, EmailAddress, and RegistrationDate. CustomerID would be the primary key.

**Distributor**

Distributor would be another entity. Attributes for Distributor would include DistributorID, ElectronicCatalog, and DistributorPhoneNumber. The primary key of Distributor would be DistributorID.

**Rentals**

Rental would be another entity. Attributes for Rentals would include RentalID, CustomerID, MovieID, RentalDate, ReturnDueDate, and Cost. RentalID would be the primary key of Rentals.

**Payment**

Another entity would be payment. Attributes of Payment would include PaymentID, CustomerID, PaymentAmount, PaymentDate, and Fees.

**Relationships and Cardinalities**

Relationships are named associations between entities that store associations in both directions (Mannino, 2019, p. 145). Cardinalities are constraints on the number of entities that can participate in a relationship and are specified in both directions of the relationship (Mannino, 2019, p. 145).

One relationship is between Movies and Customer. Movies would have a cardinality of zero to three, while Customer would have a cardinality of zero to many; with the maximum dependent on how many copies of the movie Johnson Video Store has. In other words, while a movie can be rented by as little as no customers to as many customers as there are copies of the movie at Johnson Video Store, a customer can rent be renting zero movies and they can be renting up to three movies at one time.

Another relationship is between movie and distributor. Movie would have a cardinality of zero to many while Distributor would have a cardinality of one to many. While a movie can come from as little as one distributors to many distributors, a distributor can provide any number of movies to the video store.

Customer and Rentals is another relationship. Customer would have a cardinality of one, while Rentals would have a cardinality of zero to three. In other terms, a customer can be associated to zero to three active rentals at a time, while a specific rental would only be associated with one customer.

Another relationship is between Customer and Payment. Customer has a cardinality of one and payment has a cardinality of zero to many. While a customer can be tied to any amount of payments, a specific payment is only made by one customer.

**Business Rules**

ERDs contain business rules that are represented as primary keys, relationships, cardinalities, and general hierarchies that enforce organizational policies and encourage efficient communication among the stakeholders of a business (Mannino, 2019, p. 156). Primary keys support entity identification, relationships signify direct connections between business communications, cardinalities are used to restrict the number of related entities in relationships, and generalization hierarchies support classification of business entities and organizational policies (Mannino, 2019, p. 156).

One business rule is that one customer can only rent up to three movies at a time. Another rule is that a customer can only have one account. Another rule is that a movie with one movie ID can come different distributors, despite having different distributor serial numbers. Another rule is that the date of birth of a customer will determine if they are able to rent a movie based on the rating of the movie. Another rule is that if a movie is returned past the rental due date, then additional fees will apply.

**References**

Chapple, M. (2019, November 18). *What is a primary key?*. Lifewire. https://www.lifewire.com/primary-key-definition-1019179

Mannino, M. V. (2019). *Database design, application development, and administration* (7th ed.). Chicago, IL: Chicago Business Press.