Assignment 4

SKIG

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1. Entity Relationships and Cardinalities

**CUSTOMER and SALE**

* The complete relationship restrictions are that a CUSTOMER has a minimum and a maximum cardinality of 1 – a sale with a particular SaleID can be made to one and only one customer. A SALE has a minimum cardinality of 0 and a maximum cardinality of many – a customer can buy many items but does not have to buy any.

**SALE and EMPLOYEE**

* The complete relationship restrictions are that an EMPLOYEE has a minimum and a maximum cardinality of 1 – a sale with a particular SaleID can be made by one and only one employee. A SALE has a minimum cardinality of 0 and a maximum cardinality of many – an employee can either have no sales or many sales.

**VENDOR and ITEM**

* The complete relationship restrictions are that an ITEM has a minimum cardinality of zero and a maximum cardinality of many – a vendor can supply zero or many items. A VENDOR has a minimum cardinality of 1 and a maximum cardinality of many – A same item can be supplied by one or many vendors.

**ITEM and SALE\_ITEM**

* SALE\_ITEM has a minimum cardinality of 1 and a maximum cardinality of many – an item can be sold one time or many times. An ITEM has a maximum and a minimum cardinality of 1 – Considering SALE\_ITEM to be a detailed invoice, each instance of a SALE\_ITEM refers to one and only one item instance.

**SALE\_ITEM AND SALE**

* SALE\_ITEM has a minimum cardinality of 1 and a maximum cardinality of many – a sale has to be made once on the invoice but it can be made multiple times. SALE has a minimum and a maximum cardinality of 1 – the invoice must contain only one sale.

1. Modifying the Inventory Requirements

We created an associative entity in ORDER\_ITEM between ITEM and VENDOR to keep track of item orders from vendors. We included QuantityOnHand as an attribute in ITEM to track current inventory.

**ORDER\_ITEM and ITEM**

* ORDER\_ITEM has a minimum cardinality of 0 and a maximum cardinality of many – An item can be ordered either zero times or many times. ITEM has a minimum and a maximum cardinality of 1. Assuming OrderID is unique, an order refers to one and only one items.

**ORDER\_ITEM and VENDOR**

* In this relationship, ORDER\_ITEM has a minimum cardinality of zero and a maximum cardinality of many –A vendor can supply many items but does not have to supply any.
* On the other hand, VENDOR has a minimum cardinality of 1 and a maximum cardinality of many – When an order is made, an item can be ordered from just one vendor or many vendors.

**C**. Super Type and Sub Type relationships

The supertype CLIENT contains all relevant information required from a customer (FName, LName, …). The subtypes are CUSTOMER and EMPLOYEE that will inherit the structure and values of the attributes from CLIENT. It is an inclusive subtype as a customer is either an employee or a non-employee.

Each sub entity also tracks attributes unique to each entity. The CUSTOMER sub-entity tracks the source of payment for each customer purchase, whether or not a customer has bought an item within the last 30 days, and where did a customer learn about the shop. Similarly, the EMPLOYEE sub entity tracks for how many years an employee has been working, their salary, and the discount they receive.

**E.** Validating the Model

We would show the model to the users for feedback on the entity relationships, and clarify the assumptions made when choosing the cardinalities. The goal of model validation is to ensure that business rules are followed and the design is easy to use. If users would like to track more attributes, we would add those relevant attributes to either the CUSTOMER or the EMPLOYEE Sub types. We would provide a prototype to allow users to test the database.