Assignment 4
SKIG
Dr. Gonzalez - ISDS 402 – 01
March 5th 2020

A. 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.

B. 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

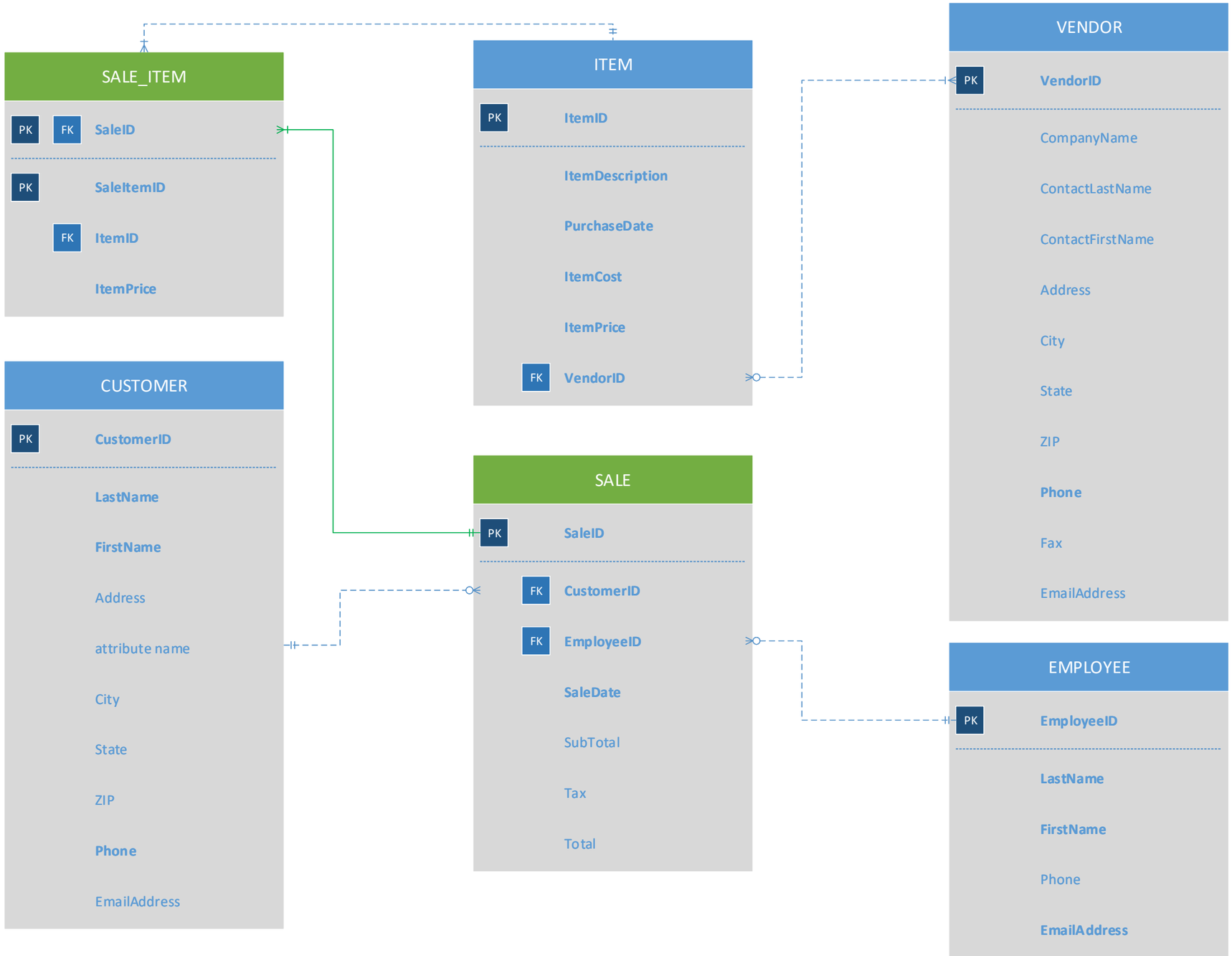
The supertype CLIENT contains all relevant information required from a customer (FName, LName, …). The subtypes are CUSTOMER and EMPLOYEE that will inherit the structure and values of the attributes from CLIENT. It is an inclusive subtype as a customer is either an employee or a non-employee.

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.

A.


SALE_ITEM
PK
FK
SaleID
PK
SaleItemID
FK
ItemID
ItemPrice
ITEM
PK
ItemID
ItemDescription
PurchaseDate
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ItemPrice
FK
VendorID
VENDOR
PK
VendorID
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Address
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State
ZIP
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CustomerID
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Address
attribute name
City
State
ZIP
Phone
EmailAddress
SALE
PK
SaleID
FK
CustomerID
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EmployeeID
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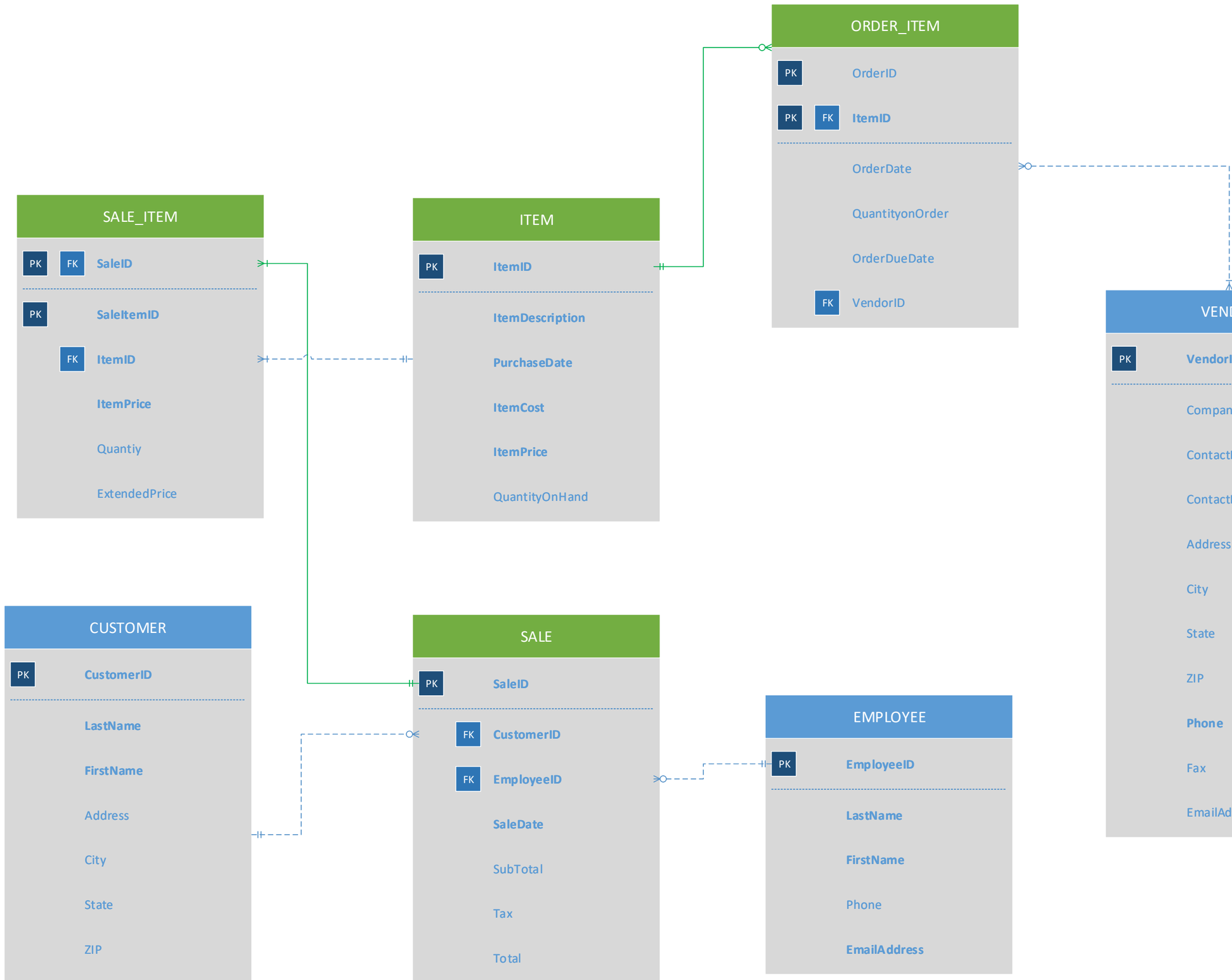
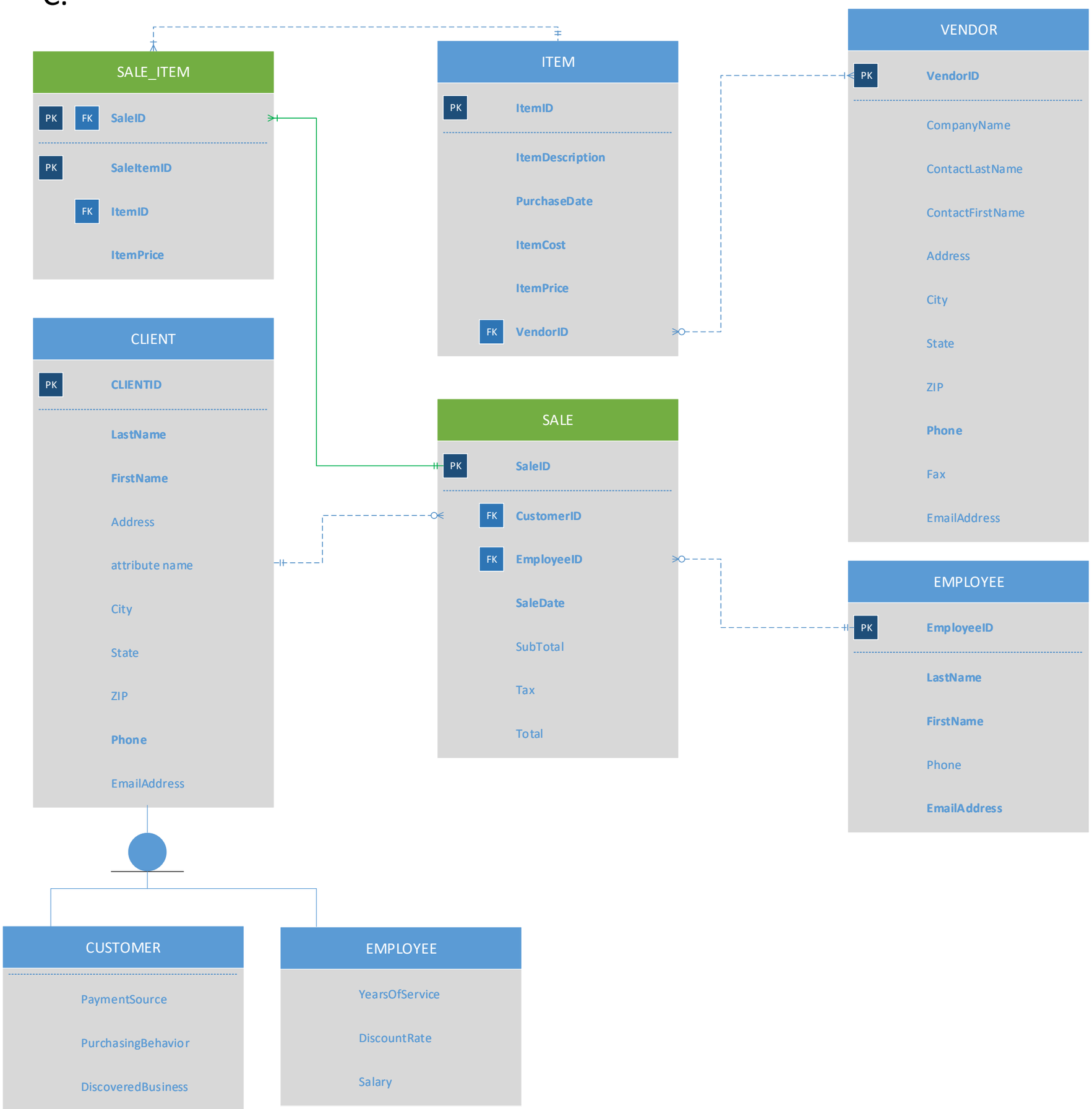
SubTotal
Tax
Total
EMPLOYEE
PK
EmployeeID
LastName
FirstName
Phone
EmailAddress

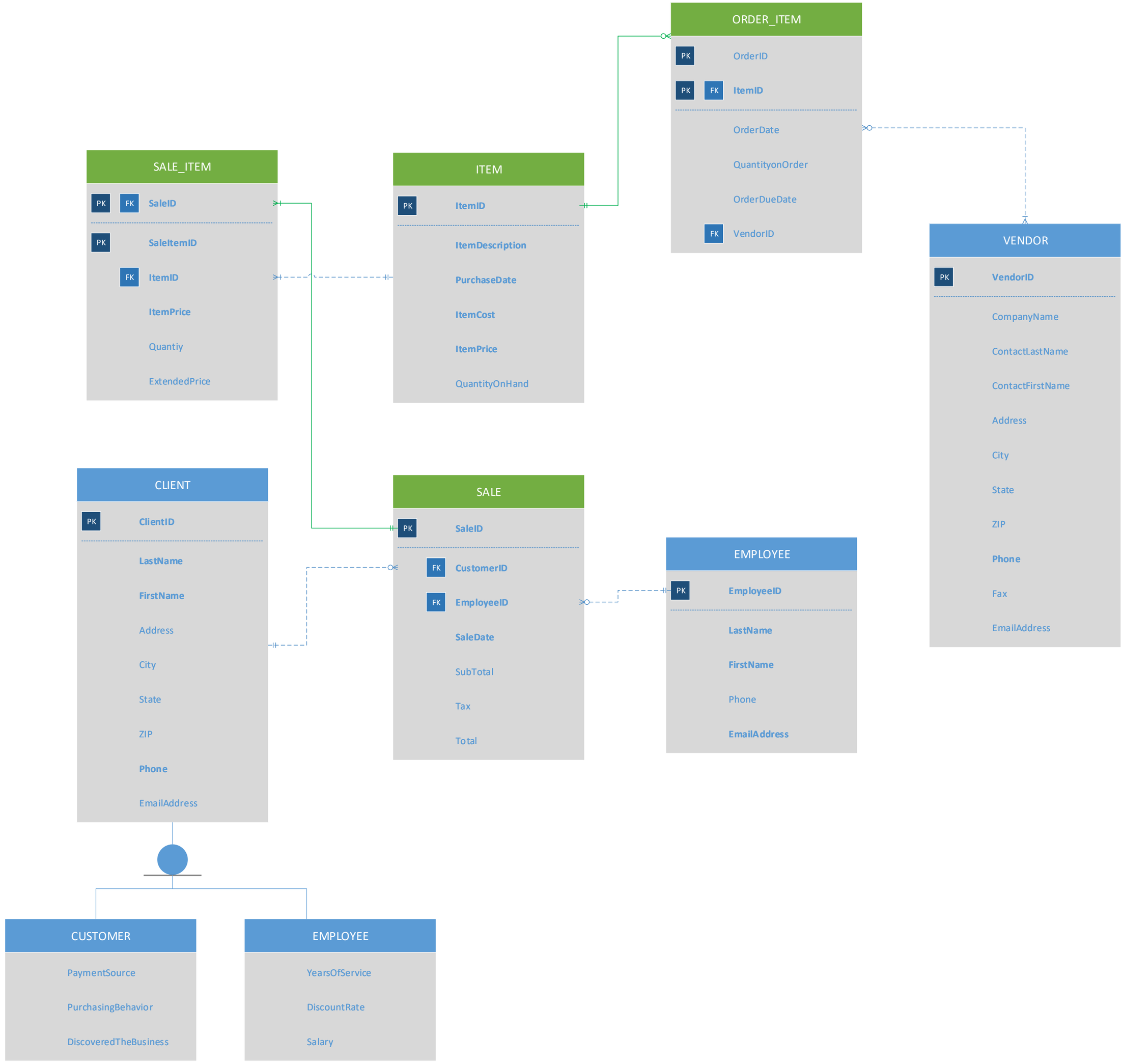
B.


SALE_ITEM
PK FK SaleID
PK SaleItemID
FK ItemID
ItemPrice
Quantiy
ExtendedPrice
ITEM
PK ItemID
ItemDescription
PurchaseDate
ItemCost
ItemPrice
QuantityOnHand
ORDER_ITEM
PK OrderID
PK FK ItemID
OrderDate
QuantityonOrder
OrderDueDate
FK VendorID
VENDOR
PK VendorID
CompanyName
ContactLastName
ContactFirstName
Address
City
State
ZIP
Phone
Fax
EmailAddress
CUSTOMER
PK CustomerID
LastName
FirstName
Address
City
State
ZIP
Phone
EmailAddress
SALE
PK SaleID
FK CustomerID
FK EmployeeID
SaleDate
SubTotal
Tax
Total
EMPLOYEE
PK EmployeeID
LastName
FirstName
Phone
EmailAddress

C.


SALE_ITEM
PK
FK
SaleID
PK
SaleItemID
FK
ItemID
ItemPrice
ITEM
PK
ItemID
ItemDescription
PurchaseDate
ItemCost
ItemPrice
FK
VendorID
VENDOR
PK
VendorID
CompanyName
ContactLastName
ContactFirstName
Address
City
State
ZIP
Phone
Fax
EmailAddress
CLIENT
PK
CLIENTID
LastName
FirstName
Address
attribute name
City
State
ZIP
Phone
EmailAddress
SALE
PK
SaleID
FK
CustomerID
FK
EmployeeID
SaleDate
SubTotal
Tax
Total
EMPLOYEE
PK
EmployeeID
LastName
FirstName
Phone
EmailAddress
CUSTOMER
PaymentSource
PurchasingBehavior
DiscoveredBusiness
EMPLOYEE
YearsOfService
DiscountRate
Salary

D.


ORDER_ITEM
PK OrderID
PK FK ItemID
OrderDate
QuantityonOrder
OrderDueDate
FK VendorID
SALE_ITEM
PK FK SaleID
PK SaleItemID
FK ItemID
ItemPrice
Quantiy
ExtendedPrice
ITEM
PK ItemID
ItemDescription
PurchaseDate
ItemCost
ItemPrice
QuantityOnHand
VENDOR
PK VendorID
CompanyName
ContactLastName
ContactFirstName
Address
City
State
ZIP
Phone
Fax
EmailAddress
CLIENT
PK ClientID
LastName
FirstName
Address
City
State
ZIP
Phone
EmailAddress
SALE
PK SaleID
FK CustomerID
FK EmployeeID
SaleDate
SubTotal
Tax
Total
EMPLOYEE
PK EmployeeID
LastName
FirstName
Phone
EmailAddress
CUSTOMER
PaymentSource
PurchasingBehavior
DiscoveredTheBusiness
EMPLOYEE
YearsOfService
DiscountRate
Salary