COMP1350 2021 – ASSIGNMENT ONE
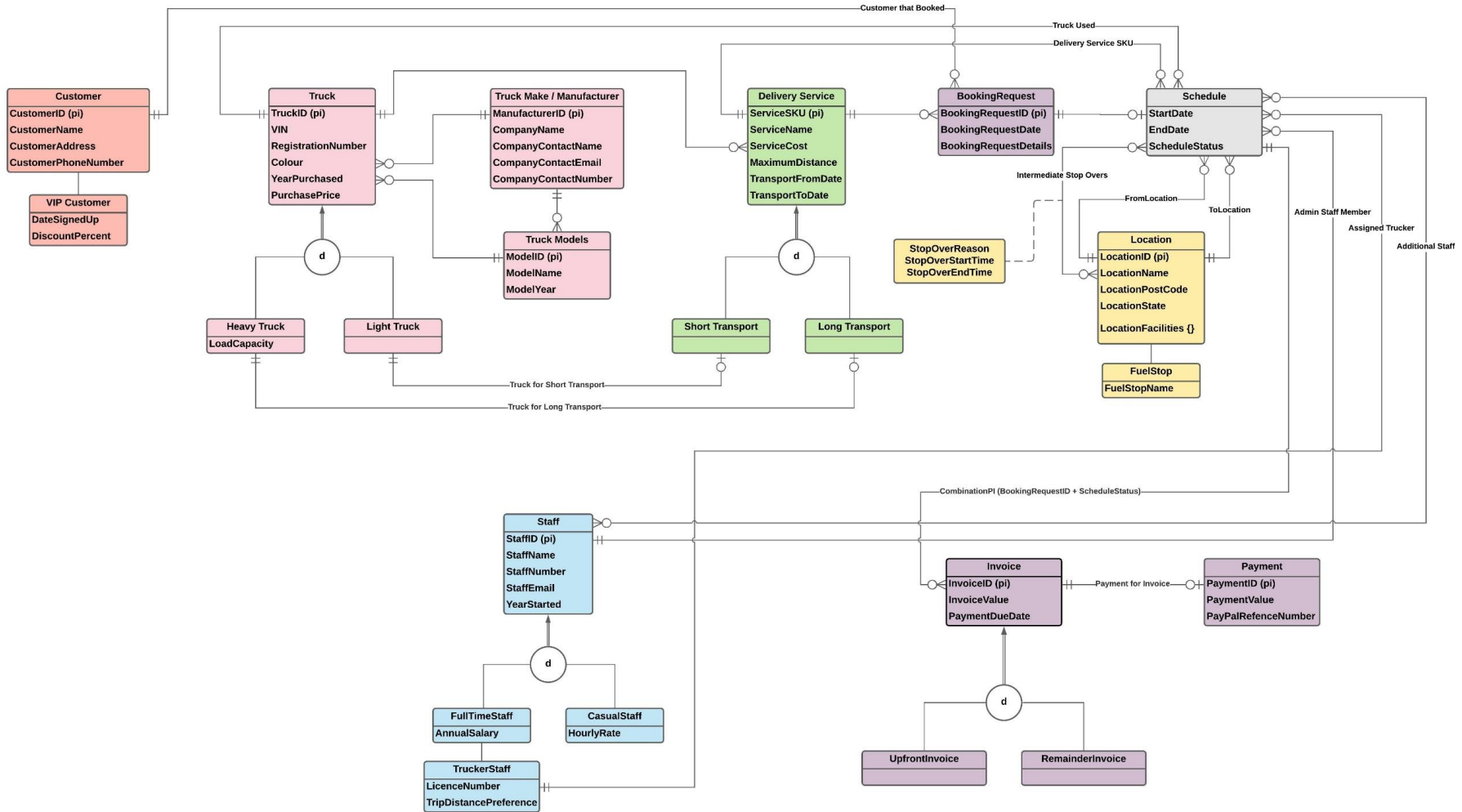
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Task 1: EER Diagram

Customer
- CustomerID (pi)
- CustomerName
- CustomerAddress
- CustomerPhoneNumber

VIP Customer
- DateSignedUp
- DiscountPercent

Truck
- TruckID (pi)
- VIN
- RegistrationNumber
- Colour
- YearPurchased
- PurchasePrice

Truck Make / Manufacturer
- ManufacturerID (pi)
- CompanyName
- CompanyContactName
- CompanyContactEmail
- CompanyContactNumber

Truck Models
- ModelID (pi)
- ModelName
- ModelYear

Delivery Service
- ServiceSKU (pi)
- ServiceName
- ServiceCost
- MaximumDistance
- TransportFromDate
- TransportToDate

BookingRequest
- BookingRequestID (pi)
- BookingRequestDate
- BookingRequestDetails

Schedule
- StartDate
- EndDate
- ScheduleStatus

Heavy Truck
- LoadCapacity

Light Truck

Short Transport

Long Transport

StopOverReason
- StopOverStartTime
- StopOverEndTime

Location
- LocationID (pi)
- LocationName
- LocationPostCode
- LocationState
- LocationFacilities {}

FuelStop
- FuelStopName

Staff
- StaffID (pi)
- StaffName
- StaffNumber
- StaffEmail
- YearStarted

Invoice
- InvoiceID (pi)
- InvoiceValue
- PaymentDueDate

Payment
- PaymentID (pi)
- PaymentValue
- PayPalRefenceNumber

FullTimeStaff
- AnnualSalary

CasualStaff
- HourlyRate

TruckerStaff
- LicenceNumber
- TripDistancePreference

UpfrontInvoice

RemainderInvoice

Relationship labels:
- Customer that Booked
- Truck Used
- Delivery Service SKU
- Intermediate Stop Overs
- FromLocation
- ToLocation
- Admin Staff Member
- Assigned Trucker
- Additional Staff
- Truck for Short Transport
- Truck for Long Transport
- CombinationPI (BookingRequestID + ScheduleStatus)
- Payment for Invoice

Assumptions, if any:

- Staff emails are also recorded
- The "make" and "manufacturer" of a truck are the same thing. Each "make" or "manufacturer" can produce many models of truck
- Stop over locations are categorised as a standard location. The facilities, name and address are all recorded as per normal
- Maximum of 1 truck per trip
- All trips are domestic / national – Meraki only operates within 1 country, transferring between trucks after flights or any similar situation is not something Meraki do

Task 2: Logical Transformation

Step 1 - Strong Entities:
- Customer (CustomerID (pk), CustomerName, CustomerAddress, CustomerPhoneNumber)
- Truck (TruckID (pk), VIN, RegistrationNumber, Colour, YearPurchased, PurchasePrice)
- Truck Make / Manufacturer (ManufacturerID (pk), CompanyName, CompanyContactName, CompanyContactEmail, CompanyContactNumber)
- Truck Model (ModelID (pk), ModelName, ModelYear)
- Delivery Service (ServiceSKU (pk), ServiceName, ServiceCost, MaximumDistance, TransportFromDate, TransportToDate)
- Booking Request (BookingRequestID (pk), BookingRequestDate, BookingRequestDetails)
- Staff (StaffID (pk), StaffName, StaffNumber, StaffEmail, YearStarted)
- Invoice (InvoiceID (pk), InvoiceValue, PaymentDueDate)
- Payment (PaymentID (pk), PaymentValue, PayPalReferenceNumber)

Step 2 - Weak Entities:
- This diagram has no weak entities

Step 3 – One-one relationships:
- Long Transport (ServiceSKU (pk), TruckID (fk))
- Short Transport (ServiceSKU (pk), TruckID (fk))

- Payment (PaymentID (pk), PaymentValue, PayPalReferenceNumber, InvoiceID (fk))

Step 4 – One-many relationships:
- Booking Request (BookingRequestID (pk), BookingRequestDate, BookingRequestDetails, CustomerID (fk))
- Delivery Service (ServiceSKU (pk), ServiceName, ServiceCost, MaximumDistance, TransportFromDate, TransportToDate, TruckID (fk))
- Truck (TruckID (pk), VIN, RegistrationNumber, Colour, YearPurchased, PurchasePrice, ManufacturerID (fk))
- Truck (TruckID (pk), VIN, RegistrationNumber, Colour, YearPurchased, PurchasePrice, ModelID (fk))
- Truck Models (ModelID (pk), ModelName, ModelYear, ManufacturerID (fk))
- Booking Request (BookingRequestID (pk), BookingRequestDate, BookingRequestDetails, ServiceSKU (fk))

Step 5 – Many-many relationships:
- This diagram has no many to many relationships, only ternary relationships

Step 6 – Multi-valued attributes:
- LocationFacilities (LocationID (pk), FacilityID (pk))

Step 7 – Associative entity / Ternary relationship:
- Schedule (StartDate, EndDate, ScheduleStatus, TruckID (fk), BookingRequestID (fk), ServiceSKU (fk), FromLocation (LocationID - fk), ToLocation (LocationID - fk), StopOverLocations (List of LocationIDs - fk), AdminStaffMember (StaffID – (fk), AssignedTrucker (StaffID – (fk), AdditionalStaffMember (List of StaffIDs – (fk))

Step 8a – Multiple relations – Superclass and subclasses:
- Heavy Truck (HTruckID (pk, fk), LoadCapacity)
- Light Truck (LTruckID (pk, fk))
- Short Transport (STServiceSKU (pk, fk))
- Long Transport (LTServiceSKU (pk, fk))
- FullTimeStaff (FTStaffID (pk, fk), AnnualSalary)
- CasualStaff (CStaffID (pk, fk), HourlyRate)
- TruckerStaff (TRStaffID (pk, fk), AnnualSalary, LicenseNumber, TripDistancePreference)
- VIP Customer (VIPCustomerID (pk, fk), DateSignedUp, DiscountPercent)

- FuelStop (FSLocationID (pk, fk), FuelStopName)
- UpfrontInvoice (UFInvoiceID (pk, fk))
- RemainderInvoice (RInvoiceID (pk, fk))

Repeat Steps 2-7:

Step 1 - Strong Entities: No Changes
Step 2 - Weak Entities:
- Schedule (**BookingRequestID (pk, fk), ScheduleStatus (pk),** StartDate, EndDate, ServiceSku (fk), TruckID (fk), FromLocationID (fk), ToLocationID (fk), IntermediateStopOverLocations (fk), AdminStaffID (fk), TStaffID (fk), AdditionalStaffID (fk))

Step 3 – One-one relationships: No Changes
Step 4 – One-many relationships : No Changes
Step 5 – Many-many relationships: No Changes
Step 6 – Multi-valued attributes: No Changes
Step 7 – Associative entity / Ternary relationship: No Changes

Final Table List:

- Customer (**CustomerID (pk, fk)**, CustomerName, CustomerAddress, CustomerPhoneNumber)
- VIP Customer (**VIPCustomerID (pk, fk)**, DateSignedUp, DiscountPercent)
- Truck (**TruckID (pk, fk)**, VIN, RegistrationNumber, Colour, YearPurchased, PurchasePrice, **ManufacturerID (fk)**, **ModelID (fk)**)
- Truck Make / Manufacturer (**ManufacturerID (pk, fk)**, CompanyName, CompanyContactName, CompanyContactEmail, CompanyContactNumber)
- Truck Model (**ModelID (pk, fk)**, ModelName, ModelYear, **ManufacturerID (fk)**)
- Heavy Truck (**HTruckID (pk, fk)**, LoadCapacity)
- Light Truck (**LTruckID (pk, fk)**)
- Delivery Service (**ServiceSKU (pk, fk)**, ServiceName, ServiceCost, MaximumDistance, TransportFromDate, TransportToDate, **TruckID (fk)**)
- Short Transport (**STServiceSKU (pk, fk)**, **LTruckID (fk)**)
- Long Transport (**LTServiceSKU (pk, fk)**, **HTruckID (fk)**))
- BookingRequest (**BookingRequestID (pk, fk)**, BookingRequestDate, BookingRequestDetails, **ServiceSKU (fk)**, **CustomerID (fk)**)
- Schedule (**BookingRequestID (pk, fk), ScheduleStatus (pk),** StartDate, EndDate, **ServiceSku (fk)**, **TruckID (fk)**, **FromLocationID (fk)**, **ToLocationID (fk)**, **IntermediateStopOverLocations (fk)**, **AdminStaffID (fk)**, **TStaffID (fk)**, **AdditionalStaffID (fk)**)
- Location (**LocationID (pk, fk)**, LocationName, LocationPostCode, LocationState, LocationFacilities)
- FuelStop (**FSLocationID (pk, fk)**, FuelStopName)
- IntermediateStopOvers (**LocationID (pk, fk)**, LocationName, LocationPostCode, LocationState, LocationFacilites, StopOverReason, StopOverStartTime, StopOverEndTime)
- Staff (**StaffID (pk, fk)**, StaffName, StaffNumber, StaffEmail, YearStarted)
- FullTimeStaff (**FTStaffID (pk, fk)**, AnnualSalary)
- CasualStaff (**CStaffID (pk, fk)**, HourlyRate)
- TruckerStaff (**TRStaffID (pk, fk)**, AnnualSalary, LicenseNumber, TripDistancePreference)
- Invoice (**InvoiceID (pk, fk)**, InvoiceValue, PaymentDueDate, **ScheduleID (BookingRequestID + ScheduleStatus) (fk)**)
- UpfrontInvoice (**UFInvoiceID (pk, fk)**)
- RemainderInvoice (**RInvoiceID (pk, fk)**)
- Payment (**PaymentID (pk, fk)**, PaymentValue, PayPalReferenceNumber, **InvoiceID (fk)**)