**CLASS DESCRIPTIONS**

A **Customer** is a person who comes to Dave’s Automotive for professional mechanical services.

An **ExistingCustomer** is a Customer that has already done business at Dave’s Automotive.

A **SteadyCustomer** is a Customer who returns to the auto shop regularly and accumulates loyalty points for each transaction made.

A **PremierCustomer** is a Customer who returns to the auto shop regularly and has subscribed to a monthly payment plan to cover an annual fee that covers all repair costs during the given year.

A **MonthlyInstallmentPayment** is a fee paid on a monthly basis that a PremierCustomer makes towards their annual fee.

A **Notification** is an E-mail sent to SteadyCustomers to alert them when an automobile they own is likely to be due for some routine maintenance.

A **ProspectiveCustomer** is a Customer that may do business with the auto shop in the future.

A **ReferralContact** is the event that occurs when a SteadyCustomer recommends Dave’s Automotive to a ProspectiveCustomer.

A **Special** is a discount given to ProspectiveCustomers to encourage them to do business with Dave’s Automotive.

An **Offer** is the event that occurs when a Special is given to a ProspectiveCustomer.

A **Vehicle** is a means of transportation owned by the Customer that is brought to the auto shop for mechanical services.

An **Appointment** is an assessment of the Customer’s Vehicle that occurs to determine which parts need maintenance.

An **Employee** is someone that works at Dave’s Automotive.

A **ServiceTechnician**  is someone who meets with Customers and their Vehicles to diagnose their Vehicle’s issues and proposes a plan for repair

A **Mechanic** is someone who possesses a set of skills useful for mechanical repairs and uses those skills to fix Vehicles.

A **Mentorship** is an apprenticeship between two Mechanics in which a Mechanic that possesses a certain skill teaches another Mechanic that skill.

A **MaintenanceOrder** is a write-up by a ServiceTechnician that details a Vehicle’s required repairs and assigns a Mechanic to each repair.

A **MaintenanceItem** is a repair that a specific Vehicle needs.

A **MaintenancePackage** is a combination of MaintenanceItems that can be bought together on a MaintenanceOrder.

An **Assignment** is a Mechanic scheduled to repair a given MaintenanceItem.

**CLASS RELATIONSHIPS**

A Customer owns one to many Vehicles.

A Vehicle is owned by one and only one Customer.

A ProspectiveCustomer is contacted by one and only one ReferralContact.

A ReferralContact contacts one and only one ProspectiveCustomers.

A ProspectiveCustomer receives zero to many Offers

An Offer is received by one and only one ProspectiveCustomer.

A Special produces one to many Offers.

An Offer is produced by one and only one Special.

A PremierCustomer pays one to many MonthlyInstallmentPayments.

A MonthlyInstallmentPayment is paid by one and only one PremierCustomer.

A MonthlyInstallmentPayment is invoked by one and only one Vehicle.

A Vehicle can invoke zero to many MonthlyInstallmentPayments.

A SteadyCustomer receives one to many Notifications.

A Notification is received by one and only one SteadyCustomer.

A Notification is invoked by one and only one Vehicle.

A Vehicle can invoke zero to many Notifications.

A Vehicle can make zero to many Appointments.

An Appointment is made for one and only one Vehicle.

An Appointment produces one and only one MaintenanceOrder.

A MaintenanceOrder is produced by one and only one appointment.

A ServiceTechnician produces one to many MaintenanceOrders.

A MaintenanceOrder is produced by one and only one ServiceTechnician.

A Mechanic is mentored by zero to many Mentorships.

A Mentorship mentors one and only one Mechanic.

A MaintenanceOrder includes one to many MaintenanceItems.

A MaintenanceItem is included in one and only one MaintenanceOrder.

A Mechanic receives zero to many Assignments.

An Assignment is received by one and only one Mechanic.

A MaintenanceItem produces one to many Assignments.

An Assignment is produced by one and only one MaintenanceItem.

A MaintenancePackage is composed of one to many MaintenanceItems.

A MaintenanceItem composes zero to many MaintenancePackages.

**NORMALIZATION/DENORMALIZATION**

To normalize our classes, repeated attributes in Customer were symbolized as a weak entity and multivalued attributes in Employee, Mechanic, and MaintenanceItem were handled. More attributes were added to each class in order to produce a valid candidate key. After producing a valid CK, we can add surrogate keys to the Customer, Vehicle and Employee classes.While performing a lossless join decomposition for the zipCode within the Customer class would've achieved 1NF, it was denormalized and zipCode, city, and state remained as attributes of Address. This prevents many unnecessary joins since auto shops are likely to have customers that are relatively local to the shop's location. There will be the few customers from more unique zipCodes, but would likely appear less often than local customers.