Case Study Car Rental System

This case study will illustrate the requirements gathering and definition process that we have been working through to date.

Narrative

The car rental system is typical of how most of these businesses operate. Real world examples are Enterprise, Budget, Hertz, and National etc., to name a few.

To rent a car, a customer can either call ahead or use their website to reserve a vehicle. Some customers drop in to the rental office and, depending on availability, will rent a car on the spot. When a reservation is made, the customer is provided with a confirmation number.
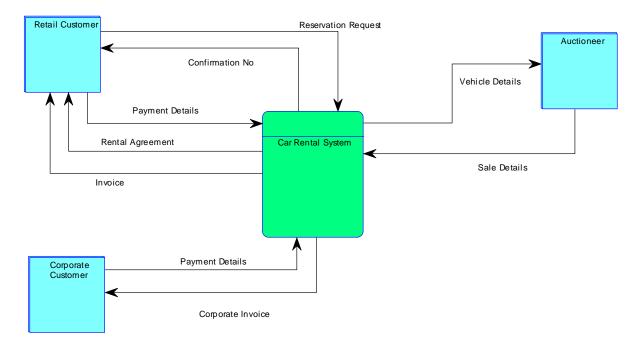
When customers pick-up their vehicle, they are attended to by a Customer Service Representative (CSR) who prepares a rental agreement. The rental agreement lists the customer information including drivers licence, the vehicle details including VIN No, Model, Make, colour, license no, and current mileage. Details of the duration of the rental are also recorded including return date, any alternate drivers, number of free kilometers allowed and pricing. Optional insurance coverage is also discussed.

Once the Rental agreement form has been prepared and signed by the customer, the CSR takes the customer to the vehicle for an inspection where any scratches or other blemishes are noted so that on its' return the customer is not liable for any pre-existing damage. The customer is then given a copy of the rental agreement, which serves as proof that they are authorized to operate.

When the customer returns or drops off the vehicle, the CSR retrieves the rental agreement and then performs an inspection of the vehicle, where the odometer reading is recorded, fuel tank level is checked and exterior and interior are checked for any damage (beyond what was noted earlier). The bill or invoice is calculated and presented to the customer for payment. Retail Customers normally pay by credit card, the details of which are noted on the rental agreement. If the customer is covered under a corporate account, they sign the bill and a separate corporate invoice is generated at month end and forwarded to the head office accounts payable department for payment.

When the vehicle is returned to the storage parking area it is noted in the vehicle inventory file as "Returned-Service". It is then cleaned and serviced to be made "available" for the next rental opportunity. However, if the vehicle odometer exceeds 20,000 km, it is taken "out of service" and held "For Auction" until sold. This is standard policy in the business, as customers want and expect to rent new vehicles. Once a vehicle is sold at auction, it is purged from the inventory file. In some instances, a vehicle may be damaged on return and must be repaired. This is also noted in the inventory records and when repairs are completed the car is once again made "available" for rental.
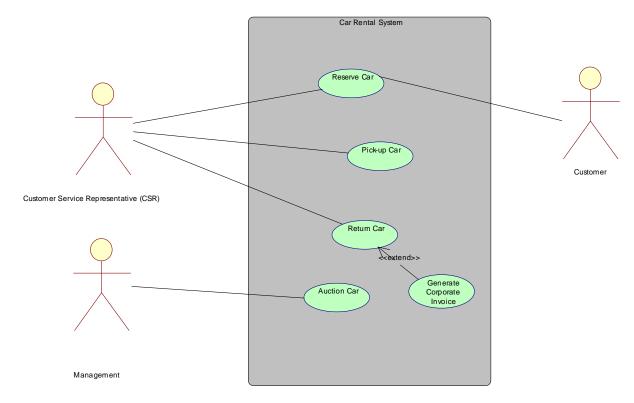
Context Diagram

Retail Customer

Reservation Request

Auctioneer

Confirmation No

Vehicle Details

Payment Details

Car Rental System

Rental Agreement

Sale Details

Invoice

Corporate Customer

Payment Details

Corporate Invoice

Event Table

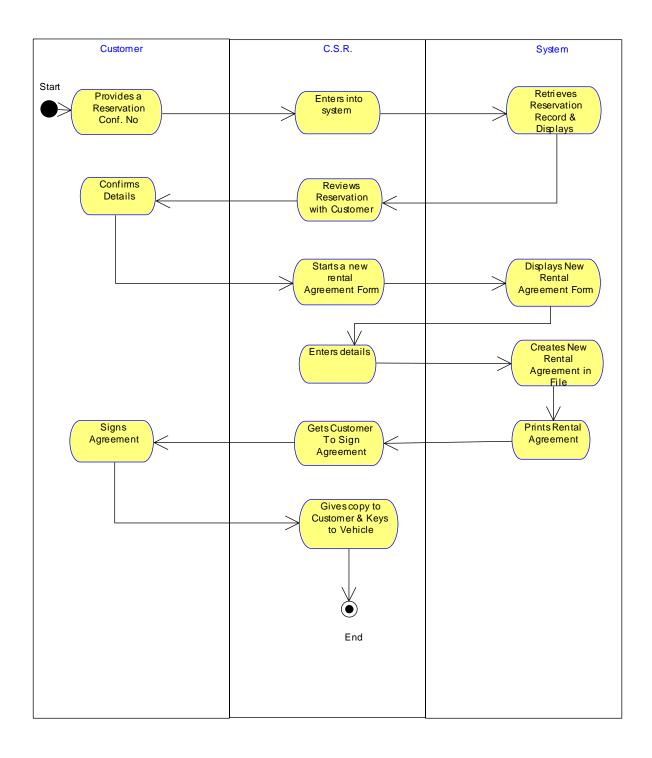| Event	Trigger	Source	Use Case	Response	Destination
Customer wants to rent a car.	Contacts the rental car company by phone, in person or by visiting the web site	Customer	Reserve Car	Confirmation No.	Customer
Customer wants to pick up car that has been rented.	Arrives at the office and presents the CSR with a confirmation number	Customer	Pick-up Car	Rental Agreement	Customer
Customer wants to return car.	On arrival at the office, presents the CSR with rental agreement copy along with keys to the car	Customer	Return Car	Bill/Invoice	Retail Customer or Corporate Customer
Corporate account invoices must be issued	Month end		Generate Corporate Invoice	Corporate Invoice	Accounts Payable – Corporate Head Office
Vehicle odometer reading exceeds maximum limit	Odometer is greater than 20,000km		Auction Car	Vehicle Details	Auctioneer

Use Case Diagram

Car Rental System

Reserve Car

Pick-up Car

Return Car

<<extend>>

Generate Corporate Invoice

Auction Car

Customer Service Representative (CSR)

Management

Customer
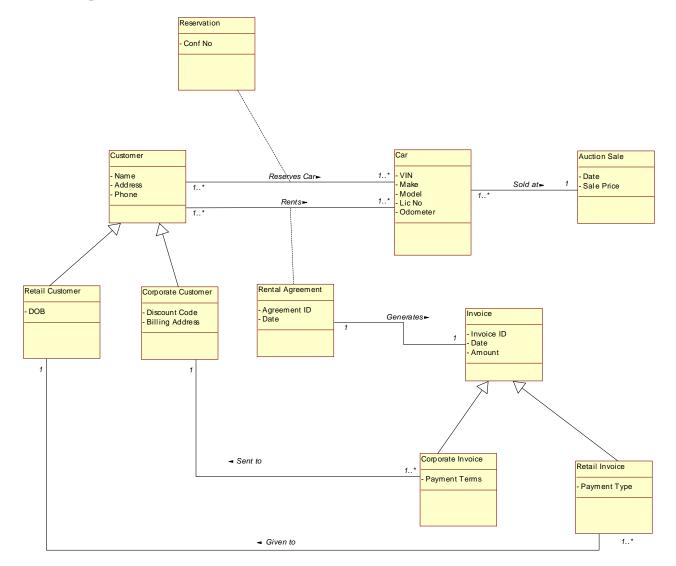
Use Case Description – "Pick up Car"

Flow of Activities for Use Case: "Pick up Car"	
Main Flow: Actor 1. Customer arrives at the Rental Car Office and provides Reservation Confirmation No. to the CSR. 2. CSR enters Conf. No into System 3. Confirms details of reservation with customer 4. Starts a new Rental Agreement 5. Enters Rental Details 6. Gets customer to sign Agreement 7. Gives copy to customer with keys to vehicle.	Main Flow: System 2.1 Retrieves and displays Reservation Details 4.1 Displays new Rental Agreement Form. 5.1 Creates new Rental Agreement in file 5.2 Prints Rental Agreement
Exception Conditions: 	

Activity diagram – "Pick-up Car"

Customer	C.S.R.	System
Start ●		
Provides a Reservation Conf. No	Enters into system	Retrieves Reservation Record & Displays
Confirms Details	Reviews Reservation with Customer	
	Starts a new rental Agreement Form	Displays New Rental Agreement Form
	Enters details	Creates New Rental Agreement in File
Signs Agreement	Gets Customer To Sign Agreement	Prints Rental Agreement
	Gives copy to Customer & Keys to Vehicle	
	◉ End	

Class Diagram

Reservation
- Conf No

Customer
- Name
- Address
- Phone

Reserves Car►   1..*

Rents►   1..*

1..*

1..*

Car
- VIN
- Make
- Model
- Lic No
- Odometer

Sold at►   1

1..*

Auction Sale
- Date
- Sale Price

Retail Customer
- DOB

Corporate Customer
- Discount Code
- Billing Address

Rental Agreement
- Agreement ID
- Date

1   *Generates►*   1

Invoice
- Invoice ID
- Date
- Amount

1

1

Corporate Invoice
- Payment Terms

Retail Invoice
- Payment Type

◄ *Sent to*   1..*

◄ *Given to*   1..*

State Diagram - Car Class