

# 77227213\_SahajBikramMalla

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Leeds Beckett University

# System Analysis and Design

Assessment

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## Part A:

### 1. Physical Level Data Flow Diagram of the Classic Car Hire company

#### CCH Physical Level 1 DFD (Level 1 Diagram)

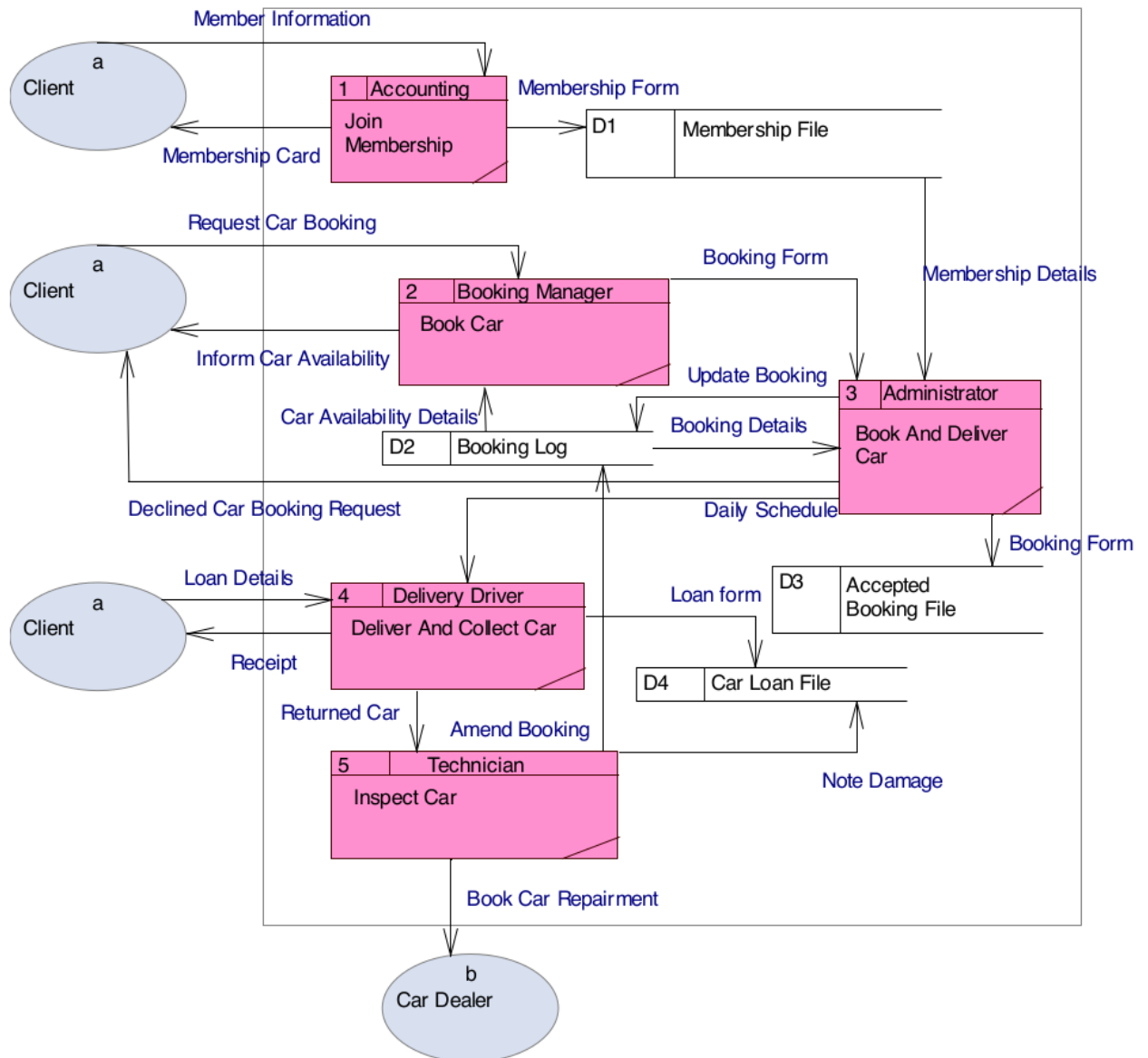


Figure 1 CCH physical Level 1 Data Flow Diagram

## Description of the Classic Car Hire company in physical Level 1 DFD:

The figure above shows the physical level one data flow diagram of the existing system of the Classic Car Hire (CCH) company. The diagram has two external entities, 'Client' and 'Car Dealer'. The Client gives their information to the 'Join Membership' process. The accounting employee stores the 'Membership Form' in the data store of the name 'Membership File'. The 'Join Membership' process provides a membership card to the client.

The client requests for the booking of a car through the 'Book Car' process. The data store, 'booking log' provides information about car availability. If the car is not available, the booking manager informs the client. Else, the car is available and booking form is passed to the 'Book and Deliver Car' process. The membership file provides information about membership details to the 'Book and Deliver Car' process. If the client is not eligible then the administrator declines the car booking request. Else, the booking log is updated and the accepted booking form is stored in the accepted booking file.

The booking log provides booking details to the 'Book and Deliver Car' process. Then the process provides a daily schedule to the 'Deliver and Collect Car' process. The client provides the loan details to the 'Deliver and Collect Car' process and the details are stored as a loan form in the data store named, 'Car Loan File'. A receipt is provided to the client by the process.

The 'Deliver and Collect Car' process returns the car and the car is inspected by the 'Inspect Car' process. If the car is damaged, the technician notes the damage and updates the loan form stored in the car loan file. The process updates the booking log and booking of car repairment is done to an external entity, 'Car Dealer'.

## 2. UML Use Case Diagram of the Classic Car Hire company.

### CCH Use Case Model

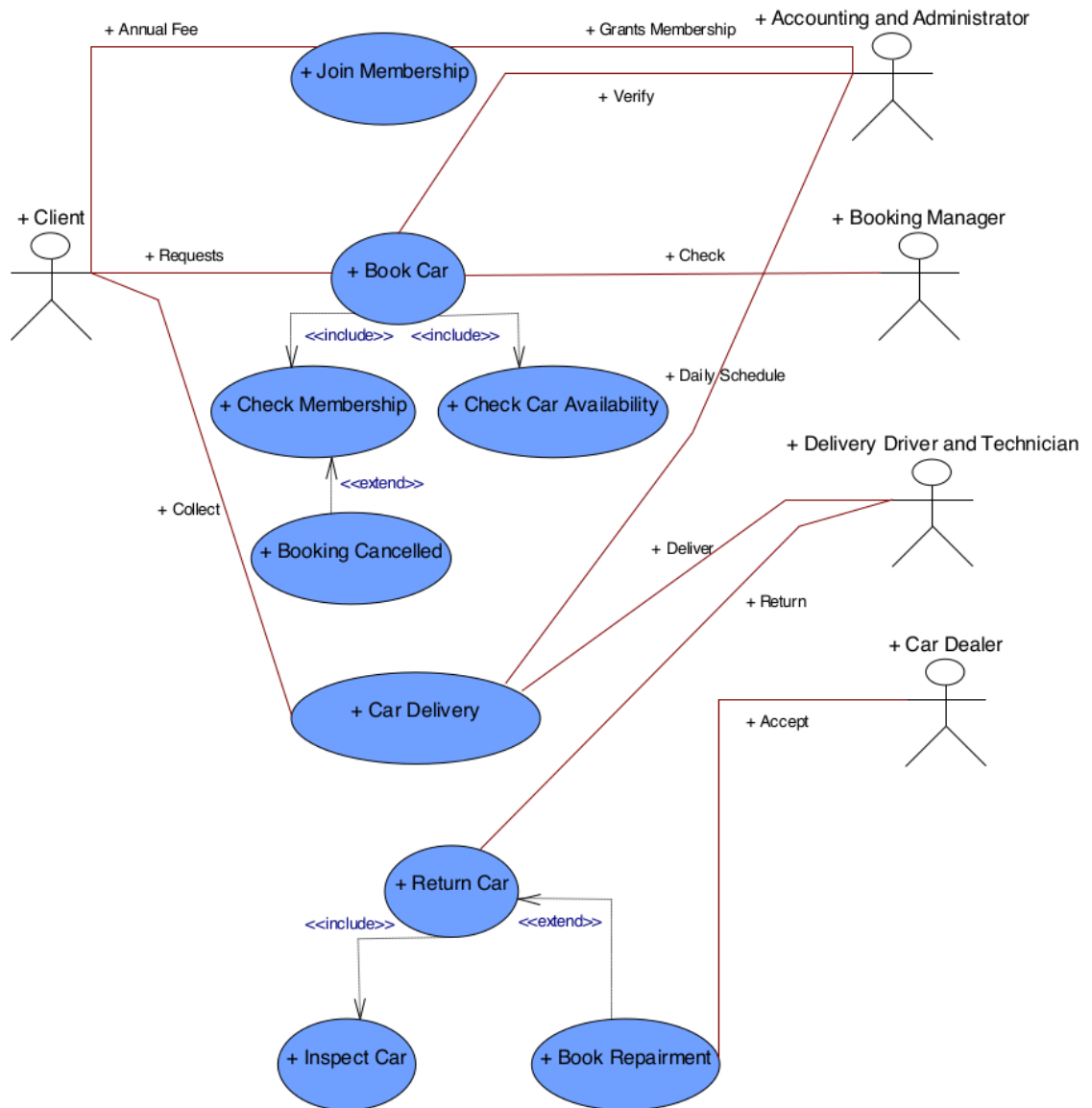


Figure 2 CCH Use Case Model

### Description of the Classic Car Hire company in Use Case Model:

This figure shows the implementation of the existing Classic Car Hiring (CCH) company in a use case model. The diagram shows five actors. The client is a primary actor and accounting and administrator, booking manager, delivery driver and technician and car dealer are secondary actors. There are nine use cases. The client and the accounting and administrator have association with join membership, book car and car delivery use cases. The booking manager has an association with book car use case. The delivery driver and technician have an association with car delivery and return car use case. The car dealer has an association with book repairment use case.

8  
Check membership and check car availability are included use case that is depended with the base use case book car. The included use case happens every time the client books the car. Booking Cancelled is extended use case of the base use case check membership. The extended use case only happens if the client booking the car is not a member. Similarly, inspect car and book repairment are dependent on the base use case return car, by include and extend respectively. Inspection of the car happens every time the car is returned and book repairment only happens if the car is damaged.

Part B:

1. Logical Level 1 Data Flow Diagram if the new automated system in the Classic Car Hire company.

### New Automated CCH Logical Level 1 DFD (Level 1 Diagram)

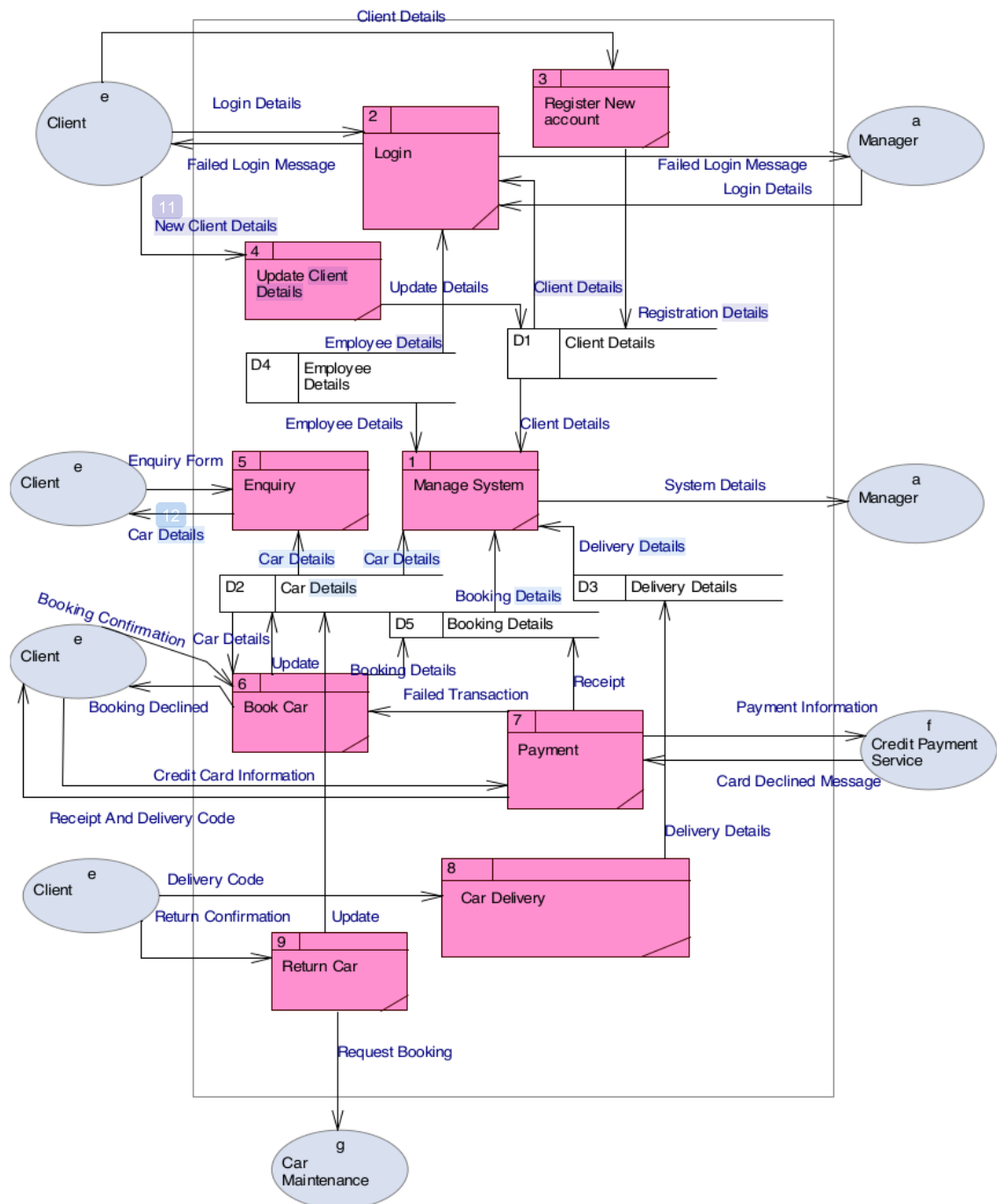


Figure 3 New Automated CCH Logical Level 1 Data Flow Diagram



### Description of the new automated Classic Car Hire company in Logical Level 1 DFD:

The above figure shows the new automated CCH logical level 1 data flow diagram. The diagram has four external entities, 'Client', 'Manager', 'Credit Payment Service' and 'Car Maintenance'. The new system can be logged in by the client or the manager. When they log in, they provide their login details, and the process, 'Login' checks for the details of the user in the data store, 'Employee Details' and 'Client Details' respectively. If the details don't match then a failed login message is passed to the external entity. The client can update their new details via the 'Update Client Details' process and the updated details are updated on the 'Client Details' data store.

The client provides an enquiry form to the 'Enquiry' process. The car details data store provides information to the enquiry process and the enquiry process responds the car details to the client. The client confirms the booking and provides confirmation to the 'Book Car' process. The process then provides booking details to the Data Store, 'Booking Details'. After booking, the client provides the credit card information to the 'Payment' process. The information is then passed to the external entity, 'Credit Payment Service'. If the payment is invalid, the card declined message is given to the 'Payment' process and booking is declined. Else, a receipt is stored in the booking details data store and delivery code and a receipt is provided to the client.

During the 'Car Delivery' process, the client provides the delivery code and delivery details is updated in the data store, 'Delivery Details'. During the return car process, the client confirms that the car is returned. After returning, the car is requested for booking to an external entity, 'Car Maintenance'. The data store, 'Car Details' is updated. All the data store is sent to the process, 'Manage System'. The process provides system details to the external entity, 'Manager'.

2. UML Use Case Diagram of the 'Online Shopping' scenario.

Online Shopping UML Use Case

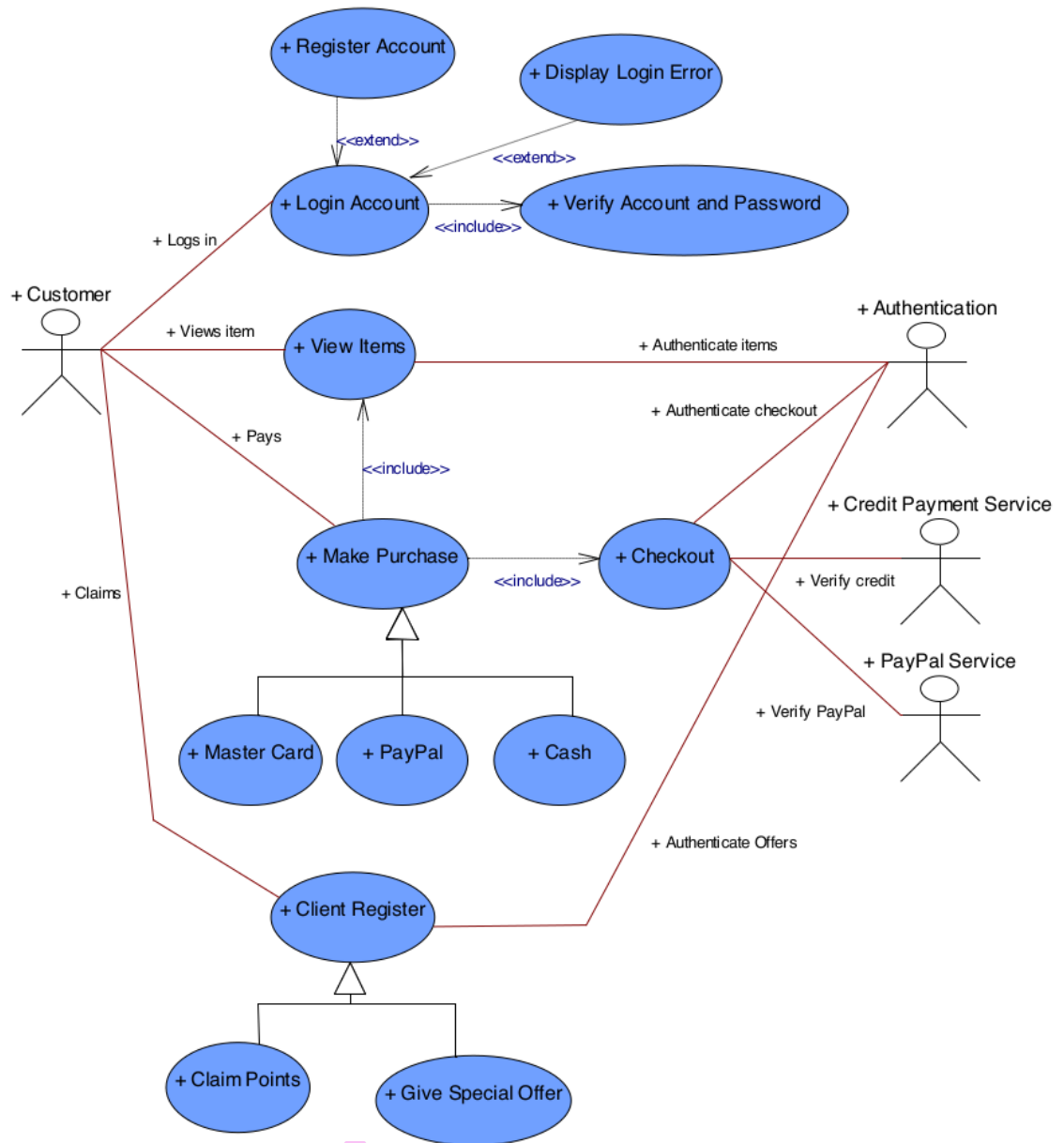


Figure 4 Online Shopping UML Use Case

## <sup>2</sup> Description of the Online Shopping UML Use Case:

The above figure shows the 'online shopping' scenario in UML Use Case diagram. There are four actors. 'Customer' is a primary actor and 'Authentication', 'Credit Payment Service' and 'PayPal Service' are secondary actors. The primary actor has an association with 'Login Account', 'View Items', 'Make Purchase' and 'Client Register' use cases. The secondary actor, 'Authentication', has an association with 'View Items', 'Checkout' and 'Client Register' use cases. Similarly, the remaining secondary actors, 'Credit Payment Service' and 'PayPal Service' has an association with 'Checkout' use case.

<sup>4</sup>  
'Verify Account and Password' is an include use case that is dependent on the base use case 'Login Account'. 'Register Account' and 'Display Login Error' are extended uses case that is also dependent on the base use case 'Login Account'. Verification of account and password happens every time the customer logs in the system. Likewise, registration of account only happens if the customer trying to login does not have a registered account. The display of login error only happens when the user id and password are not verified. 'View Items' and 'Checkout' are included use case of the base use case, 'Make Purchase'. The customer can view their items and checkout form every time they make purchases. 'Make Purchase' is also a general use case that has, 'Master Card', 'PayPal' and 'Cash' as specialized use cases. Similarly, 'Client Register' is also a general use case that has, 'Claim Points' and 'Give Special Offer' as specialized use cases. The specialized use cases have the same property of their general use case and have some new properties of their own.

### 3. UML Class diagram of the 'Online Shopping' scenario.

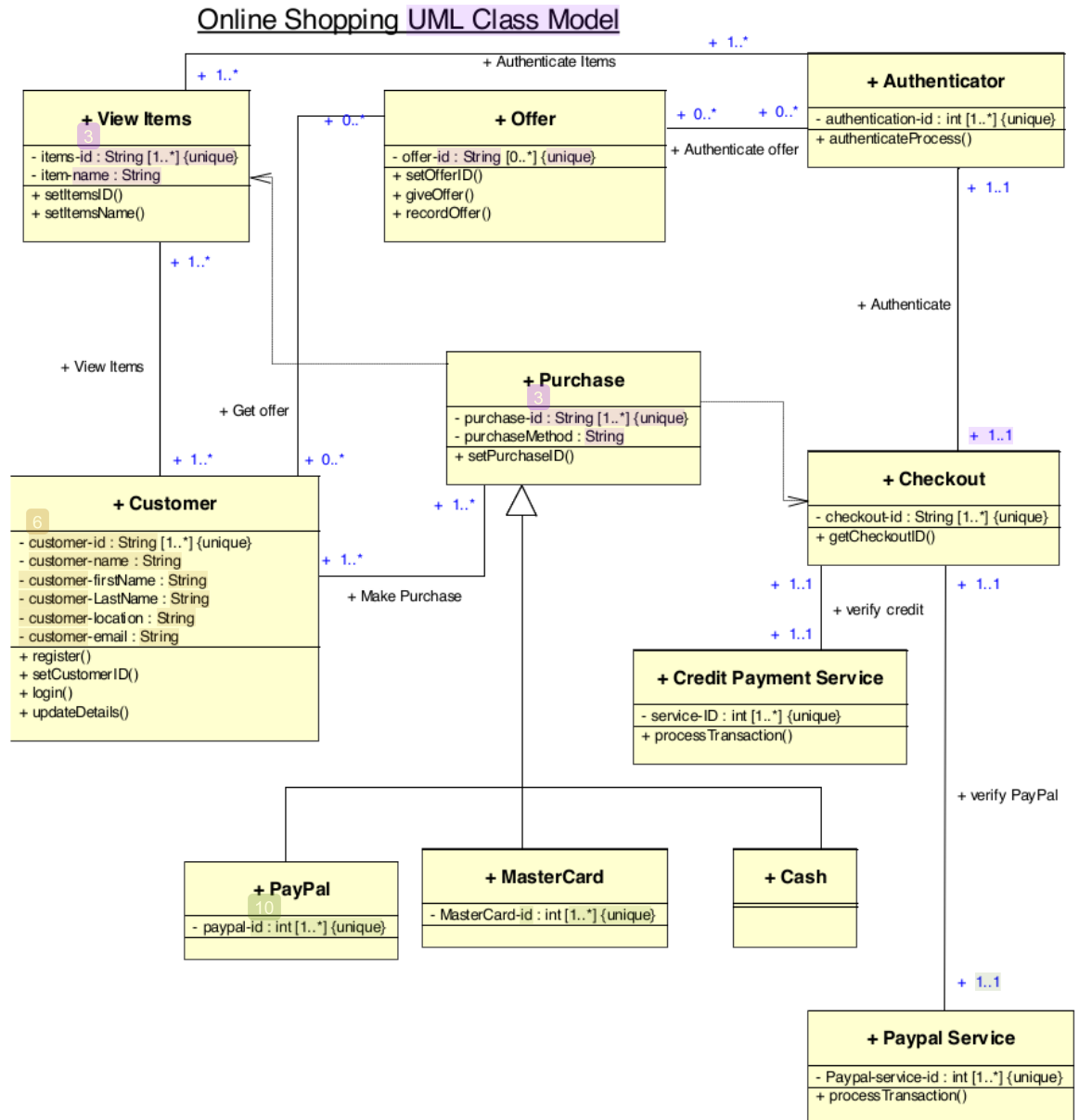


Figure 5 Online Shopping UML Class Model

### Description of the Online Shopping UML Class Model:

The diagram shows the 'Online Shopping' scenario in UML Class Model. There are eleven classes in the figure. Each class have their attributes and methods. The 'Customer' class has an association with class 'View Items' with the multiplicity of one to many. The 'Customer' class also has an association with class 'Offer' and 'Purchase' with the multiplicity of zero to many and one to many respectively. The 'Purchase' class is dependent on the classes 'View Items' and 'Checkout'. The classes, 'PayPal', 'MasterCard' and 'Cash' are inherited from the 'Purchase' class. The class, 'Authenticator' is associated with 'Checkout', 'Offer' and 'View Items' with the multiplicity of one to one, zero to many and one to many respectively. 'Checkout' class is associated with 'Credit Payment Service' and 'PayPal Service' with the multiplicity of one to one.

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