HOTEL RESERVATION SYSTEM

Phase II

SWE 621 – Spring 2013 Term Project

Project Team
Adarsh Ghanta
Matthias Mohammod
Shaeq Khan
Vividh S. Viswanatha

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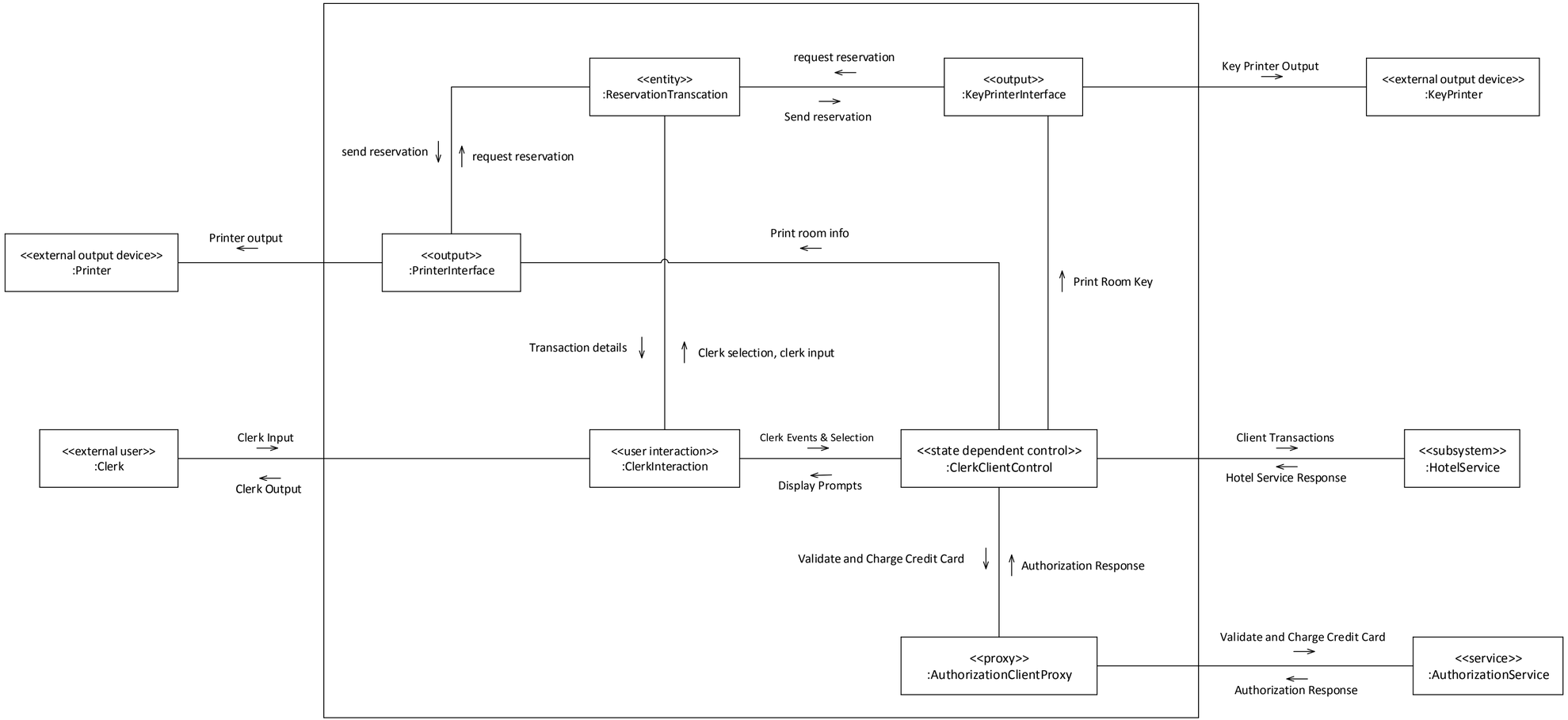
d) *Define the information hiding classes in the system. Define the operations of each class. Define the class interface specifications for the information hiding classes in the system.*

e) *Develop a task interface specification and a task behavior specification for each concurrent task in the system, showing how each task responds to the inputs it receives.*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Send reservation
<<output>>
:KeyPrinterInterface
Key Printer Output
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:KeyPrinter
send reservation
request reservation
<<external output device>>
:Printer
Printer output
<<output>>
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Clerk selection, clerk input
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<<subsystem>>
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Validate and Charge Credit Card
Authorization Response
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Validate and Charge Credit Card
Authorization Response
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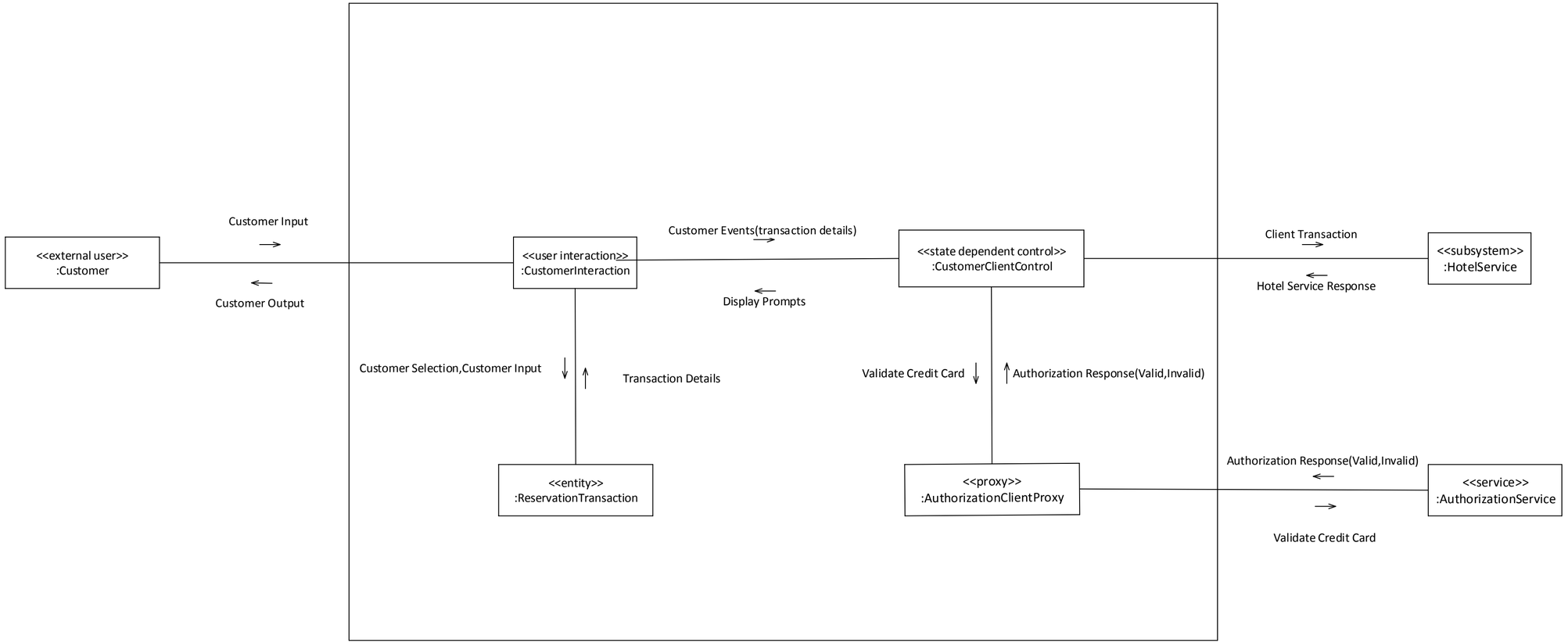
:AuthorizationService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Hotel Service Response
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Transaction Details
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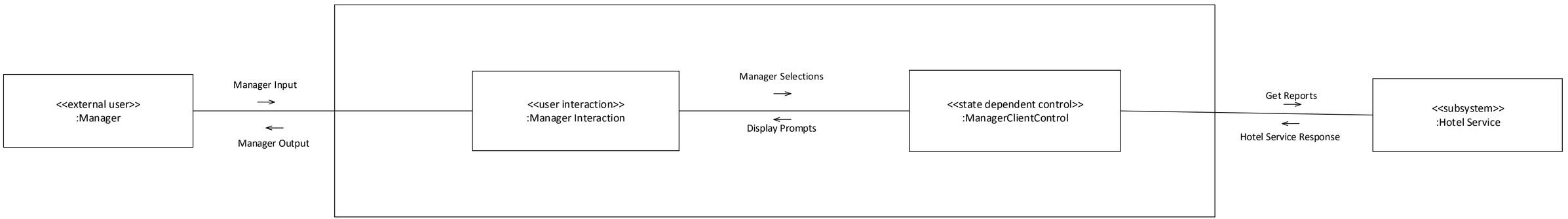
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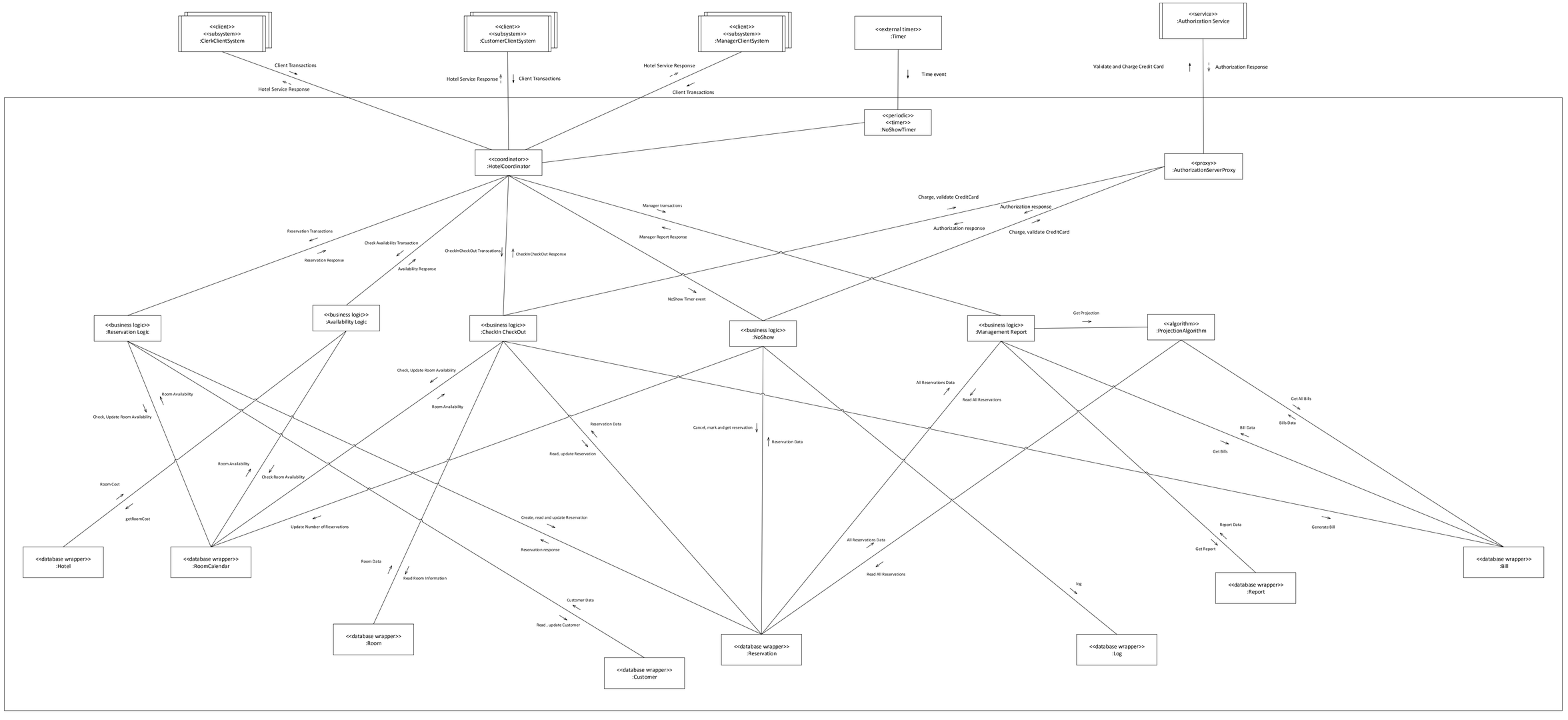
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Client Transactions
Hotel Service Response
Client Transactions
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Authorization response
Charge, validate CreditCard
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:Availability Logic
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Check, Update Room Availability
Room Availability
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All Reservations Data
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Bill Data
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Reservation response
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Room Data
Read Room Information
log
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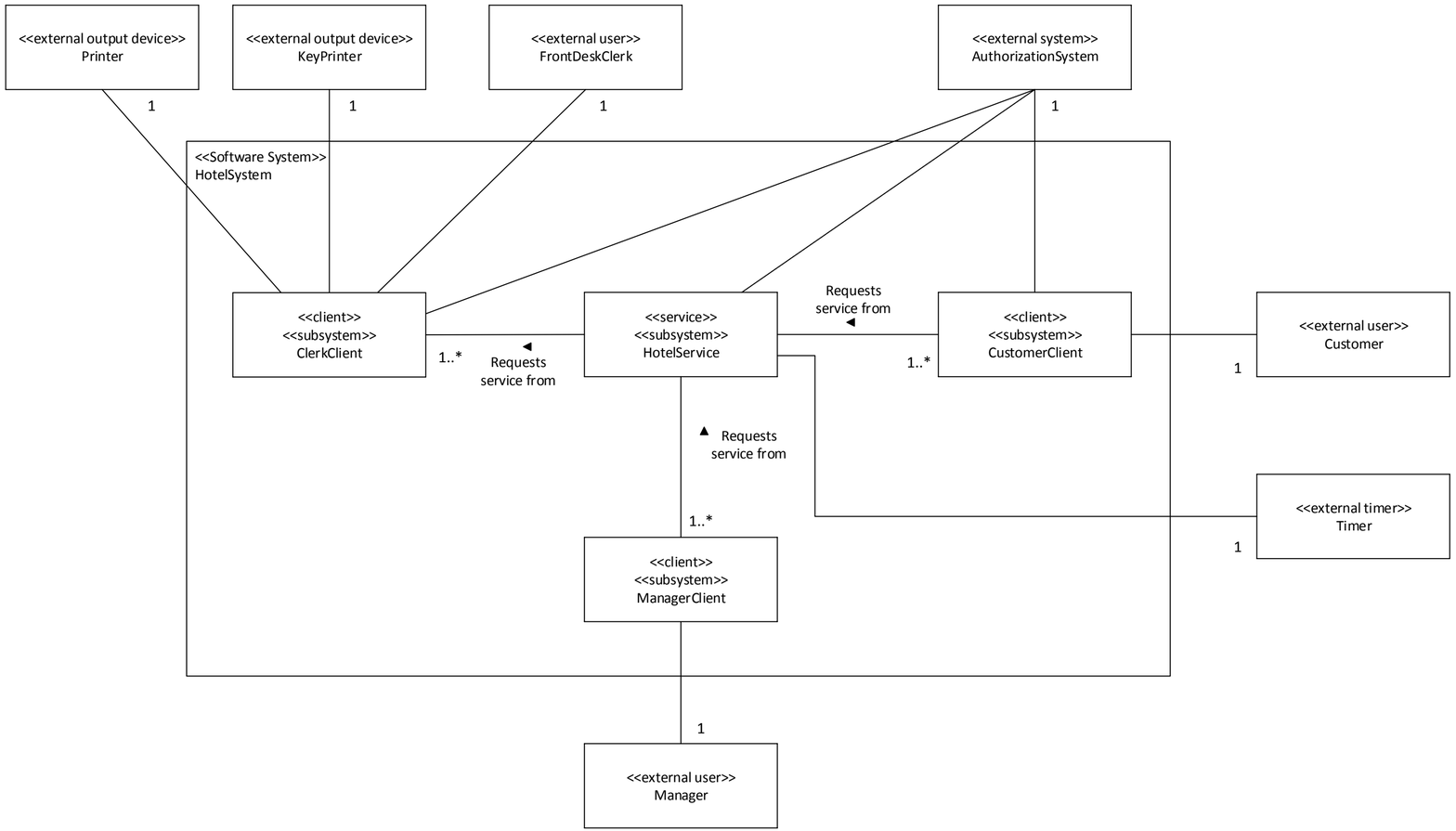
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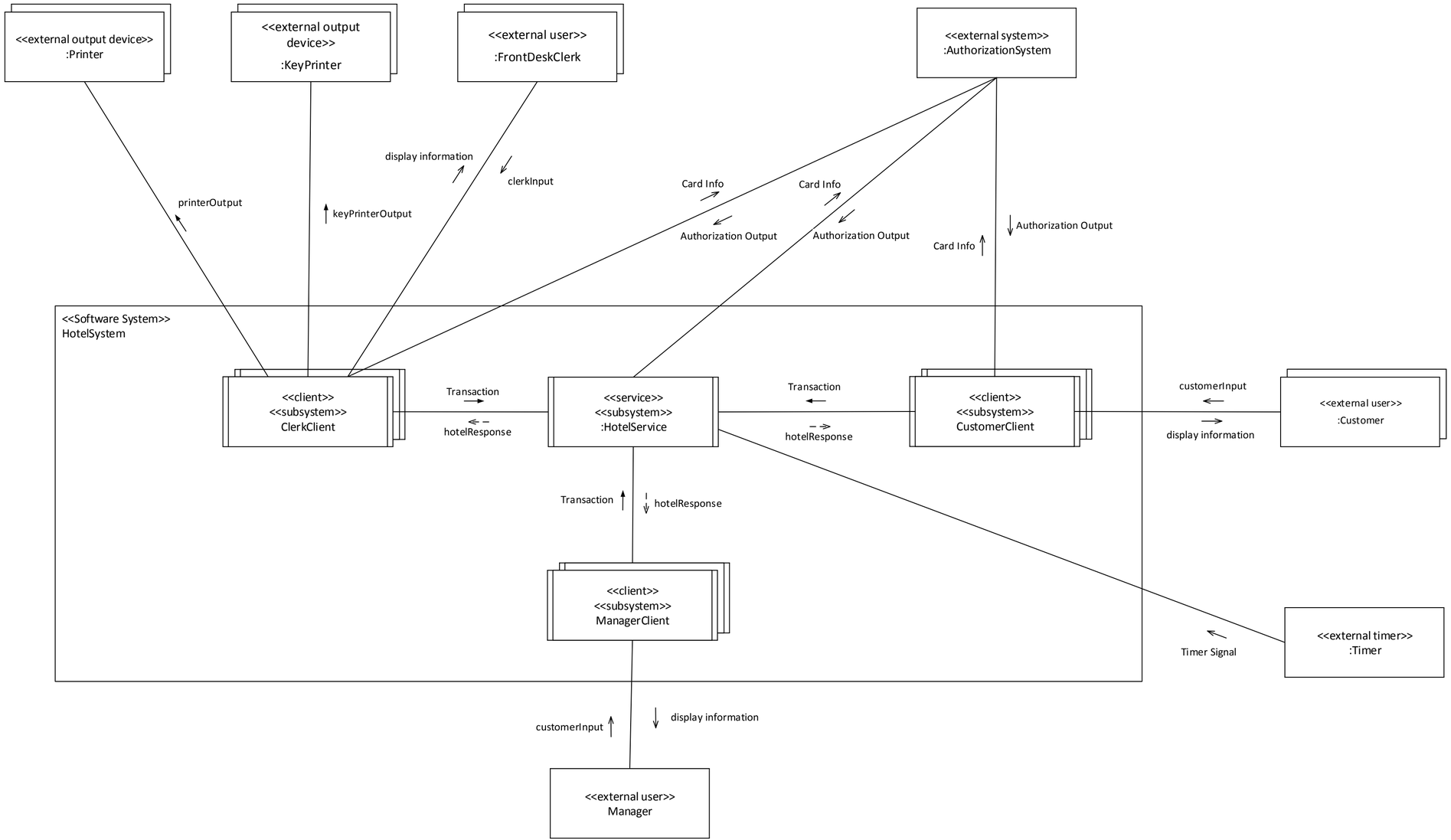
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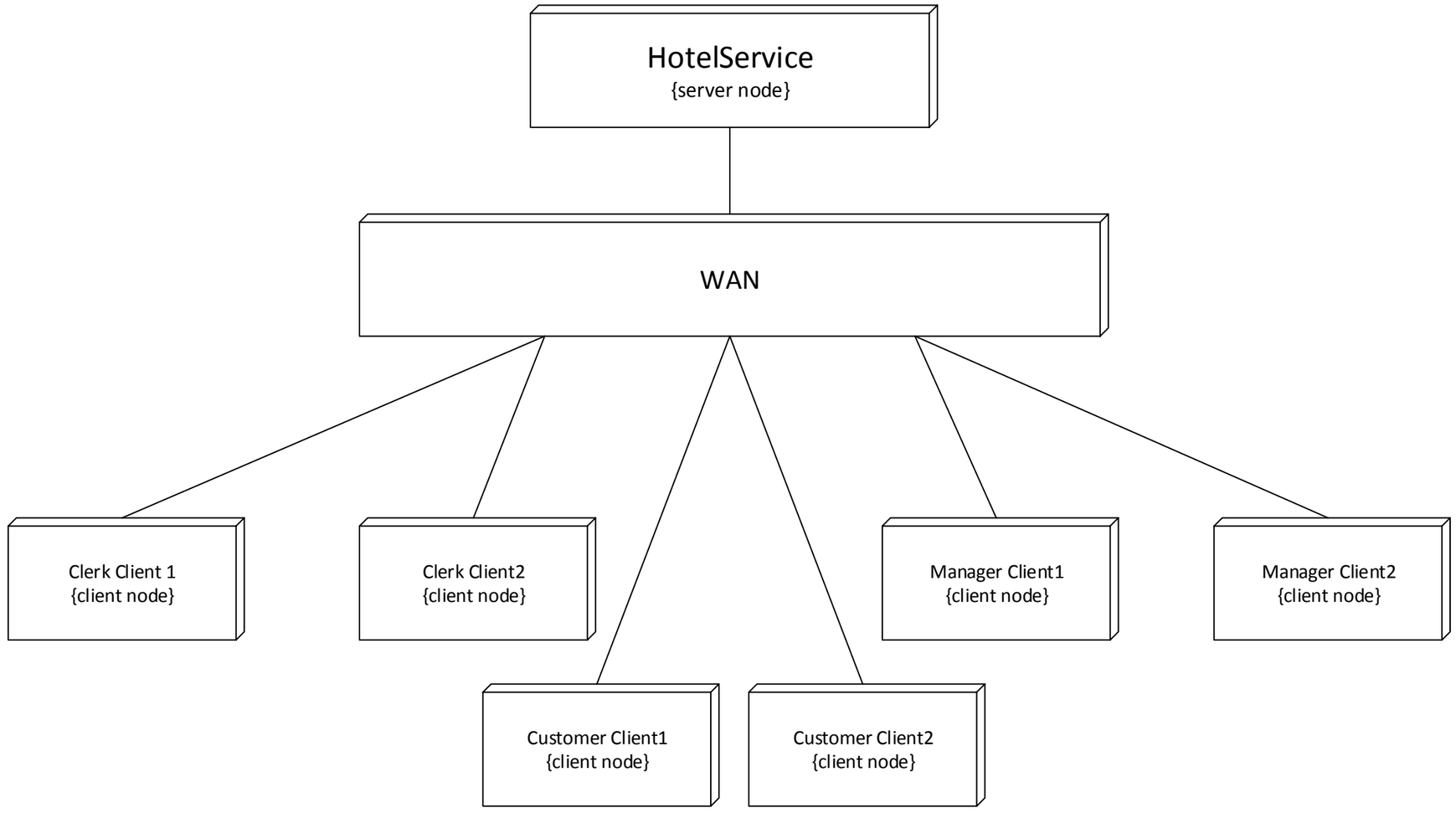
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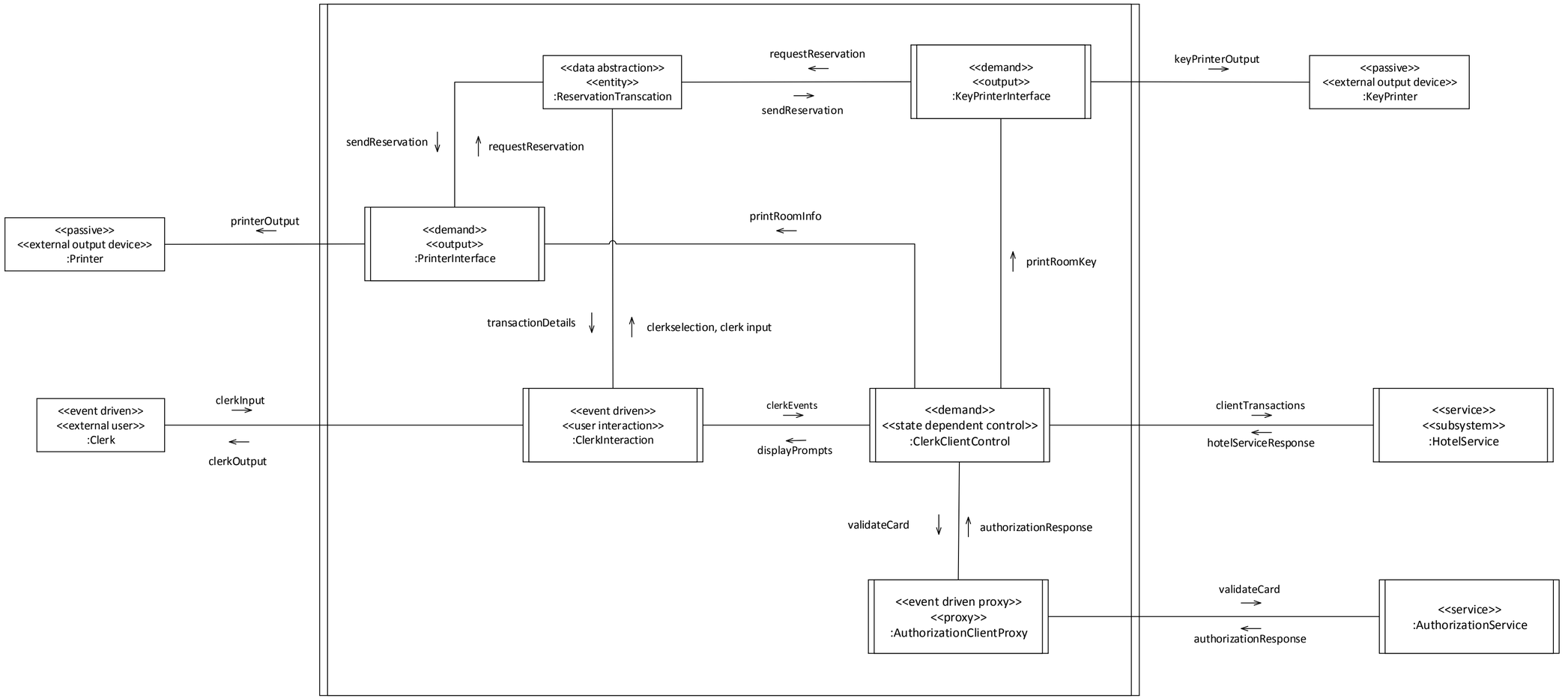
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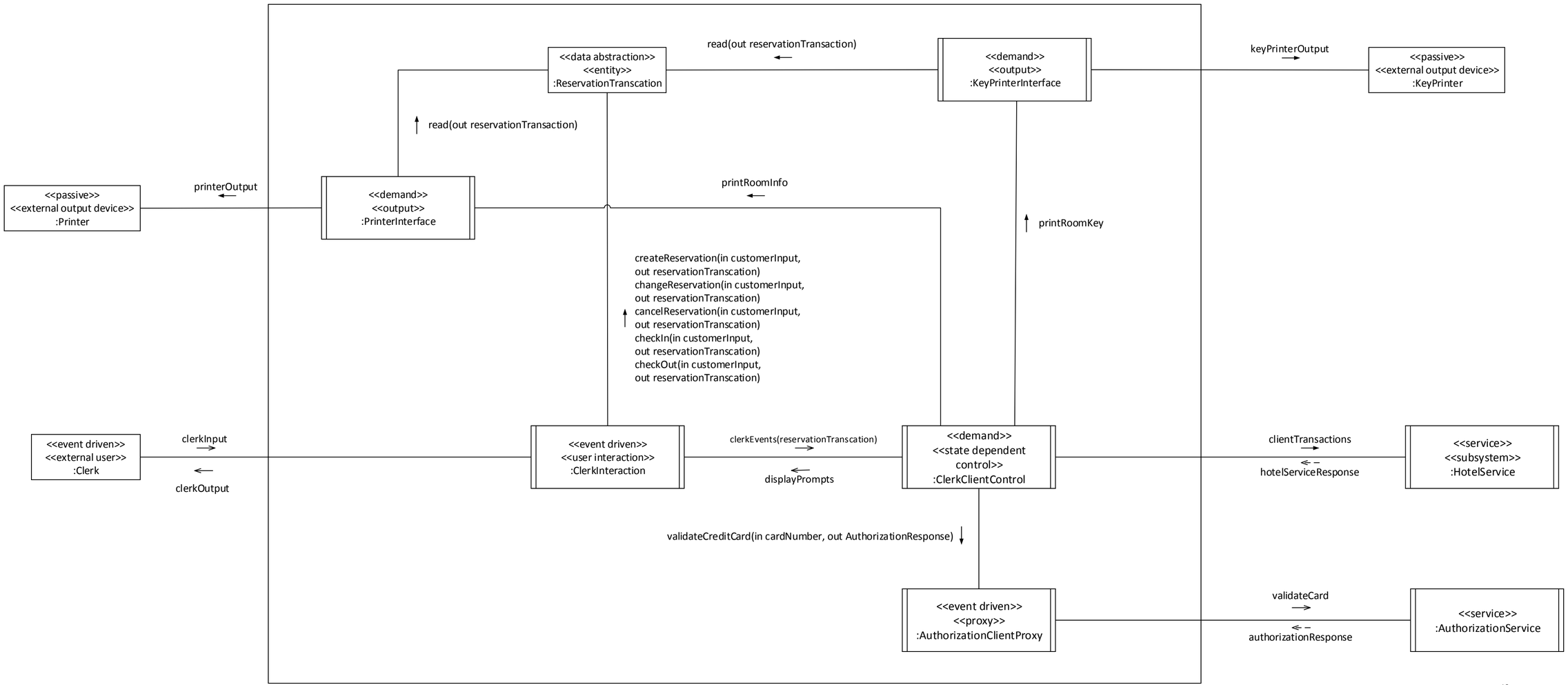
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changeReservation(in customerInput,
out reservationTranscation)
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out reservationTranscation)
checkIn(in customerInput,
out reservationTranscation)
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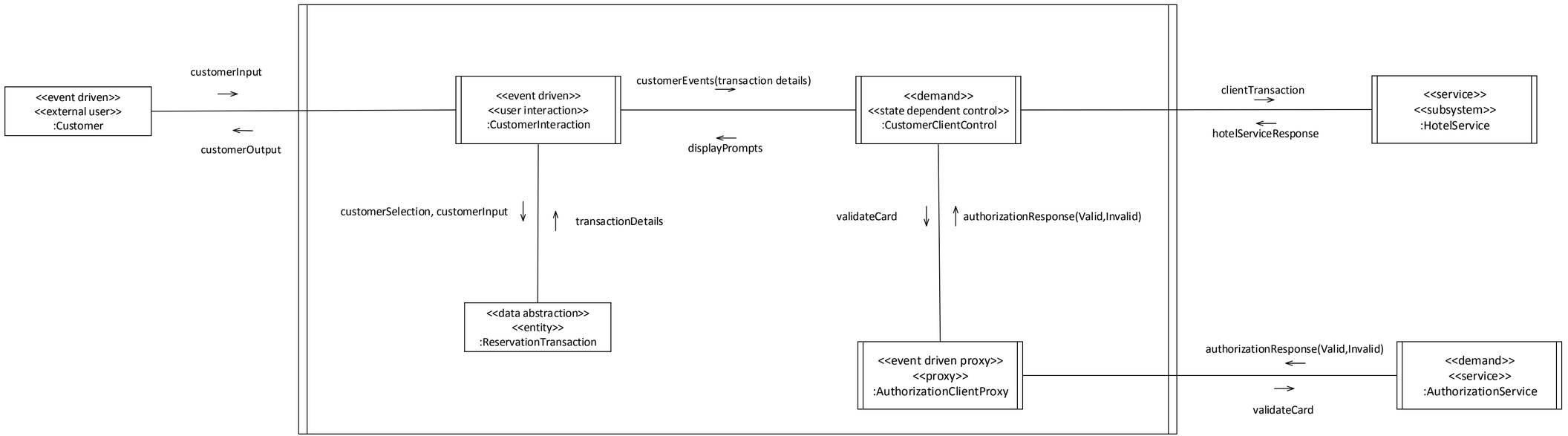
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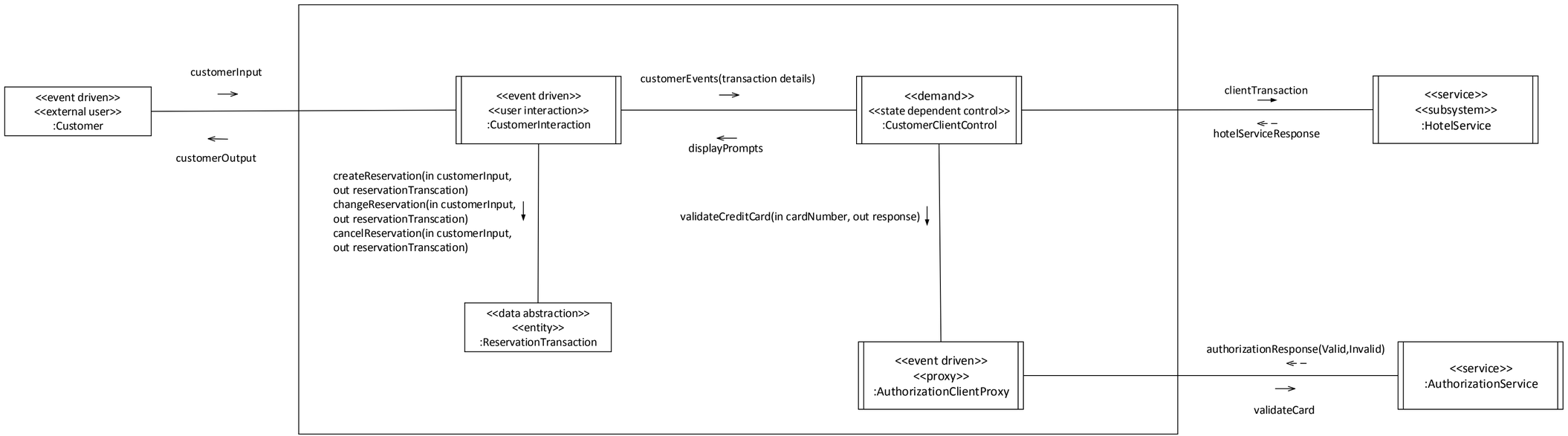
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out reservationTranscation)
validateCreditCard(in cardNumber, out response)
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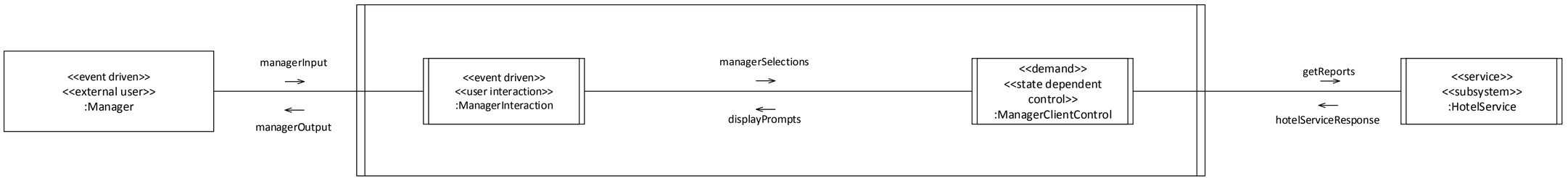
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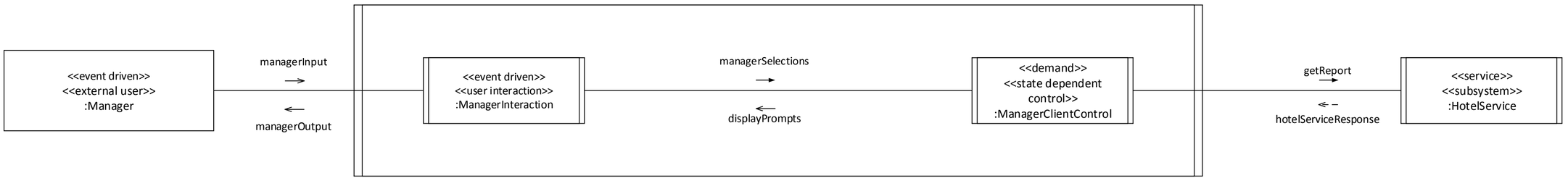
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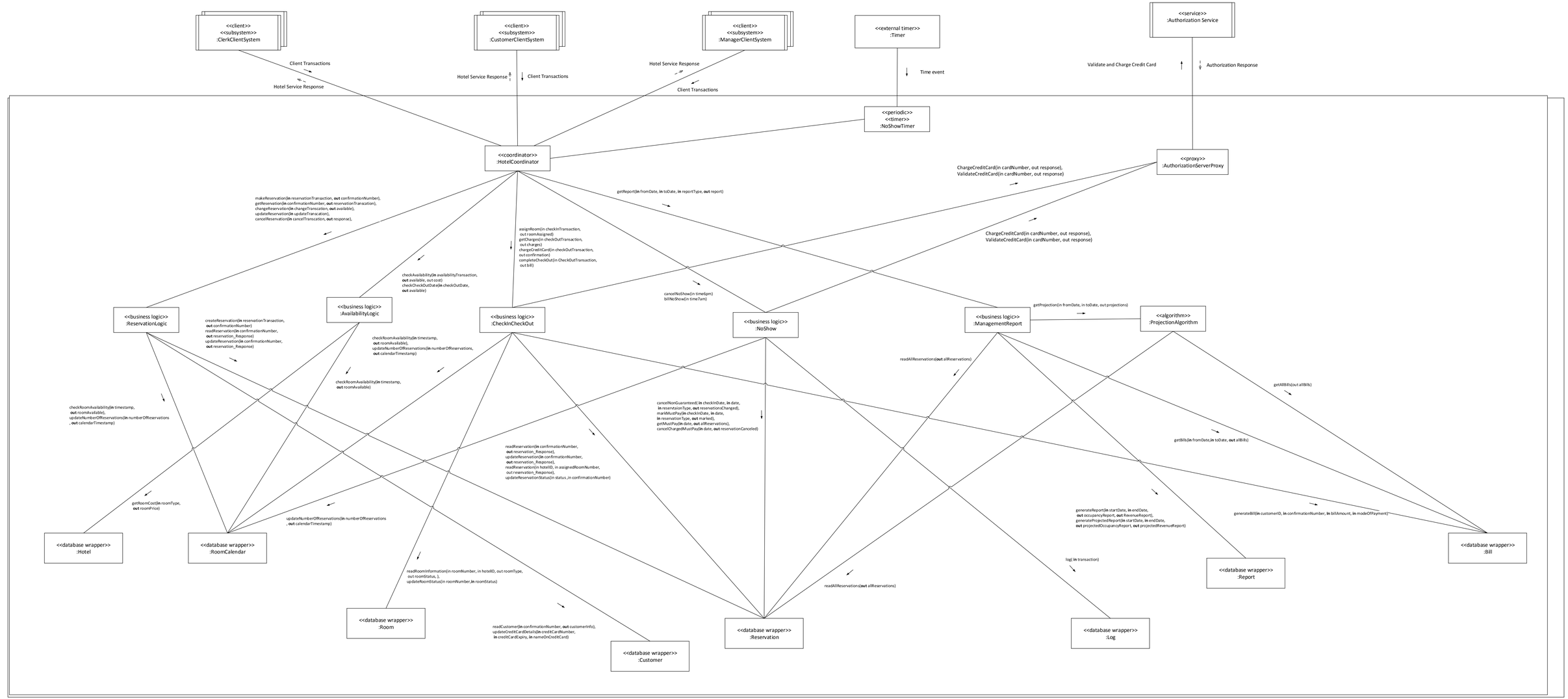
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Client Transactions
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Hotel Service Response
Client Transactions
Hotel Service Response
Client Transactions
Time event
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ChargeCreditCard(in cardNumber, out response),
ValidateCreditCard(in cardNumber, out response)
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getReservation(in confirmationNumber, out reservationTransaction),
changeReservation(in changeTransaction, out available),
updateReservation(in updateTransaction),
cancelReservation(in cancelTransaction, out response),
getReport(in fromDate, in toDate, in reportType, out report)
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out roomAssigned)
getCharges(in checkOutTransaction,
out charges)
chargeCreditCard(in checkOutTransaction,
out confirmation)
completeCheckOut(in CheckOutTransaction,
out bill)
checkAvailability(in availabilityTransaction,
out available, out cost)
checkCheckOutDate(in checkOutDate,
out available)
cancelNoShow(in time6pm)
billNoShow(in time7am)
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:AvailabilityLogic
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out reservation_Response)
updateReservation(in confirmationNumber,
out reservation_Response)
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updateNumberOfReservations(in numberOfReservations,
out calendarTimestamp)
checkRoomAvailability(in timestamp,
out roomAvailable)
readAllReservations(out allReservations)
getAllBills(out allBills)
checkRoomAvailability(in timestamp,
out roomAvailable),
updateNumberOfReservations(in numberOfReservations
, out calendarTimestamp)
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markMustPay(in checkInDate, in date,
in reservationType, out marked),
getMustPay(in date, out allReservations),
cancelChargedMustPay(in date, out reservationCanceled)
getBills(in fromDate,in toDate, out allBills)
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out reservation_Response),
updateReservation(in confirmationNumber,
out reservation_Response),
readReservation(in hotelID, in assignedRoomNumber,
out reservation_Response),
updateReservationStatus(in status ,in confirmationNumber)
getRoomCost(in roomType,
out roomPrice)
updateNumberOfReservations(in numberOfReservations
, out calendarTimestamp)
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generateProjectedReport(in startDate, in endDate,
out projectedOccupancyReport, out projectedRevenueReport)
generateBill(in customerID, in confirmationNumber, in billAmount, in modeOfPayment)
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<<database wrapper>>
:RoomCalendar
<<database wrapper>>
:Bill
log(in transaction)
<<database wrapper>>
:Report
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out roomStatus,),
updateRoomStatus(in roomNumber,in roomStatus)
readAllReservations(out allReservations)
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updateCreditCardDetails(in creditCardNumber,
in creditCardExpiry, in nameOnCreditCard)
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:Reservation
<<database wrapper>>
:Log
<<database wrapper>>
:Customer

<<database wrapper>>
Hotel

+create(**in** hotelChainName, **in** hotelName, **in** street,**in** city,**in** state,**in** zipcode)
+updateTotalRooms (**in** totalRooms)
+updateSingleRooms(**in** singleRooms)
+updateDoubleRooms(**in** doubleRooms)
+updateSingleRoomPrice(**in** singleRoomPrice)
+updateDoubleRoomPrice(**in** doubleRoomPrice)
+updateGroupBookingPercentage(**in** groupBookingPercentage)
+delete(**in** hotelId)
+getRoomCost(**in** roomType, **out** roomPrice)

<<database wrapper>>
Room

+createRoom(**in** roomNumber,**in** hotelID,**in** roomType)
+updateRoomStatus(**in** roomNumber,**in** roomStatus)
+readRoomInformation(**out** roomType,**out** roomStatus,**in** roomNumber,**in** hotelID)
+delete(**in** roomNumber, **in** hotelID)

<<database wrapper>>
Customer

+createCustomer(**in** firstName,**in** lastname,**in** contactNumber,**in** email)
+updateConfirmationNumber(**in** confirmationNumber)
+updateCreditCardDetails(**in** creditCardNumber,**in** creditCardExpiry,**in** nameOnCreditCard)
+readCustomer(**in** confirmationNumber,**out** customerInfo)
+delete(customerID)
+readCreditCard(in customerID, out CreditCardNumber, out creditCardExpiry, out NameOnCreditCard)

<<database wrapper>>
Room Calendar

+createCalendar(**in** hotelID, **in** totalRooms)
+updateNumberofReservations(**in** numberOfReservations, **in** calendarTimeStamp)
+updateNumberOfRoomsOccupied(**in** numberOfRoomsOccupied)
+updateNumberOfRoomsUnderMaintanence(**in** numberofRoomsUnderMaintenance)
+readRoomsAvailable(**out** numberOfRoomsAvailable)
+checkRoomAvailability(**in** timestamp,**out** roomAvailable)

<<database wrapper>>
Reservation

allReservations : Reservations

+createReservation(**in** reservationTransaction,**out** confirmationNumber)
+updateAssignedRoomNumber(**in** assignedRoomNumber)
+updateCheckInDate(**in** checkInDate)
+updateCheckOutDate(**in** checkOutDate)
+updateReservationStatus(**in** status,**in** confirmationNumber)
+readReservation(**in** confirmationNumber,**out** reservation_Response)
+updateReservation(**in** confirmationNumber, **out** reservation_Response)
+readReservation(**in** hotelID,**in** assignedRoomNumber, **out** reservation_response)
+cancelNonGuaranteed(**in** checkInDate,**in** date,**in** reservationType,**out** reservationsChanged)
+markMustPay(**in** checkIndate,**in** date,**in** reservationType,**out** marked)
+getMustPay(**in** date,**out** allReservations)
+cancelChargedMustPay(**in** date,**out** reservationCancelled)
+readReservations(**in** fromDate,**in** toDate,**out** allReservations)
+readAllReservations(**out** allReservations)

<< database wrapper>>
Log

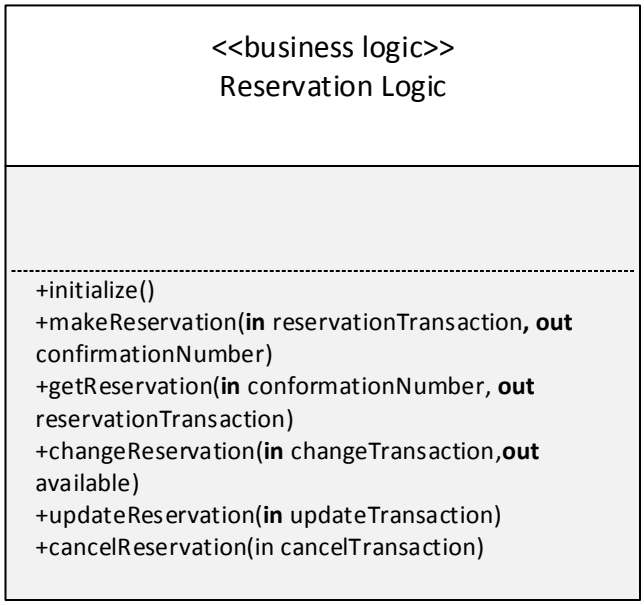
+ read(**out** transaction)
+ log(**in** transaction)

<<database wrapper>>
Report

+ generateReport(**in** startDate, **in** endDate, **out** occupancyReport, **out** RevenueReport)
+ generateProjectedReport(**in** startDate, **in** endDate, **out** projectedOccupancyReport, **out** projectedRevenueReport)

<<database wrapper>>
Bill

+ generateBill(**in** customerID, **in** confirmationNumber,**in** billAmount, **in** modeOfPayment)
+ updateBillAmount(**in** billAmount)
+ updateModeOfPayment(**in** modeOfPayment)
+ getBill(**in** customerID, **in** confirmationNumber, **out** billAmount, **out** modeOfPayment)
+ getBills(**in** fromDate,**in** toDate, **ou**t allBills)
+ getAllBills(**out** allBills)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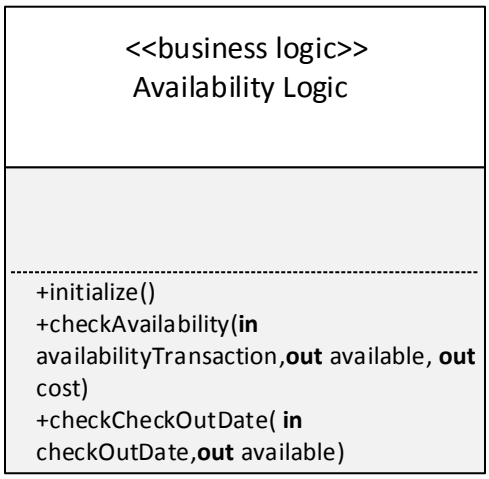
Reservation Logic
+initialize()
+makeReservation(in reservationTransaction, out confirmationNumber)
+getReservation(in conformationNumber, out reservationTransaction)
+changeReservation(in changeTransaction,out available)
+updateReservation(in updateTransaction)
+cancelReservation(in cancelTransaction)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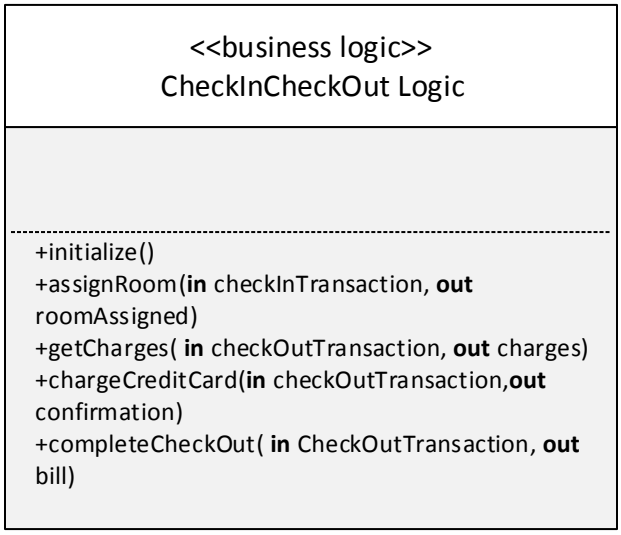
+initialize()
+checkAvailability(in availabilityTransaction,out available, out cost)
+checkCheckOutDate(in checkOutDate,out available)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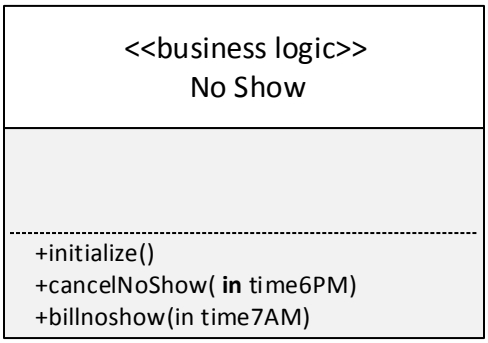
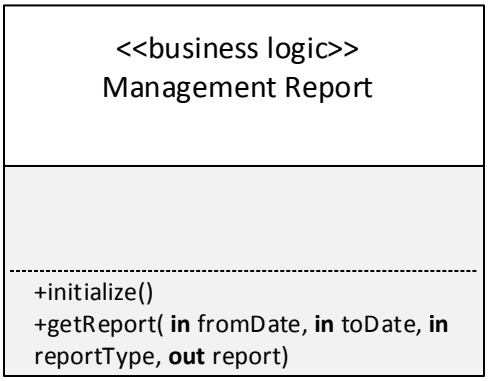
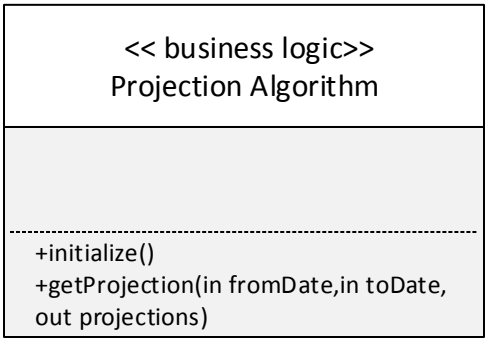
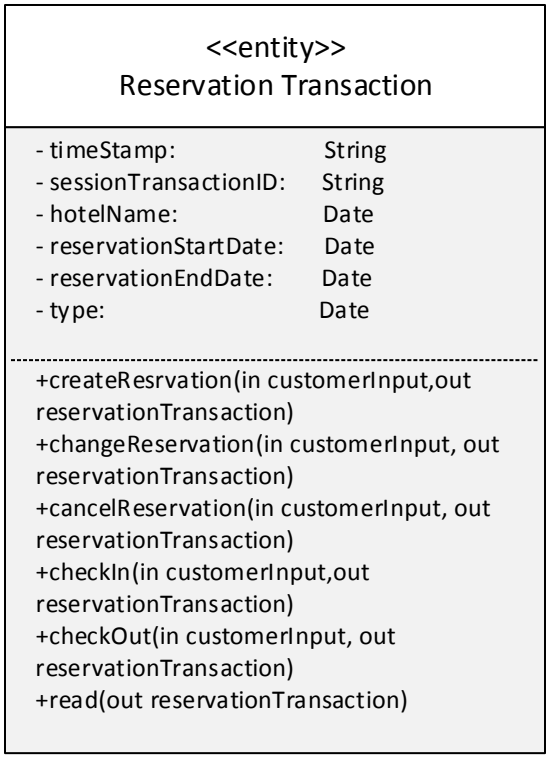
CheckInCheckOut Logic
+initialize()
+assignRoom(in checkInTransaction, out roomAssigned)
+getCharges(in checkOutTransaction, out charges)
+chargeCreditCard(in checkOutTransaction,out confirmation)
+completeCheckOut(in CheckOutTransaction, out bill)


<<business logic>>
No Show
+initialize()
+cancelNoShow(in time6PM)
+billnoshow(in time7AM)


<<business logic>>
Management Report
+initialize()
+getReport(in fromDate, in toDate, in reportType, out report)


<< business logic>>
Projection Algorithm
+initialize()
+getProjection(in fromDate,in toDate, out projections)


<<entity>>
Reservation Transaction
- timeStamp: String
- sessionTransactionID: String
- hotelName: Date
- reservationStartDate: Date
- reservationEndDate: Date
- type: Date
+createResrvation(in customerInput,out reservationTransaction)
+changeReservation(in customerInput, out reservationTransaction)
+cancelReservation(in customerInput, out reservationTransaction)
+checkIn(in customerInput,out reservationTransaction)
+checkOut(in customerInput, out reservationTransaction)
+read(out reservationTransaction)

Database Wrapper Class Interface Specifications

1.

Information Hiding Class : Hotel
Information Hidden : Encapsulates hotel attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :
1. create(**in** hotelChainName:String, **in** hotelName:String, **in** street:String,**in** city:String,**in** state:String,**in** zipcode:int)

Function: Creates a new hotel object with the given attributes.
Precondition: None
Postcondition: A new hotel entity is created with the specified values.
Input Parameters: hotelChainName- the name you want to give, hotelName - the name of the hotel under which you want to add this new chain, street- street name, city- name of the city where your hotel is located,state- state name, zipcode- zip of the location.
Operations Used:None.

2.updateTotalRooms (**in** totalRooms:int)

Function: Updates the number of rooms available.
Precondition: None
Postcondition: The total number of rooms available in the hotel are changed after this method is executed.
Input Parameters: totalRooms- this number is taken and those many rooms are available..
Operations Used:None.

3. updateSingleRooms(**in** singleRooms:int)

Function: Updates the number of single rooms available.
Precondition: None
Postcondition: The total number of single rooms available in the hotel are changed after this method is executed.
Input Parameters: singleRooms- this number is taken and those many singlerooms are made available..
Operations Used:None.

4. updateDoubleRooms(**in** doubleRooms:int)

Function: Updates the number of double rooms available.
Precondition: None
Postcondition: The total number of double rooms available in the hotel are changed after this method is executed.
Input Parameters: doubleRooms- this number is taken and those many double rooms are made available..
Operations Used:None.

5. updateSingleRoomPrice(**in** singleRoomPrice:double)

Function: Updates the price of single room.
Precondition: None
Postcondition: A new price is set for each single room.
Input Parameters: singleRoomPrice- this number is taken and this amount is charged for each single room.
Operations Used:None.

6. updateDoubleRoomPrice(**in** doubleRoomPrice:double)

Function: Updates the price of double room.
Precondition: None
Postcondition: A new price is set for each double room.
Input Parameters: doubleRoomPrice- this number is taken and this amount is charged for each double room.
Operations Used:None.

7. updateGroupBookingPercentage(**in** groupBookingPercentage:double)

Function: Updates the percentage of discount applied when group booking is done.
Precondition: None
Postcondition: A new percentage is set for group booking.
Input Parameters: groupBookingPercentage- this new percentage value is taken into consideration.
Operations Used:None.

8. delete(**in** hotelId)

Function: Deletes the hotel entity with the given hotelID from the system.
Precondition: There should be a hotel existing with that hotelID in the system
Postcondition: The hotel with give hotelID gets deleted from the system.
Input Parameters: hotelID- this value is taken and the matching hotel is deleted from the system.
Operations Used:None.

9. getRoomCost(**in** roomType, **out** roomPrice:double)

Function: Takes the room type as input and returns its price as output.
Precondition: The given room type should exist in the system.
Postcondition: The price of the input room type is displayed on the standard O/P.
Input Parameters: roomType- this value is taken to display its cost.
Output Parameters: roomPrice- the cost of each room.
Operations Used:None

2.

Information Hiding Class : Room
Information Hidden : Encapsulates room attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.

Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. createRoom(in roomNumber:int,in hotelID:String,in roomType:String)

Function: Takes the roomNumber,hotelID and roomType and creates a room entity with given specifications
Precondition: None.
Postcondition: A new room type is created.
Input Parameters: roomNumber- a new unique room number is given to the room, hotelID- the Unique ID of the hotel where this new room has to be created is given, roomType- this value is taken to display its cost.
Operations Used:None

2. updateRoomStatus(in roomNumber:int,in roomStatus:String)

Function: This method updates the room status, ex. occupied, under maintenance etc.
Precondition: The specified room number should exist.
Postcondition: The status of the room gets changed after the successful execution of the method .
Input Parameters: roomStatus- this value is assigned and displayed as the status of the room,roomNumber- The room number whose status should be changed.
Operations Used:None

3. readRoomInformation(out roomType:String,out roomStatus:String,in roomNumber:int,in hotelID:String)

Function: This method displays roomNumber and hotelID by taking in roomType and roomStatus as inputs.
Precondition: The specified room number should exist.
Postcondition: The roomNumber and HotelID are displayed .
Invariant: Values of the room remain unchanged.

Output Parameters: roomType- this is the type of room, roomStatus- status of the room.
Input Parameters: roomNumber,hotelID
Operations Used:None

4. delete(in roomNumber:int, in hotelID:String)

Function: This method deletes the room with specified number in the mentioned hotel.
Precondition: The specified room number should exist.
Postcondition: The roomNumber gets erased from the system .
Input Parameters: roomNumber- this is the number of the room, hotelID- the unique value given to each room.
Operations Used:None

3.

Information Hiding Class : Customer
Information Hidden : Encapsulates customer attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. createCustomer(in firstName:String,in lastname:String,in contactNumber:int,in email:String)

Function: This method creates a new customer entity with the given attributes.
Precondition: None.
Postcondition: A new customer object is created .

Input Parameters: firstName- the first name of the customer, lastName- last name of the customer, contactNumber- phone number of the customer should be entered, email- email address of the customer.
Operations Used:None

2. updateConfirmationNumber(in confirmationNumber:int)

Function: takes in a conformationNumber and generates a new conformation Number.
Precondition: None.
Postcondition: The conformationNumber is updated.
Input Parameters: conformationNumber- the existing conformation number given at the time of booking.
Operations Used:None

3. updateCreditCardDetails(in creditCardNumber:int,in creditCardExpiry:date,in nameOnCreditCard:String)

Function: Updates the credit card details with the provided ones.
Precondition: None.
Postcondition: New credit card details are stored in the system.
Input Parameters: creditCardNumber- number present on the top of the credit card,creditCardExpiry- the credit card expiry date, nameOnCeditCard- card holders name.
Operations Used:None

4. readCustomer(in confirmationNumber:int,out customerInfo:Customer)

Function: Displays the customer info on receiving the confirmation number.
Precondition: The specified conformation number should exist.
Postcondition: The customer details are displayed .
Input Parameters: conformationNumber- the number given to the customer at the time of booking.
Output Parameters: customerInfo- the customer details such as name, credit card details etc.
Operations Used:None

5. delete(customerID)

Function: Deletes the customer entity with the given customerID
Precondition: The specified customer should exist.
Postcondition: The specified customer entity is deleted.
Input Parameters: customerID- the unique ID associated with the customer.
Operations Used:None

6. readCreditCard(in customerID, out CreditCardNumber, out creditCardExpiry, out NameOnCreditCard)

Function: Displays credit card information of the customer upon receiving the customerID.
Precondition: The specified customer should exist.
Postcondition: The specified customers card details are displayed .
Input Parameters: customerID- the unique ID associated with the customer.
Output Parameters:credit card number,credit card expiry, name on credit card.
Operations Used:None

14.

Information Hiding Class : Room Calendar
Information Hidden : Encapsulates room calendar attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. createCalendar(in hotelID:String, in totalRooms:int)

Function: Creates the calendar entity with the given hotelID and totalRooms.
Precondition: The specified hotelID should exist.

Postcondition: The specified customer entity is deleted.
Input Parameters: customerID- the unique ID associated with the customer.
Operations Used:None

2. updateNumberofReservations(in numberOfReservations:int, in calendarTimeStamp:date)

Function: Updates the number of reservations made .
Precondition: None.
Postcondition: The number of reservations made are updated in the system.
Input Parameters: numberOfReservations- a number representing the reservations made, calendarTimeStamp- the time and date at that point of time.
Operations Used:None

3. updateNumberOfRoomsOccupied(in numberOfRoomsOccupied:int)
Function: Updates the number of rooms occupied .
Precondition: None.
Postcondition: The number of available rooms is updated.
Input Parameters: numberOfRoomsOccupied- a number representing the no.of occupied rooms.
Operations Used:None

4. updateNumberOfRoomsUnderMaintanence(in numberofRoomsUnderMaintenance:int)

Function: Updates the number of rooms under maintenance .
Precondition: None.
Postcondition: The number of rooms under maintenance is updated.
Input Parameters: numberOfRoomsUnderMaintenance- a number representing the no.of rooms under maintenance.
Operations Used:None

5. readRoomsAvailable(out numberOfRoomsAvailable:int)

Function: Displays the no. of rooms available on the standard I/O.
Precondition: None.
Postcondition: The number of rooms under maintenance is updated.

Input Parameters: None.
Output Parameters: numberOfRoomsAvailable-Displays the number of rooms available.
Operations Used:None

6. checkRoomAvailability(in timestamp:date,out roomAvailable:boolean)

Function: Displays the room availability.
Precondition: None.
Postcondition: The availability of a particular room is displayed.
Input Parameters: timeStamp- current timeStamp.
Output Parameters: roomAvailable-Displays whether the room is available or not.
Operations Used:None

5.

Information Hiding Class : Reservation
Information Hidden : Encapsulates reservation attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. createReservation(in reservationTransaction,out confirmationNumber:int)

Function: Creates a new reservation transaction.
Precondition: None.
Postcondition: A new reservation entity is created.
Input Parameters: reservationTransaction- Reservations details.
Output Parameters: confirmationNumber-A unique identification number that associates a particular reservation with a customer.

Operations Used:None

2. updateAssignedRoomNumber(in assignedRoomNumber)

Function: Alters already assigned room number.
Precondition: None.
Postcondition: A new roomNumber is generated.
Input Parameters: assignedRoomNumber- The number with which the room is identified.
Operations Used:None

3. updateCheckInDate(in checkInDate)

Function: Updates check in date.
Precondition: None.
Postcondition: A new check in date is generated.
Input Parameters: checkInDate- The date when customer lodges the room.
Operations Used:None

4. updateCheckOutDate(in checkOutDate)

Function: Updates check out date.
Precondition: None.
Postcondition: A new check out date is generated.
Input Parameters: checkOutDate- The date when customer leaves the room.
Operations Used:None

5. updateReservationStatus(in status,in confirmationNumber)

Function: Updates reservation status.
Precondition:A reservation must have been already made.
Postcondition: Reservation details are updated.
Input Parameters: status- The current state of the reservation,conformationNumber- a unique number which can pull the reservation details pertaining to a reservation transaction.
Operations Used:None

6. readReservation(**in** confirmationNumber,**out** reservation_Response)

Function: Displays reservation details upon receiving conformationNumber.
Precondition:A reservation must be existing with the given conformationNumber.
Postcondition: Reservation details are displayed .
Input Parameters: conformationNumber- unique number which pulls the reservation details.
Output Parameters: reservation_Response- reservation details displayed.
Operations Used:None

7. cancelNonGuaranteed(**in** checkInDate:date,**in** date:date,**in** reservationType:String,**out** reservationsChanged:String)

Function: Automatically cancels the reservations which are not guaranteed, after specified time .
Precondition:A non-guaranteed reservation must have already been made.
Postcondition: The changed reservation is diplayed, the cancelled room is made available for re-reservation .
Input Parameters: checkInDate- the date specified by the customer when he is going to come,date- present day's date,reservationType- Category of reservation.
Output Parameters: reservationChanged- modified reservation.
Operations Used:None

8. markMustPay(in checkIndate,in date,in reservationType,out marked)

Function: Identifies all the reservations that are to be charged that particular day.
Precondition: None.
Postcondition: Reservations are identified, based on their check-in date .
Input Parameters: checkInDate- the date chosen by the customer to checkin, date- present day's date,reservationType- specifies the category of reservation.
Output Parameters: marked- all the reservations that have to be charged.
Operations Used:None

9. getMustPay(in date,out allReservations)

Function: Pulls all reservations that have to make a payment on that particular calendar day .

Precondition: None.
Postcondition: All the have to pay reservations are identified.
Input Parameters: date- present day's date.
Output Parameters: allRservations- all the reservations that have to be charged.
Operations Used:None

10. cancelChargedMustPay(in date,out reservationCancelled)

Function: Cleans up the system by deleting all the marked and charged reservations .
Precondition: None.
Postcondition: Only those reservations exist which have pending payments.
Input Parameters: date- present day's date.
Output Parameters: reservationCancelled- all the reservations cancelled.
Operations Used:None
11. readReservations(in fromDate,in toDate,out allReservations)

Function: Retrieves the reservations made between the specified dates .
Precondition: None.
Postcondition: All the reservations made the mentioned period are displayed.
Input Parameters: fromDate-desired day's date, toDate- end date of the period,
Output Parameters: allReservations- all the reservations made in the mentioned period.
Operations Used:None

12. readAllReservations(out allReservations)

Function: Retrieves the reservations made between the specified dates .
Precondition: None.
Postcondition: All the reservations made the mentioned period are displayed.
Output Parameters: allReservations- all the reservations made in the mentioned period.
Operations Used:None

6.

Information Hiding Class : Log

Information Hidden : Encapsulates Log attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. read(out transaction)

Function: Reads the transactions from log and displays all of them.
Precondition: None.
Postcondition: All the reservations made the mentioned period are displayed.
Output Parameters: allReservations- all the reservations made in the mentioned period.
Operations Used:None

2. log(in transaction)

Function: Stores the given transaction in the log .
Precondition: None.
Postcondition: The log is saved on the database for future reference.
Input Parameters: transaction- details pertaining to a reservation.
Operations Used:None

7.

Information Hiding Class : Report
Information Hidden : Encapsulates Report attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.

Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. generateReport(in startDate, in endDate, out occupancyReport, out RevenueReport)

Function: Generates a report on the number of rooms occupied and revenue generated from the occupation, within the specified period .
Precondition: None.
Postcondition: A report is generated.
Input Parameters: startDate- the beginning date from which the system should look for occupancy, endDate- the date until which the system should generate the report.
Output Parameters: occupancyReport- document displaying the occupancy rate of the hotel, revenueReport- document displaying the revenue generated from the occupied rooms.
Operations Used:None

2. generateProjectedReport(in startDate, in endDate, out projectedOccupancyReport, out projectedRevenueReport)

Function: Generates reports based on the execution of projection algorithm.
Precondition: None.
Postcondition: The generated report indicates the expected occupancy and expected revenue from that.
Input Parameters: startDate- the beginning date from which the system should look for occupancy, endDate- the date until which the system should generate the report.
Output Parameters: projectedOccupancyReport- document displaying the projected occupancy rate of the hotel, projectedRevenueReport- document displaying the projected revenue generated from the occupied rooms.
Operations Used:None

8.

Information Hiding Class : Bill
Information Hidden : Encapsulates Bill attributes and hides details of how to interface to database management system.
Class Structuring Criterion :Database Wrapper Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. generateBill(in customerID, in confirmationNumber,in billAmount, in modeOfPayment)

Function: Creates a bill by taking in customerID, confirmationNumber, billAmount and mode of payment.
Precondition: None.
Postcondition: A bill is generated from the inputs.
Input Parameters: customerID- The unique number with which a customer is identified, conformationNumber- the unique number with which each reservation is identified,billAmount- the amount for which the customer should be charged for,modeOfPayment- type of payment option the customer has chosen.
Output Parameters:None.
Operations Used:None

2. getBill(in customerID, in confirmationNumber, out billAmount, out modeOfPayment)

Function: Pulls out the bill when we provide customerID, confirmationNumber.
Precondition: None.
Postcondition: The bill is diplayed.
Input Parameters: customerID- The unique number with which a customer is identified, conformationNumber- the unique number with which each reservation is identified.

Output Parameters:billAmount- the amount for which the customer has been charged,modeOfPayment- kind of payment option the customer has chosen.
Operations Used:None

3. getBills(in fromDate,in toDate, out allBills)

Function: Pulls out all the bills generated between the from date and the to date.
Precondition: None.
Postcondition: The bills are displayed.
Input Parameters: fromDate- The date from which the system should start looking for bills,toDate-the date until when the system should look for bills.
Output Parameters:allBills- The bills that have been generated in the mentioned period.
Operations Used:None
4. getAllBills(out allBills)

Function: Pulls all the bills from the inception of the system.
Precondition: None.
Postcondition: The bills are displayed.
Input Parameters: None.
Output Parameters:allBills- The bills that have been generated from the beginning .
Operations Used:None

Business Logic Class Interface Specifications

1.

Information Hiding Class : Reservation Logic
Information Hidden :Encapsulates reservation specific business rules.
Class Structuring Criterion :Business Logic Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. makeReservation(in reservationTransaction:reservationTransaction, out confirmationNumber:int)

Function: Makes a reservation for the customer by using the details from client side reservation Transaction, and generates a confirmation number.
Precondition: None.
Postcondition: Confirmation Number generated.
Input Parameters: reservationTransaction- client side details entered by customer/clerk.
Output Parameters:confirmationNumber- a unique number which can identify the reservation number.
Operations Used:None

2. getReservation(in conformationNumber:int, out reservationTransaction:reservationTransaction)

Function: Upon receiving the conformation number , returns the reservation transaction.
Precondition: The specified conformation number should exist.
Postcondition: reservation transaction displayed .
Input Parameters: confirmationNumber- a unique number which can identify the reservation number.

Output Parameters: reservationTransaction- client side details entered by customer/clerk.
Operations Used:None

3. changeReservation(in changeTransaction:reservationTransaction,out available:String)

Function: Makes changes to the reservation and specifies whether the altered room specifications are available.
Precondition: None.
Postcondition: reservation transaction altered and displayed .
Input Parameters: changeTransaction- new transaction information entered at client side.
Output Parameters: available- shows whether the new changes are allowed or not.
Operations Used:None

4. updateReservation(in updateTransaction:reservationTransaction)

Function: Updates the reservation details with the new input.
Precondition: None.
Postcondition: Reservation Details Updated .
Input Parameters: updateTransaction- altered transaction details.
Output Parameters: None.
Operations Used:None

5. cancelReservation(in cancelTransaction:reservationTransaction)

Function: Cancels the reservation details for the given transaction received from client side.
Precondition: The transaction to be cancelled should exist.
Postcondition: Reservation Details Cancelled .
Input Parameters: cancelTransaction- transaction details of the reservation to be cancelled.
Output Parameters: None.

2.

Information Hiding Class : Availability Logic
Information Hidden :Encapsulates occupancy and availability specific business rules.
Class Structuring Criterion :Business Logic Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. checkAvailability(in availabilityTransaction:reservationTransaction,out available:boolean, out cost:float)

Function: Confirms the availability of a particular selection transaction received from the client side.
Precondition: None.
Postcondition: Sends back available and cost if the operation is successful .
Input Parameters: availabilityTransaction- transaction details of the reservation to be checked at the server side.
Output Parameters: available- message showing whether that particular selection is available or not, cost-price for that selection.

2. checkCheckOutDate(in checkOutDate:date,out available:boolean)

Function: Confirms the availability of a particular check out date.
Precondition: None.
Postcondition: Sends back available if the room is available for those many days .
Input Parameters: checOutDate- the date on which the customer wants to vacate the room.
Output Parameters: available- message showing whether that particular selection is available or not.

3.

Information Hiding Class : CheckInCheckOut Logic
Information Hidden :Encapsulates checkIn and checkOut specific business rules.
Class Structuring Criterion :Business Logic Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. assignRoom(in checkInTransaction:reservationTransaction, out roomAssigned:boolean)

Function: Assigns room to a customer with the given transaction details .
Precondition: None.
Postcondition: Room Assigned and that room made unavailable until he checks out .
Input Parameters: checkInTransaction- transaction details of the reservation coming from the client.
Output Parameters: roomAssigned- message showing that the room has been assigned.

2. getCharges(in checkOutTransaction:reservationTransaction, out charges:float)
Function: Calculates the amount to be charged based on the check out date .
Precondition: None.
Postcondition: The charges are computed and forwarded to the client side.
Input Parameters: checkOutTransaction- checkOut transaction details of the reservation coming from the client.
Output Parameters: charges- message showing the amount to be paid by the customer.

3. chargeCreditCard(in checkOutTransaction:reservationTransaction,out confirmation:int)

Function: Charges the customer from his credit card, based on the amount which he needs to pay calculated from his check out date.
Precondition: None.
Postcondition: After successful execution amount comes into hotels account from customers credit card.
Input Parameters: checkOutTransaction- checkOut transaction details of the reservation coming from the client.
Output Parameters: conformation- message showing that the payment transaction has been successful .

4. completeCheckOut(in CheckOutTransaction:reservationTransaction, out bill:bill)

Function: Completes the transaction by generating a bill by taking checkOutTransaction into account.
Precondition: None.
Postcondition: Generates a bill.
Input Parameters: checkOutTransaction- checkOut transaction details of the reservation coming from the client.
Output Parameters: bill- a PDF format document containing summary of the entire customers stay .

4.

Information Hiding Class : NoShow Logic
Information Hidden :Contains NoShow specific business rules.
Class Structuring Criterion :Business Logic Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. cancelNoShow(in time6PM)

Function: Automatically cancels reservations that are not guaranteed and the customer does not show up.
Precondition: None.
Postcondition: Removes the hold put on that room and makes is available again.
Input Parameters: time6PM- timer input coming from external timer.
Output Parameters: None .

2. billnoshow(in time7AM:timestamp)

Function: Automatically bills all the guaranteed reservations when the time is 7AM and the customer has not turned up.
Precondition: None.
Postcondition: The billing process initiated.
Input Parameters: time7AM- timer input coming from external timer.
Output Parameters: None .

5.

Information Hiding Class : Management Report Logic
Information Hidden :Encapsulates manager reporting specific business rules.
Class Structuring Criterion :Business Logic Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. getReport(in fromDate:date, in toDate:date, in reportType:String, out report:report)

Function: Generates report depending on the inputs received from the user.
Precondition: None.
Postcondition: A report is generated in the specified report format and in between the mentioned period.

Input Parameters: fromDate- the date from which the system should start looking for transaction to generate reports, toDate- the date until which the system should look for, reportType- mentiones the kind of report the manager is looking for ex. revenue, room occupancy .
Output Parameters: report- the document displaying the information the user is looking for .

6.

Information Hiding Class : Projection Algorithm Logic
Information Hidden :Encapsulates Algorithmic business rules which can predict the future occupancy and revenue.
Class Structuring Criterion :Business Logic Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Attributes : None.
Inherited Operations : None.
Attributes : None.
Operations Provided :

1. getProjection(in fromDate:date,in toDate:date, out projections:report)

Function: Generates report depending on the calculations of the algorithm .
Precondition: None.
Postcondition: A report is generated in the specified report format and in between the mentioned period.
Input Parameters: fromDate- the date from which the system should compute the algorithm to generate reports, toDate- the date until which the system should compute the algorithm for generating reports, reportType- mentions the kind of report the manager is looking for ex. revenue, room occupancy .
Output Parameters: report- the document displaying the information the user is looking for .

Data Abstraction Class Interface Specifications

1.

Information Hiding Class : ReservationTransaction
Information Hidden : Encapsulates reservation attributes and their current values.
Class Structuring Criterion : Data Abstraction Class
Assumptions : None.
Anticipated Changes : None.
Superclass : None.
Inherited Operations : None.
Attributes : timeStamp:Date , sessionTransactionID:String, hotelName:String, reservationStartDate:date,reservationEndDate:date,type:String
Operations :

1. createReservation(in customerInput, out reservationTranscation)

Function: Creates a new reservation transaction.
Precondition: None.
Postcondition: A new reservation entity is created.
Input Parameters: customerInput- Details entered by customer from keyboard.
Output Parameters: reservationTransaction- New reservation entity created.
Operations Used:None

2. changeReservation(in customerInput,out reservationTranscation)

Function: Changes the reservation transaction, by using the new customer input.
Precondition: None.
Postcondition: A new reservation entity is created.
Input Parameters: customerInput- Details entered by customer from keyboard.
Output Parameters: reservationTransaction- New reservation entity created.
Operations Used:None

3. cancelReservation(in customerInput,out reservationTranscation)

Function: Cancels the reservation transaction.
Precondition: None.
Postcondition: Reservation is canceled and the entity is deleted.

Input Parameters: customerInput- Details entered by customer from keyboard.
Output Parameters: reservationTransaction- New reservation entity created.
Operations Used:None

4. checkIn(in customerInput,out reservationTranscation)

Function: Checks in a customer into the hotel.
Precondition: None.
Postcondition: The room has been checked in and the reservation transaction is updated.
Input Parameters: customerInput- Details entered by customer from keyboard.
Output Parameters: reservationTransaction- New reservation entity created.
Operations Used:None

5. checkOut(in customerInput,out reservationTranscation)

Function: Checks out a customer out of the hotel.
Precondition: None.
Postcondition: The room has been checked out and the reservation transaction is updated.
Input Parameters: customerInput- Details entered by customer from keyboard.
Output Parameters: reservationTransaction- New reservation entity created.
Operations Used:None

6. read(out reservationTransaction)

Function: Reads the reservation entity that is currently residing on the client machine.
Precondition: None.
Postcondition: The reservationTransactiond details are displayed.
Input Parameters: None.
Output Parameters: reservationTransaction- Reservation Entity displayed.
Operations Used:None

TIS_TBS- Customer Interaction

Name: CustomerInteraction
Information hidden: Details for processing input from customer and output processed information to the customer using standard I/O.
Structuring criteria: role criterion: user interaction; concurrency criterion: event driven
Assumptions: only one Customer Interaction is handled at one time.
Anticipated Changes: Possible additional selections and output will need to be provided.
Task interface:

Task inputs:
Event input: Customer selection interrupts to indicate that a selection has been made.
External input: CustomerInput through the standard input device such as keyboard (Customer info, room info).
Asynchronous message communication:

- Display prompts

Task outputs:
External output: CustomerOutput
Asynchronous message communication:

- DisplayPrompt

Passive objects accessed: ReservationTransaction
Errors detected: Invalid date interval

loop
-- Wait for external interrupt from customer client
wait (selectionEvent);
read reservation information and customer choice;
if customerChoice = make reservation
then --
-- Write Reservation data into the ReservationTransaction object;
ReservationTransaction.createReservation(customerInput)
elseif customerChoice = change reservation
then
-- Write Reservation data into the ReservationTransaction object;
ReservationTransaction.changeReservation(customerInput)
elseif customerChoice = cancel reservation
then
-- Write Reservation data into the ReservationTransaction object;
ReservationTransaction.cancelReservation(customerInput)

-- Send transaction object created message to CustomerClientControl

```
send(CustomerClientControlMessageQ, reservationTransaction, customerChoice)
--wait for message from CustomerClientControl
receive(CustomerInteractionMessageBuffer, displayPrompt)
--send message to Clerk
send(customerOutput)
end loop;
```

TIS_TBS - Customer Client Control

Name: CustomerClientControl
Information hidden: Details of how CustomerClientControl handles events.
Structuring criteria: role criterion: control; concurrency criterion: demand driven
Assumptions:
Anticipated Changes: Possible addition of further Customer selections (Options).
Task interface:

Task inputs:
Asynchronous message communication:

- Customer events

Task outputs:
External output: Client Transactions

Synchronous message communication:
Message:

- ValidateCreditCard

Input parameters: cardNumber
Reply: response

Asynchronous message communication:

- Display Prompts

Errors detected: Invalid cardNumber, invalid events

loop
-- Messages from all senders are received on Message Queue
receive(CustomerClientControlMessageQ, reservationTransaction, customerChoice)
-- Extract the event name and any message parameters
-- Given the incoming event, lookup state transition table;
-- change state if required; return action to be performed;
newEvent = message.event
outstandingEvent = true;
while outstandingEvent **do**
CustomerClientStateMachine.processEvent (**in** newEvent, **out** action);
outstandingEvent = false;
-- Execute action(s) as given on CustomerClientControl statechart

case action **of**

Create Reservation: --create a reservation request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Change Reservation: --change a reservation request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Cancel Reservation: --cancel a reservation request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Display Prompt: --display information or updates to the Clerk
send(clerkInteractionMessageBuffer, displayPrompt);
outstandingEvent = true;

send(validateCreditCard, in cardNumber, out response);
newEvent = response; outstandingEvent = true;

end case;
end while;
end loop;

TIS_TBS - Customer Client System

Name: CustomerClient
Information hidden: Details of how CustomerClient processes customer selections and hotel service responses
Structuring criteria: role criterion: client; concurrency criterion: demand driven
Assumptions: only one request is made at one time.
Anticipated Changes: Possible addition of further requests.
Task interface:
Task inputs:
Synchronous message communication with reply:
Message replies as described below
Task outputs:
Synchronous message communication with reply:

Messages:

- makeReservation
  Input parameters: reservationTransaction
  Reply: confirmationNumber
- getReservation
  Input parameters: confirmationNumber
  Reply: reservationTransaction
- changeReservation
  Input parameters: changeTransaction
  Reply: available
- updateReservation
  Input parameters: updateTransaction
- cancelReservation
  Input parameters: cancelTransaction
- checkAvailability
  Input parameters: avaialabilityTransaction
  Reply: available, cost
- checkCheckOutDate
  Input parameters: checkOutDate
  Reply: available

Errors detected: Unrecognized response

loop
receive (HotelService, Response) from Hotel Service Response Queue;
Extract response name and response parameters from response;
case Response of
CheckAvailabilityResponse:

-- Room(s) Available
display (CustomerInteraction, roomsAvailable,totalCost);
-- Room(s) not Available
displayPrompt (CustomerInteraction, roomsNotAvailable);

case Response of
MakeReservationResponse:
-- Reservation Successful
display (CustomerInteraction, confirmationNumber);
-- Reservation not Successful
displayPrompt (CustomerInteraction, reservationNotsuccessful);

case Response of
CancelReservationResponse (non-guaranted or guaranted before deadline):
-- Valid Confirmation Number
display (CustomerInteraction, reservationCanceled);
-- Invalid Confirmation Number
prompt (CustomerInteraction, reservationNotFound);

case Response of
CancelReservationResponse (guaranted after deadline):
-- Valid Confirmation Number
display (CustomerInteraction, reservationCanceled, customerCharged);
-- Invalid Confirmation Number
prompt (CustomerInteraction, reservationNotFound);

case Response of
ChangeReservationResponse:
-- Valid Confirmation Number
display (CustomerInteraction, reservationInformation);
-- Invalid Confirmation Number
prompt (CustomerInteraction, reservationNotFound);

case Response of
MakeReservationResponse:
-- Valid Confirmation Number, Change Reservation Successful
display (CustomerInteraction, reservationChangedInformation);
-- Valid Confirmation Number, Change Reservation Not Successful
prompt (CustomerInteraction, reservationNotSuccessful);
-- Invalid Confirmation Number, Change Reservation Not Successful
prompt (CustomerInteraction, reservationNotFound);

```
end case;
end loop;
```

TIS_TBS - Clerk Interaction

Name: ClerkInteraction
Information hidden: Details for processing input from clerk and output processed information to the clerk using standard I/O.
Structuring criteria: role criterion: user interaction; concurrency criterion: event driven
Assumptions: one Clerk Interaction is handled at a time.
Anticipated Changes:
Task interface:

Task inputs:
Event input: Clerk selection interrupts to indicate that a selection has been made.
External input: ClerkInput through the standard input device such as keyboard (Customer info, room info).
Asynchronous message communication:

Task outputs:
External output: ClerkOutput
Asynchronous message communication:

- DisplayPrompt

Passive objects accessed: ReservationTransaction
Errors detected: Invalid date interval

loop
-- Wait for external interrupt from clerk client
wait (selectionEvent);
read reservation information and clerk choice;
if clerkChoice = make reservation
then --
-- Write Reservation data into the ReservationTransaction object;
ReservationTransaction.createReservation(customerInput)
elseif clerkChoice = change reservation
then
-- Write Reservation data into the ReservationTransaction object;
ReservationTransaction.changeReservation(customerInput)
elseif clerkChoice = cancel reservation
then
-- Write Reservation data into the ReservationTransaction object;
ReservationTransaction.cancelReservation(customerInput)
elseif clerkChoice = check in
then
-- Write Reservation data into the ReservationTransaction object;

ReservationTransaction.checkInReservation(customerInput)
elseif clerkChoice = check out
then
-- Write Reservation data into the ReservationTransaction object;
ReservationTransaction.checkOutReservation(customerInput)
else -- selection was not recognized so display “not implemented”;
Exit;
end if;
-- Send transaction object created message to ClerkClientControl
send(ClerkClientControlMessageQ, reservationTransaction, clerkChoice)
--wait for message from ClerkClientControl
receive(clerkInteractionMessageBuffer, displayPrompt)
--send message to Clerk
send(clerkOutput)
end loop;

TIS_TBS - Clerk Client Control

Name: ClerkClientControl
Information hidden: Details of how ClerkClientControl handles events.
Structuring criteria: role criterion: control; concurrency criterion: demand driven
Assumptions:
Anticipated Changes: Possible addition of further Clerk selections (Options).
Task interface:

Task inputs:
Asynchronous message communication:

- Clerk events

Task outputs:
External output: Clerk Transactions

Synchronous message communication:
Message:

- ValidateCreditCard

  Input parameters: cardNumber
  Reply: response

- Print Room Key
- Print room info

Asynchronous message communication:

- Display Prompts

Errors detected: Invalid cardNumber, invalid events

loop
-- Messages from all senders are received on Message Queue
receive(ClerkClientControlMessageQ, reservationTransaction, clerkChoice)
-- Extract the event name and any message parameters
-- Given the incoming event, lookup state transition table;
-- change state if required; return action to be performed;
newEvent = message.event
outstandingEvent = true;
while outstandingEvent **do**
ClerkClientStateMachine.processEvent (**in** newEvent, **out** action);
outstandingEvent = false;
-- Execute action(s) as given on ClerkClientControl statechart

case action **of**

Create Reservation: --create a reservation request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Change Reservation: --change a reservation request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Cancel Reservation: --cancel a reservation request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Check In: --Check In request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Check Out: --Check Out request to the Hotel Service
send(promptMessageQueue, displayWait);
send(Hotel Service, **in** clientTransaction, **out** hotelServiceResponse);
newEvent = hotelServiceResponse; outstandingEvent = true;

Print Room Info: --Print the room information
send(PrinterInterface);
outstandingEvent = true;

Print Room Key: --Print the room key
send(KeyPrinterInterface);
outstandingEvent = true;

Display Prompt: --display information or updates to the Clerk
send(clerkInteractionMessageBuffer, displayPrompt);
outstandingEvent = true;

Validate Credit Card: --validate the Customer Credit Card for the Reservation
send(validateCreditCard, in cardNumber, out response);
newEvent = response; outstandingEvent = true;

```
end case;
end while;
end loop;
```

TIS_TBS - Clerk Client System

Name: ClerkClient
Information hidden: Details of how ClerkClient processes clerk selections and hotel service responses
Structuring criteria: role criterion: client; concurrency criterion: demand driven
Assumptions: only one request is made at one time.
Anticipated Changes: Possible addition of further requests.
Task interface:
Task inputs:
Synchronous message communication with reply:
Message replies as described below
Task outputs:
Synchronous message communication with reply:

Messages:

- makeReservation
  Input parameters: reservationTransaction
  Reply: confirmationNumber
- getReservation
  Input parameters: confirmationNumber
  Reply: reservationTransaction
- changeReservation
  Input parameters: changeTransaction
  Reply: available
- updateReservation
  Input parameters: updateTransaction
- cancelReservation
  Input parameters: cancelTransaction
- checkAvailability
  Input parameters: avaialabilityTransaction
  Reply: available, cost
- checkCheckOutDate
  Input parameters: checkOutDate
  Reply: available
- assignRoom
  Input parameters: checkInTransaction
  Reply: roomAssigned
- getCharges
  Input parameters: checkOutTransaction
  Reply: charges
- chargeCreditCard
  Input parameters: checkOutTransaction
  Reply: confirmation
- completeCheckOut

Input parameters: checkOutTransaction
Reply: bill

Errors detected: Unrecognized response

loop
receive (HotelService, Response) from Hotel Service Response Queue;
Extract response name and response parameters from response;
case Response of
CheckAvailabilityResponse:
-- Room(s) Available
display (ClerkInteraction, roomsAvailable,totalCost);
-- Room(s) not Available
displayPrompt (CustomerInteraction, roomsNotAvailable);

case Response of
MakeReservationResponse:
-- Reservation Successful
display (ClerkInteraction, confirmationNumber);
-- Reservation not Successful
displayPrompt (CustomerInteraction, reservationNotsuccessful);

case Response of
CancelReservationResponse (non-guaranted or guaranted before deadline):
-- Valid Confirmation Number
display (ClerkInteraction, reservationCanceled);
-- Invalid Confirmation Number
prompt (ClerkInteraction, reservationNotFound);

case Response of
CancelReservationResponse (guaranted after deadline):
-- Valid Confirmation Number
display (ClerkInteraction, reservationCanceled, customerCharged);
-- Invalid Confirmation Number
prompt (ClerkInteraction, reservationNotFound);

case Response of
ChangeReservationResponse:
-- Valid Confirmation Number
display (ClerkInteraction, reservationInformation);

-- Invalid Confirmation Number
prompt (ClerkInteraction, reservationNotFound);

case Response of
MakeReservationResponse:
-- Valid Confirmation Number, Change Reservation Successful
display (ClerkInteraction, reservationChangedInformation);
-- Valid Confirmation Number, Change Reservation Not Successful
prompt (ClerkInteraction, reservationNotSuccessful);
-- Invalid Confirmation Number, Change Reservation Not Successful
prompt (ClerkInteraction, reservationNotFound);

case Response of
CheckInReservationResponse:
-- Valid Confirmation Number
display (ClerkInteraction, reservationInformation);
-- Invalid Confirmation Number
prompt (ClerkInteraction, reservationNotFound);

case Response of
CheckInReservationResponse:
-- Valid Credit Card
display (ClerkInteraction, assignedRoomNumber);
print(keyPrinterInterface,printKey);
print(printerInterface,roomInformation);
-- Invalid Credit Card
prompt (ClerkInteraction, invalidCreditCard);

case Response of
ChangeCheckOutDateResponse:
-- Rooms Available
display (ClerkInteraction, newCheckOutDate);
-- Rooms Not Available
prompt (ClerkInteraction, roomsNotAvailable);

case Response of
CheckOutReservationResponse:
-- Valid Room Number
display (ClerkInteraction, reservationInformation);
-- Invalid Room Number
prompt (ClerkInteraction, reservationNotFound);

```
case Response of
PaymentResponse:
-- Payment Successful
print (printerInterface, receipt);
-- Payment Not Successful, Payment Method Credit Card
prompt (ClerkInteraction, chargeNotAuthorized);
-- Payment Not Successful, Payment Cash
prompt (ClerkInteraction, InsufficientAmount);

end case;
end loop;
```

TIS_TBS - Manager Interaction

Name: ManagerInteraction
Information hidden: Details of retrieving reports from Hotel Service database and displaying information to the Manager.
Structuring criteria: role criterion: user interaction; concurrency criterion: event driven
Assumptions: only one Manager Interaction is handled at one time.
Anticipated Changes: Possible additional selections will need to be provided.
Task interface:
Task inputs:
Event input: Manager selection interrupt to indicate that a selection has been made.
External input: managerInput through the keypad (report type and date intervals).
Task outputs:
External output: prompt, report
Asynchronous message communication:
- displayPrompt
- displayReport
- promptDisplayed
- reportDisplayed.

Passive objects accessed: none
Errors detected: Invalid date interval

loop
-- Wait for external interrupt from manager client
wait (selectionEvent);
get manager selection;
if selection is recognized
then --
-- send manager selection message to ManagerClient Control;
send (ManagerClientControlMessageQ, selected);
-- Wait for message from ManagerClientControl;
receive (managerInteractionMessageBuffer, message);
if message = prompt
then
prompt for new date intervals;
-- Send prompt displayed message to ManagerClientControl;
Send (ManagerClientControlMessageQ, prompted);
elseif message = display
then
display reports;
-- Send report displayed message to ManagerClientControl;
send (ManagerClientControlMessageQ, reportDisplayed);

```
else error condition;
end if;
else -- selection was not recognized so display “not implemented”;
Exit;
end if;
end loop;
```

TIS_TBS - Manager Client Control

Name: ManagerClientControl
Information hidden: Details of how ManagerClientControl handles events.
Structuring criteria: role criterion: control; concurrency criterion: demand driven
Assumptions:
Anticipated Changes: Possible addition of further Manager options.
Task interface:
Task inputs:
Asynchronous message communication:
Messages:
. generateReport
Input parameters: startDate, endDate, reportType
External input: managerInput through the keypad (report type and date intervals).
Synchronous message communication without reply:
- displayPrompt
- displayReport
Task outputs:
External output: prompt, report
Asynchronous message communication:
- promptDisplayed
- reportDisplayed.
Errors detected: Invalid date interval

loop
-- Messages from all senders are received on Message Queue
Receive (ManagerClientControlMessageQ, message);
-- Extract the event name and any message parameters
-- Given the incoming event, lookup state transition table;
-- change state if required; return action to be performed;
newEvent = message.event
outstandingEvent = true;
while outstandingEvent **do**
ManagerClientStateMachine.processEvent (**in** newEvent, **out** action);
outstandingEvent = false;
-- Execute action(s) as given on ManagerClientControl statechart
case action **of**
GetReport:--get manager reports from Hotel Service;
send (Hotel Service, **in** getReport, **in** fromdate **, in** toDate **,out** getReportResponse);
newEvent = getReportResponse; outstandingEvent = true;

Display Prompt: -- Display selection menu for manager;

send (promptMessageQueue,displayPrompt);
ManagerClientTransaction.updateManagerSelection (valid);

Invalid Selection Action: -- Display InvalidSelection prompt;
send (promptMessageQueue, displayInvalidSelectionPrompt);
ManagerClientTransaction.updateSelectionStatus (invalid);
...
end case;

TIS_TBS - Manager Client System

Name: ManagerClient
Information hidden: Details of how ManagerClient processes manager selections and hotel service responses
Structuring criteria: role criterion: client; concurrency criterion: demand driven
Assumptions: only one request is made at one time.
Anticipated Changes: Possible addition of further requests.
Task interface:
Task inputs:
Synchronous message communication with reply:
.message replies from hotel service
. getReports response
Task outputs:
Synchronous message communication with reply:
Messages:
. getReport
Output parameters: startDate, endDate, reportType

Errors detected: Unrecognized response

loop
receive (HotelService, Response) from Hotel Service Response Queue;
Extract response name and response parameters from response;
case Response of
GetReportResponse:
-- Selection was valid
respond (ManagerInteraction, displayReport);
-- Selection was invalid
respond (ManagerInteraction, displayPrompt);
end case;
end loop;

TIS_TBS - Hotel Service

Name: HotelService
Information hidden: Details of how HotelService processes client Transactions.
Structuring criteria: role criterion: service; concurrency criterion: demand driven
Assumptions: Transactions are processed sequentially
Anticipated Changes: Possible addition of further transactions; possible change from sequential service to concurrent service processing.
Task interface:

Task inputs:
Synchronous message communication with reply:
Messages:

- checkAvailability

  Input parameters: reservationTranscation
  Reply: availabilityResponse

- makeReservation

  Input parameters: reservationTranscation
  Reply: reservationResponse

- getReservation

  Input parameters: reservationTranscation
  Reply: reservationResponse

- changeReservation

  Input parameters: reservationTranscation
  Reply: reservationResponse

- updateReservation

  Input parameters: reservationTranscation
  Reply: reservationResponse

- cancelReservation

  Input parameters: reservationTranscation
  Reply: reservationResponse

- assignRoom

Input parameters: reservationTranscation
Reply: CheckInCheckOutResponse

- getCharges

  Input parameters: reservationTranscation
  Reply: CheckInCheckOutResponse

- chargeCreditCard

  Input parameters: reservationTranscation
  Reply: CheckInCheckOutResponse

- completeCheckOut

  Input parameters: reservationTranscation
  Reply: CheckInCheckOutResponse

- getReport

  Input parameters: reservationTranscation
  Reply: ManagmentReportResponse

Task outputs:

Message replies as described previously.
Errors detected: Unrecognized response

loop
receive (ClientMessageQ, message) from Hotel Service Message Queue;
Extract message name and message parameters from the message;
Case Message of
checkAvailability:

-- Check that number rooms entered and dates are valid for reservation;
AvailabilityLogic.checkAvailability
(**in** availabilityTransaction, **out** available, out cost);
-- If rooms area available Response are available and return cost for the
Reservation;
-- otherwise availability response is unavailable;
reply(CustomerClient, ClerkClient, available, cost);

makeReservation:

```
        -- Check that number rooms entered and dates are valid for reservation;
        -- If all checks are successful, then create a reservation.
        ReservationLogic. createReservation
        (in reservationTransaction, out confirmationNumber);
        reply(CustomerClient, ClerkClient, confirmationNumber);
getReservation:
        -- Check confirmation number or the room number is present in
        resevationTranscation sent;
        ReservationLogic.getReservation
        (in confirmationNumber, out reservationTransaction);
        -- If Reservation Found then reservation response is the
        -- ReservationTransaction object;
        -- otherwise the response is reservation not found.
        reply(client, reservationTransaction);
changeReservation:
        -- Check if change reservation transaction contains all the required details to change
        reservation ;
        ReservationLogic.changeReservation;
        (in changeTranscation, out available);
        -- If reservation is available for the new changes changeReservation response will be
        available;
        --otherwise unavailable;
        reply(client, available);
updateReservation:
        -- Check if change reservation transaction contains all the required details;
        ReservationLogic.updateReservation
                (in updateTranscation);
cancelReservation:
        -- Check if change reservation transaction contains all the required details;
        ReservationLogic.cancelReservation(in cancelTranscation, out cancelResponse);
        -- On successful cancelation cancelReservation response done;
        reply(client, cancelResponse);
assignRoom:
        -- Check if change reservation transaction contains all the required details;
        CheckInCheckOut.assignRoom
        (in checkInTransaction, out roomAssigned);
        -- after assigning the room successfully send back a response roomAssigned;
        reply(client, roomAssigned);
getCharges:
```

-- Check if change checkOuttransaction contains all the required details;
CheckInCheckOut. getCharges
(in checkOutTransaction, out charges)
--System gets the charges and send responses back to the client with the charges;
reply(client, charges);

chargeCreditCard:
-- Check if checkOuttransaction contains all the required details;
CheckInCheckOut .chargeCreditCard
(in checkOutTransaction, out confirmation);
--Gets the credit card number from the checkOutTransaction and charges through
AuthorizationServerProxy;
-- If payment is done successfully chargeCreditCard sends a successful response;
-- Otherwise unsuccessful response;
reply (client, confirmation);

completeCheckOut:
-- Check if checkOuttransaction contains all the required details;
CheckInCheckOut .completeCheckOut
(in CheckOutTransaction, out bill);
-- Completes the Check out for Reservation in the checkoutTransaction;
-- send the bill for the reservation as response.
reply (Client, bill);

getReport:
-- Check if date and report type entered is valid;
CheckInCheckOut.getReport(**in** fromDate, **in** toDate, **in** reportType, **out** report);
-- This generates a report and send back the generated report as response;
reply(report);

TIS_TBS - Authorization Client Proxy

Name: AuthorizationClientProxy
Information hidden: Details of how AuthorizationClientProxy handles events.
Structuring criteria: role criterion: control; concurrency criterion: proxy
Assumptions:
Anticipated Changes:
Task interface:

Task inputs:
Synchronous message communication:
Message:

- ValidateCreditCard

  Input parameters: cardNumber
  Reply: response

Task outputs:
External output: AuthorizationResponse
Errors detected: Invalid cardNumber, invalid events

loop
receive (ClerkClientMessageQueue, message) from Authorization Proxy Queue;
Extract message name and message parameters from message;
case Message **of**
ValidateCard:
-- Get checked that card is valid and not expired
AuthorizationClientProxy.ValidateCard(**in** cardNumber, **out** authorizationResponse);
-- If successful, validation response is valid
reply(clerkClient, authorizationResponse);

case Message **of**
ChargeCreditCard:
-- Get amount to be charged, and get credit card charged
AuthorizationProxy.ChargeCreditCard(**in** cardNumber, **in** amount, **out** authorizationResponse);
-- If successful, charging is authorized and complete
reply(clerkClient, paymentResponse);

end case;
end loop;

TIS_TBS - Authorization Server Proxy

Name: AuthorizationServerProxy
Information hidden: Details of how AuthorizationServerProxy handles events.
Structuring criteria: role criterion: control; concurrency criterion: proxy
Assumptions:
Anticipated Changes:
Task interface:

Task inputs:
Synchronous message communication:
Message:

- ChargeCreditCard

  Input parameters: cardNumber
  Reply: response

- ValidateCreditCard

  Input parameters: cardNumber
  Reply: response

Task outputs:
External output: AuthorizationResponse
Errors detected: Invalid cardNumber, invalid events

loop
receive (ClerkClientMessageQueue, message) from Hotel Service Queue;
Extract message name and message parameters from message;
case Message **of**
ValidateCreditCard:
-- Get checked that card is valid and not expired
AuthorizationServerProxy.ValidateCreditCard(**in** cardNumber, **out** authorizationResponse);
-- If successful, validation response is valid
reply(hotelService, authorizationResponse);

case Message **of**
ChargeCreditCard:
-- Get amount to be charged, and get credit card charged
AuthorizationServerProxy.ChargeCreditCard(**in** cardNumber, **in** amount, **out** authorizationResponse);
-- If successful, charging is authorized and complete
reply(hotelService, paymentResponse);

```
end case;
end loop;
```

TIS_TBS - Key Printer Interface

Name: KeyPrinterInterface
Information hidden: Details of processing output to Key Printer
Structuring criteria: role criterion: output; concurrency criterion: demand driven
Assumptions: only one request is made at one time.
Anticipated Changes: Possible additional output to be printed.
Task interface:

Task inputs:
Event input: ClerkClientControl messages the KeyPrinterInterface to print room key.
Internal input: ClerkClient Control
Synchronous message communication without reply:

- Print Room Key

Synchronous message communication with reply:

- Read
  Reply: reservationTranscation

Task outputs:

Synchronous message communication without reply:

- KeyPrinter Output

Errors detected: Unrecognized response

loop
-- Wait for external interrupt from clerk client control
wait (selectionEvent);
Read reservation information from Reservation Transaction object
ReservationTransaction.read(out ReservationTransaction)
Send the information to the Printer
send(KeyPrinter, ReservationTransaction)
end loop;

TIS_TBS - Printer Interface

Name: PrinterInterface
Information hidden: Details of processing output to the Printer
Structuring criteria: role criterion: output; concurrency criterion: demand driven
Assumptions: only one request is made at one time.
Anticipated Changes:
Task interface:

Task inputs:
Event input: ClerkClientControl messages the PrinterInterface to print room info.
Internal input: ClerkClientControl
Synchronous message communication without reply:

- Print Room Info

Synchronous message communication with reply:

- Read
  Reply: reservationTranscation

Task outputs:

Synchronous message communication without reply:

- Printer Output

Passive objects accessed: ReservationTransaction

Errors detected: Unrecognized response

loop
-- Wait for external interrupt from clerk client control
wait (selectionEvent);
Read reservation information from Reservation Transaction object
ReservationTransaction.read(out ReservationTransaction)
Send the information to the Printer
send(Printer, ReservationTransaction)
end loop;