Systems Analysis and Design

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Teamwork ver.1

Group 5

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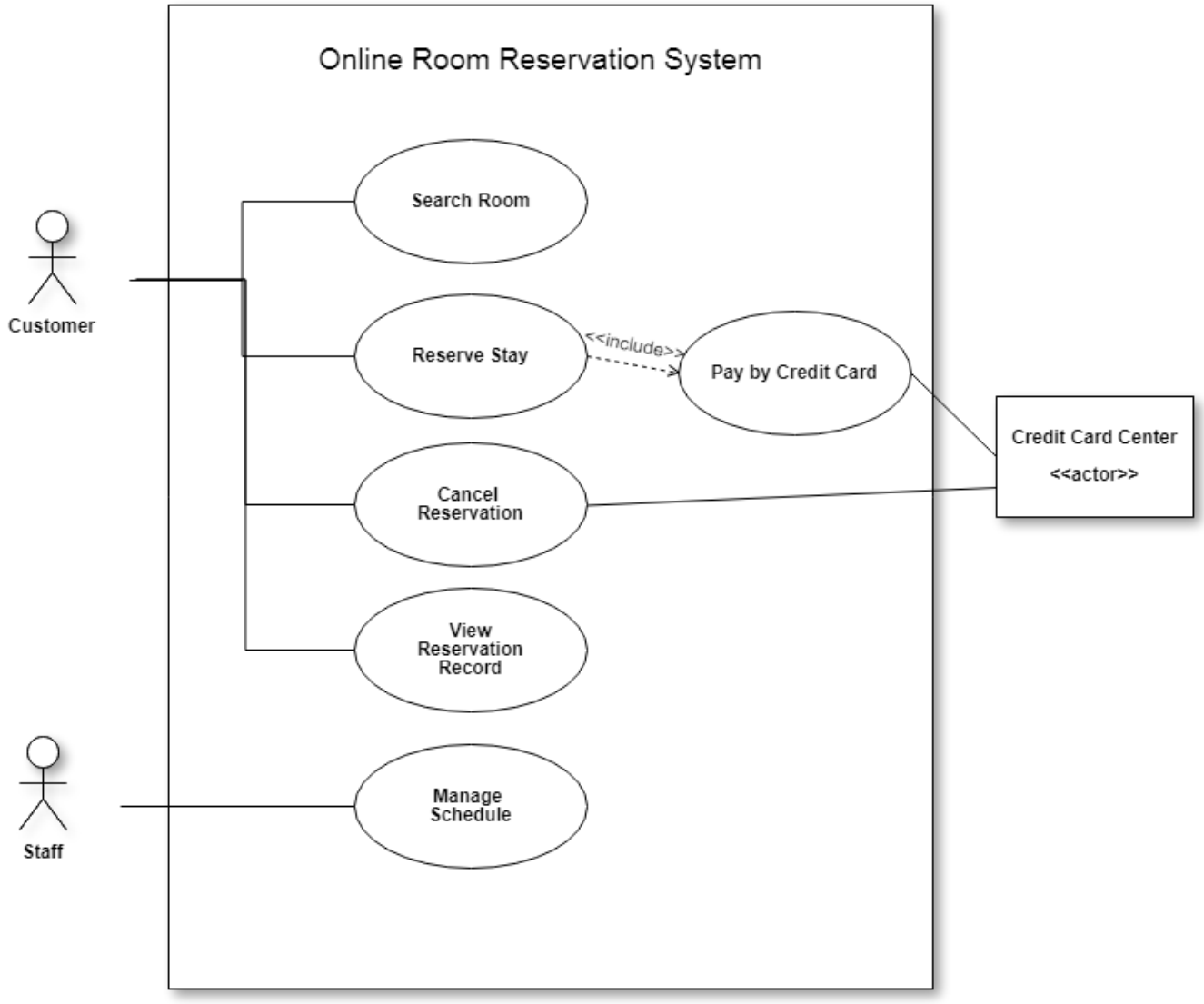
Describe the project in text

This project is designed for the customer who wants to view or book accommodation in our hotel. It's simple – choose your date and favorite rooms or suites; it's safe – One-Time-Password (OTP) protects your information every time you log in.

We have Single Room, Double Room, Quad Room, Eight Room and each of them all has three types of levels
to choose, respectively Business class, luxury class, president class.
The customers are allowed to view all room types, interior and decoration through the gallery.
If the customer wants to reserve, first entering check in/out date. The system does not ask the number of people who will stay, we just simply set the max occupancy of the room and the customer choose the suitable room, just for simplified the process.
Next, the system displays all empty rooms and their level (If there is no empty room, please enter other date), choose the room(s) you want, and the system will show the room amenities(has or not Private bathroom/Free toiletries/free breakfast/ Non-smoking Rooms/free Wifi, etc.).
Check it what you want to reserve and the next step is to enter your information(Name, Phone Number, Re-enter Phone Number, Email Address, Special Demand), the system will send OTP token via text message to your phone and please enter the token. If you don't enter anything over 120 seconds, you are asked to re-enter new OTP token that the system has sent again. And next, enter the credit card number, expiration date and CVV. If incorrect, please re-enter the credit card number, expiration date and CVV. If successful, the booking system will show the receipt to remind booking successful on the page.

If the customer wants to view the reservation record, he/she must enter his/her phone number and click "confirm" button. Later on, the system will send the OTP token via text message to his/her phone. After receiving the OTP token, the customer types in the token, the system will show the all reservation records belong to that customer. If the customer hopes to cancel a specific reservation, the system will send the request to the credit card system for a refund.

Draw a use case diagram of the project



In our system, there are six use cases in total. Search Room, Reserve Stay, Cancel Reservation, View Reservation Record, Manage Schedule, and Pay by Credit Card, respectively.

The functions a customer can use are Search Room, Reserve Stay, Cancel Reservation, View Reservation Record. On the other hand, hotel staffs can use Manage Schedule function.
When the customer makes a room booking, he/she must pay by credit card, and the payment will withdraw from the bank account.
If the customer wants to cancel the reservation, the payment will refund into his/her bank account directly.

Create a use case description and describe the normal flow of events, subflows, alternate/Exception flows for one of the most important functions of the project

Use Case Name: Reserve Stay	ID: 2	Importance Level: high
Primary Actor: Customer	Use Case Type: Detail, Real	
Stakeholders and Interests: Customer-want to book rooms online.		
Brief Description: Customer uses this system to book room online.		
Trigger: When customer clicks “Reserve Stay” function. Type: External		
Relationships: Association: Customer, Credit Card Center Include: Pay by Credit Card Extend: Generalization:		
Normal Flow of Events: 1. The customer chooses what date does customer want to check in and out. 2. The system checks the dates. If there are no vacancy the S-1: Display “No available room message” subflow is performed. 3. The system displays all available rooms and the suite level. 4. The customer selects the room and its level. 5. The customer enters the personal information. 6. The customer needs to re-enter the phone number. 7. The system checks both of numbers are match or not. If they don’t match the S-2: Display “Phone number invalid message” subflow is performed. 8. The system generates the OTP token. 9. The system sends OTP token via text message to customer’s mobile. If the customer doesn’t receive the OTP token the S-3: Click “Resend” Button subflow is performed. 10. The customer enters the OTP token. If the system waits over 2 minutes the S-4: Display “Overtime message” subflow is performed. 11. The system checks the OTP token. If the OTP token is unmatched the S-5: Display “Unmatched message” subflow is performed. 12. The customer types the credit card information. 13. The system verifies the information of credit card. If the information is invalid the S-6: Display “Invalid message” subflow is performed. 14. The system displays the transaction success message. 15. The customer exits the system.		

SubFlows:

S-1: Display “No available room message”
The system goes back to the step #1.

S-2: Display “Phone number invalid message”
The system goes back to the step #5.

S-3: Click “Resend” Button.
The system goes back to the step #8.

S-4: Display “Overtime message”

1. The system displays the information of overtime.
2. The customer clicks “Resend” button.
3. Go back to the step #8.

S-5: Display “Unmatched message”
The system goes back to the step #10.

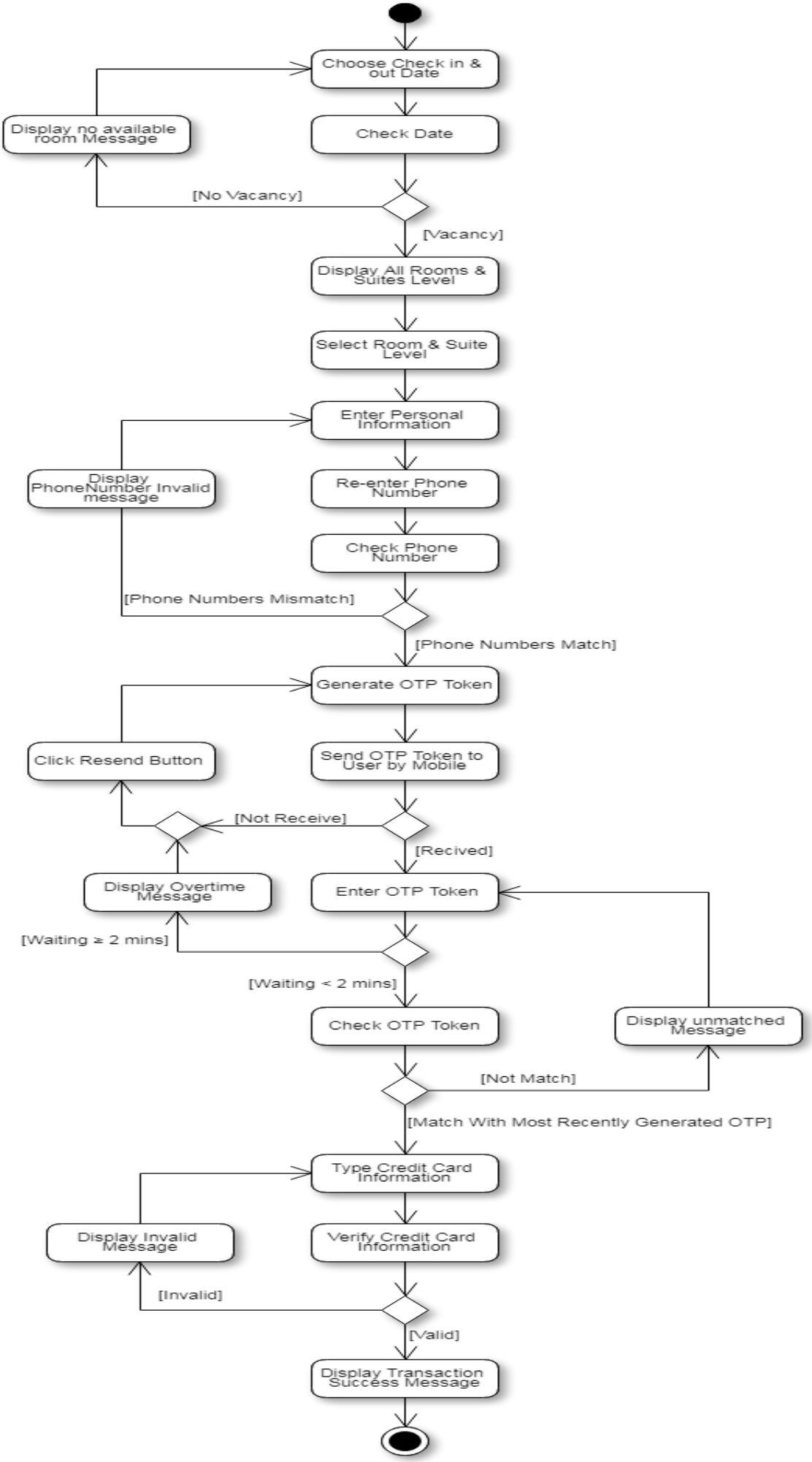
S-6: Display “Invalid message”
The system goes back to the step #12.

Alternate/Exceptional Flows:

E1. The connection with credit card center is offline.

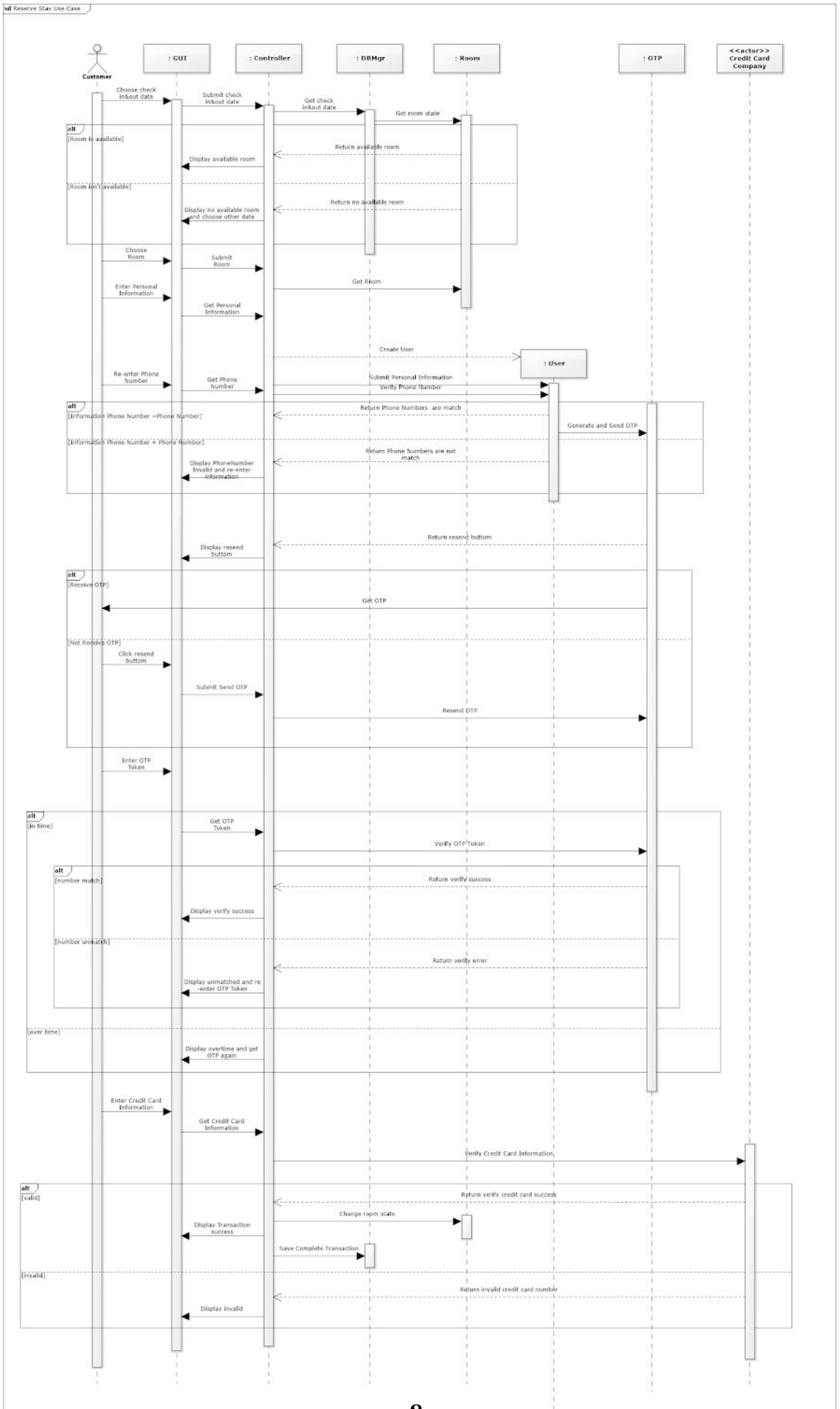
Draw an activity diagram to depict the use case you selected from question 2 or some aspects of the system

This activity diagram aims to depict the process of "Reserve Stay" use case. When booking over the internet, first, the customer has to choose the date he/she wants to stay and later on, the system will check that specific date has rooms available or not. If not, the system will show the message and return to step #1. If so, the system will display all available rooms & suites and their levels for the customer to select. With selected room, the system will ask to type personal information. Because of the communication purpose, the system is designed to check and verify by double entering phone number, and sending One-Time-Password(OTP) text message. There is a time limit for waiting customer entering the OTP token. If the timeout occurs, the system will show overtime message and require customer click Resend button, then the system returns to step #8. If the timeout doesn't occur, the system will check whether the entered OTP token matches the generated OTP token or not. If so, move to next step. If not, go back to step #10. The next step is to type credit card number, expiration date, and CVV for completing the transaction. The system will check the validity of the credit card. If not, return to step #12. If so, show the transaction success message.

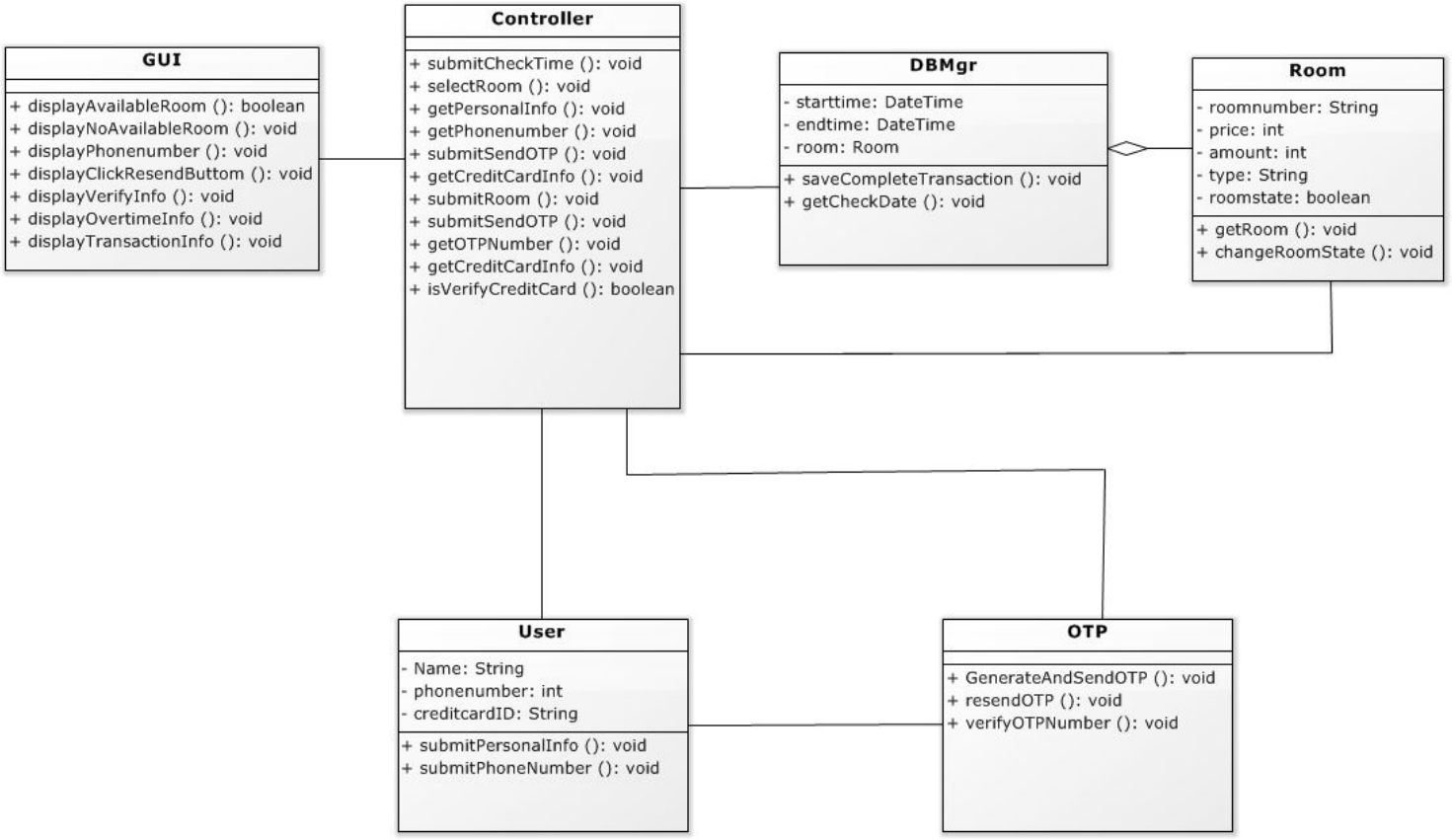

Choose Check in & out Date
Check Date
Display no available room Message
[No Vacancy]
[Vacancy]
Display All Rooms & Suites Level
Select Room & Suite Level
Enter Personal Information
Re-enter Phone Number
Display PhoneNumber Invalid message
Check Phone Number
[Phone Numbers Mismatch]
[Phone Numbers Match]
Generate OTP Token
Send OTP Token to User by Mobile
Click Resend Button
[Not Receive]
[Recived]
Display Overtime Message
Enter OTP Token
[Waiting ≥ 2 mins]
[Waiting < 2 mins]
Check OTP Token
Display unmatched Message
[Not Match]
[Match With Most Recently Generated OTP]
Type Credit Card Information
Verify Credit Card Information
Display Invalid Message
[Invalid]
[Valid]
Display Transaction Success Message

Draw a detailed sequence diagram based on the use case you selected, or some aspects of the system

Our sequence diagram shows the interaction with Customer, GUI, Controller, DBMgr, Room, User, OTP, and Credit Card Company in Order room this product process. Customer chooses the check in & out date. GUI submits check in & out date. DBMgr gets specific date and Room uses the specific date to get all the room state. If there are not available room, return no available room to Controller and assigns GUI to display no available room and choose other date. If there are available room, return available room to Controller and assigns GUI to display available room, then Customer chooses room. GUI submits room to Controller and gets room's information. Customer enters personal information. GUI gets personal information and Controller creates User and submits personal information. Customer re-enters phone number. GUI gets phone number and User verifies phone number. If phone number in information is equal to phone number, User return phone numbers are match, and OTP generates and sends OTP to Customer. OTP returns resend button and GUI displays resend button. If Customer receives OTP, Customer gets OTP. If Customer doesn't receive OTP, Customer clicks resend button, GUI submits send OTP to Controller and Controller assigns OTP to resend OTP. Customer enters OTP Token. If customer enters in time, Controller gets OTP Token and OTP verifies OTP Token. If OTP Token is match, OTP returns verify success and GUI displays verify success. If OTP Token isn't match, OTP returns verify error and GUI displays unmatched and re-enters OTP Token. If customer enters overtime, GUI displays overtimes and gets OTP again. Customer enters credit card information and Controller gets credit card information. Credit Card Company verifies credit card information. If verifying information is valid, credit card company returns verify credit card success, Room changes room state, GUI displays transaction and DBMgr saves complete transaction. If verifying information is invalid, Credit Card Company returns invalid credit card number and GUI displays invalid.


sd Reserve Stay Use Case
Customer
: GUI
: Controller
: DBMgr
: Room
: OTP
<<actor>>
Credit Card
Company
: User
Choose check in&out date
Submit check in&out date
Get check in&out date
Get room state
alt
[Room is available]
Return available room
Display available room
[Room isn't available]
Return no available room
Display no available room and choose other date
Choose Room
Submit Room
Get Room
Enter Personal Information
Get Personal Information
Create User
Re-enter Phone Number
Get Phone Number
Submit Personal Information
Verify Phone Number
[Information Phone Number =Phone Number]
Return Phone Numbers are match
Generate and Send OTP
[Information Phone Number ≠ Phone Number]
Return Phone Numbers are not match
Display PhoneNumber Invalid and re-enter information
Return resend buttom
Display resend buttom
[Receive OTP]
Get OTP
[Not Receive OTP]
Click resend buttom
Submit Send OTP
Resend OTP
Enter OTP Token
[in time]
Get OTP Token
Verify OTP Token
[number match]
Return verify success
Display verify success
[number unmatch]
Return verify error
Display unmatched and re -enter OTP Token
[over time]
Display overtime and get OTP again
Enter Credit Card Information
Get Credit Card Information
Verify Credit Card Information
[valid]
Return verify credit card success
Change room state
Display Transaction success
Save Complete Transaction
[invalid]
Return invalid credit card number
Display invalid

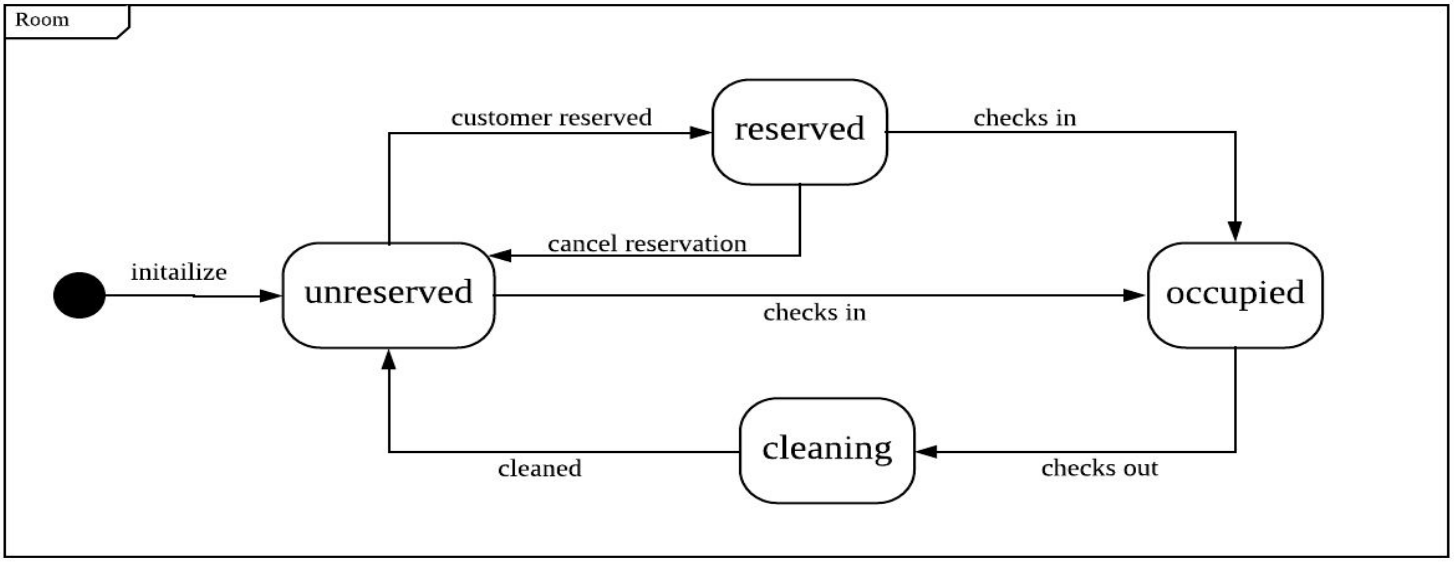
Based on the sequence diagram you have finished, please draw a class diagram with necessary attributes and operations in each class



This is our class diagram depicting the reserve stay function as part of the system.

1. GUI is responsible for displaying information that the customer wants to know, and it can use controller's method, so their relationship is association.
2. DBMgr stores the Room's information, therefore, the Room is part of DBMgr, their relationship is aggregation.
3. User needs to verify customer's phone number by Controller, and returns "Match or Not match" message to Controller, so their relationship is association.
4. OTP generates and sends OTP token to customer, and returns "success or error" to Controller, so it is association relationship with Controller.

Draw a behavior state machine to depict an important class or the system as it goes through the whole process



We choose "room" class as our behaviour state machine. A room has four states-unreserved, reserved, occupied, and cleaning.
We start to initialize a room to unreserved. If someone has reserved that room, the state will turn to reserved. If the customer has canceled reservation, the state will turn to unreserved. Once the customer who reserved the room(s) and goes to check in, the state will change to occupied. On the other hand, other room(s) hasn't been reserved but checked in, the state will change to occupied as well.
By the time customer checks out, the state will change to cleaning. The state will back to unreserved if the cleaning is finished.

Score Chart

ID	Name	Score	Implementation content
B10400075	Jim	100%	Sequence Diagram
B10423018	Sam	100%	Use Case Diagram &Describe the project
B10423051	Tady	100%	Use Case Description
B10423019	Javar	100%	Class Diagram
B10323022	Awy	100%	Use Case Description
B10523029	Timothy	100%	Activity Diagram
B10523049	Ian	85%	Class Diagram
B10523035	Charly	85%	Describe the project
B10523002	Ivan	85%	State Machine