SPACEVOYAGER

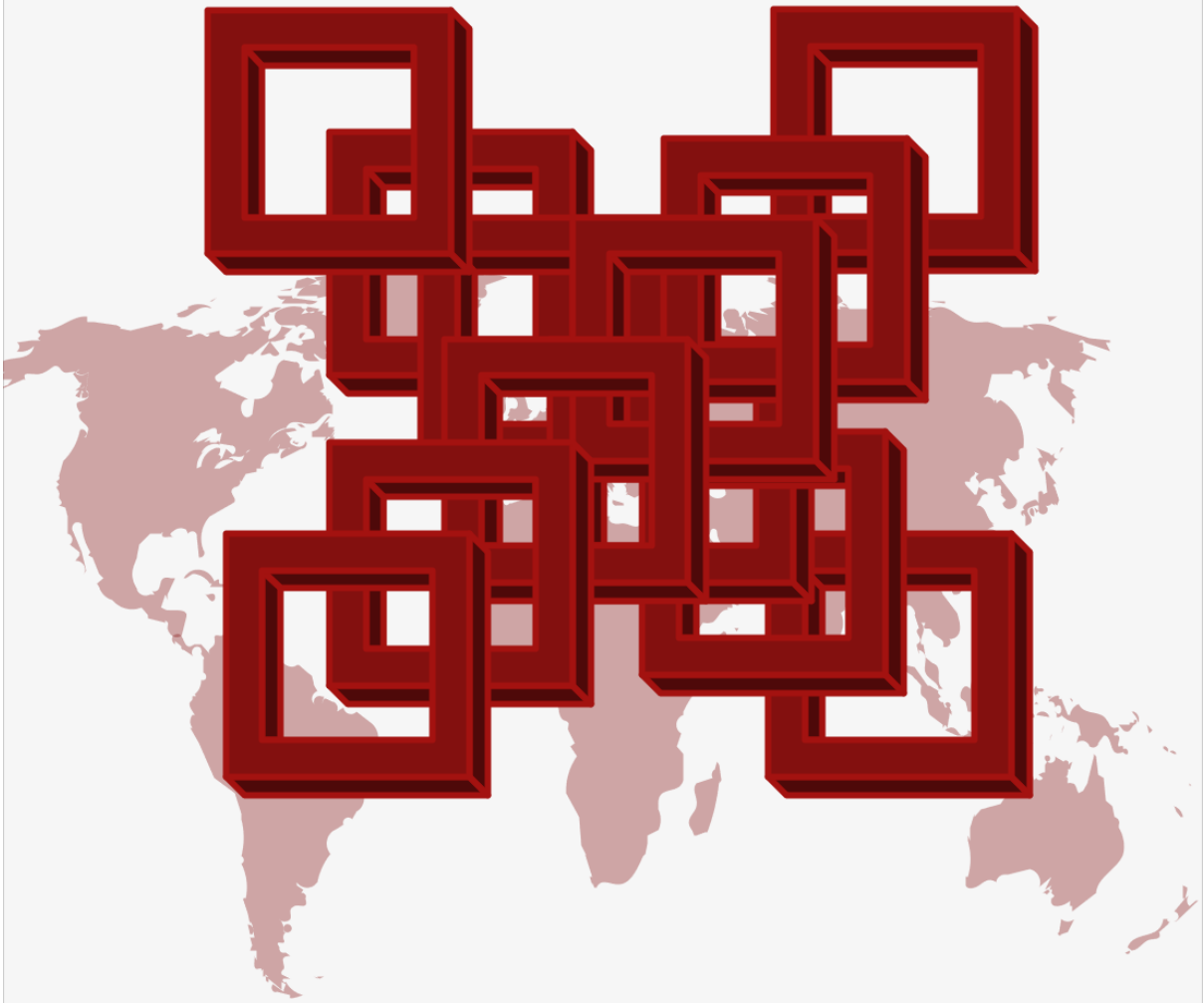

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Table of Contents

1.0 Introduction

1.1 Purpose

The purpose of this document is to detail the specifications for SpaceVoyager. Space tourists will be able to use this app to review attractions, share recommendations, and purchase tour packages. This is version 1.0.

1.2 Document Conventions

The following document conventions are used:

Acronyms	Descriptions
ToS	Terms of Service
OS	Operating System
GPS	Global Positioning System
NASA	National Aeronautics and Space Administration
WiFi	Wireless Fidelity
UX	User Experience

1.3 Intended Audience and Reading Suggestions

This document is intended for the software developers, customers, and testers.

1.4 Project Scope

Space excursions are on our horizons and as commercial space flight and tourism are about to become the next gold rush, SpaceVoyager intends to be the very first application to incorporate making reservations, leaving/reading reviews, buying tickets, and tour packages all in one safe space. By incorporating these functions together, it will eliminate the needless hassle and trouble consumers will encounter when making these decisions on multiple different platforms. Providing all of their excursion documentation in one place will also make it easy for consumers to keep track of their trip and share their adventures with their friends and family back home.

1.5 References

Altexsoft. (2019, November 21). *Non-functional requirements: Examples, types, how to approach*. https://www.altexsoft.com/blog/non-functional-requirements/

Fernández, E. B., & Yuan, X. (1999, August). *An analysis pattern for reservation and use of reusable entities* [Conference session]. Pattern Languages of Programs Conference (PLoP99), Monticello, IL, USA. https://hillside.net/plop/plop99/proceedings/Fernandez2/reservAnalysisPattern3.PDF

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Links to third-party software:

- Payment gateway: Authorize.net 2.0.2 - https://www.authorize.net/
- Discussion forum API: Discourse 2.8 - http://www.discourse.org/
- Restaurant reservation: OpenTable API - https://dev.opentable.com/
- Hotel reservation: Amadeus API - https://developers.amadeus.com/self-service/category/hotel
- Purchase attractions tickets and passes: Viator 2.0 - https://docs.viator.com/partner-api/technical/

2.0 Overall Description

2.1 Product Perspective

This is a new, self-contained product. SpaceVoyager is to be a one-stop source for space tourists planning their trips, where they can read user-generated reviews on accommodations, restaurants, and attractions. SpaceVoyager will also allow users to book accommodations, make restaurant reservations, purchase tickets to attractions, and buy tour packages directly from tour operators. They can also connect with other users and share their experiences.

2.2 Product Features (Functions)

The SpaceVoyager app will feature the following functions:

1. Connect to the Galaxy Web* WiFi
2. Connect to Galaxy Maps* by Google
3. Take high-quality images with filters to share with friends and family
4. Post reviews with pictures.
5. Make and cancel reservations.
6. Book and cancel Flights.
7. View, purchase and cancel tour packages.
8. Digitally attach all required identification to the app for fast access.

*Service names are not final, could change according to service providers.

2.3 User Classes and Characteristics

Space tourists: They will use the webapp to plan their trips, read and leave reviews, and make payments for bookings, tickets, and tour packages.
Restaurant owners: They will use the SpaceVoyager app reviews to increase their quality of service and create demand.
Tour operators: They will use the SpaceVoyager to sell their tour packages.

2.4 Operating Environment

The software will:

- be developed using C#
- be available on iOS and Android devices through the App store
- Be supported on Google Chrome, Firefox, and Safari

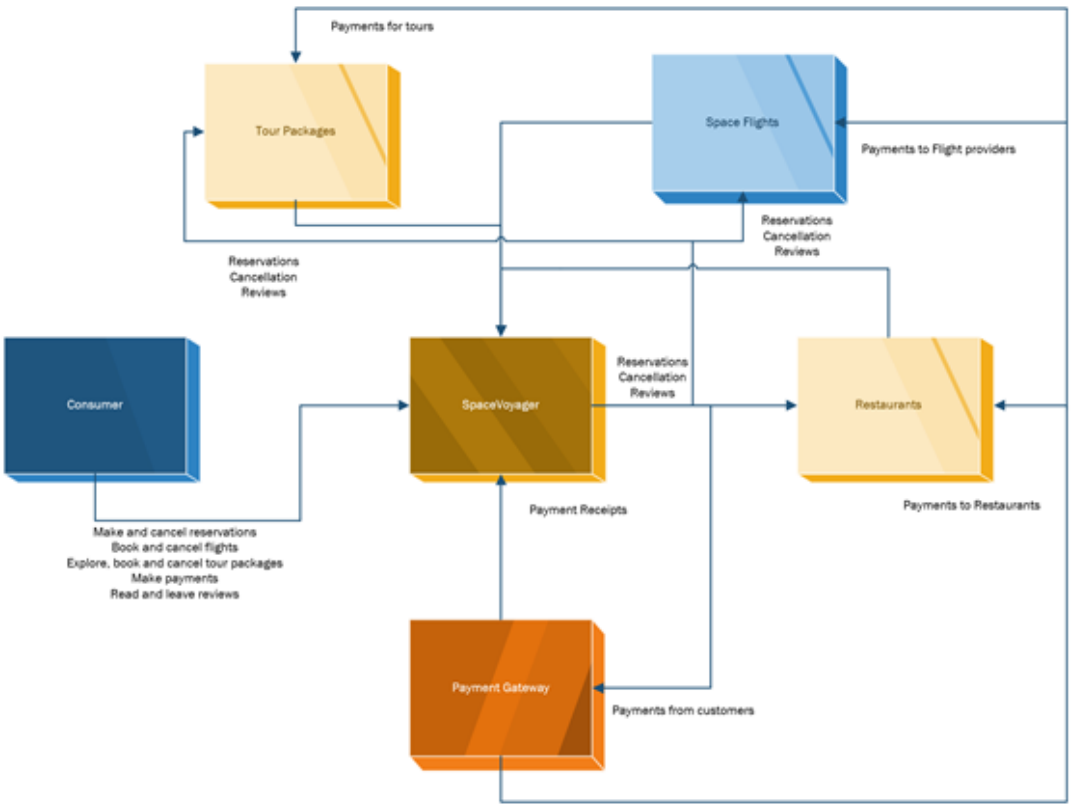
2.7 Assumptions and Dependencies

We assume that there will be a service provider that will provide WiFi and location-based map services in space. The major issue will be not having cell towers to boost the WiFi signal in space and not having a commercial-grade Global Positioning System in space. These technologies would have to be developed completely from scratch as space is not as forgiving as Earth. To have hundreds of satellites to provide and boost WiFi signals also means more space debris to avoid during flights and the dangers they pose by re-entering the atmosphere. GPS is already in use by NASA to guide Astronauts to Earth but there will be a need for commercial implementation and a friendly user interface for consumers' use.

3.0 External Interface Requirements

3.1 User Interfaces

The end-user will access SpaceVoyager through our mobile application and a web interface. The mobile app will be available on iOS and Android devices through their respective application stores, the web interface will support Google Chrome, Firefox, and Safari. The system will use PHP instead of Node.js due to speed requirements not being a factor.



3.2 Hardware Interfaces

- iOS with GPS sensors and a camera.
- Android phone with GPS sensors and a camera.

3.3 Software Interfaces

- Payment gateway: Authorize.net 2.0.2
- Discussion forum: Discourse 2.8
- Restaurant reservation: OpenTable API
- Hotel reservation: Amadeus API
- Purchase attractions tickets and passes: Viator 2.0

3.4 Use Cases

Use cases			
Use Case Name	List of Related Requirement ID	Actor(s)	Brief Description
Create Account	FR01	App user, System Admin(s)	The actor will click on the create new account button, in response the software will present the actor with a form to complete with their personal information/desired password, the software will then send the actor a confirmation email and once confirmed the unique account will be active.
Post review(s)/comment(s)	FR02, FR03	App user, Tour Operator(s), Sales and Marketing, Moderator(s)	The actor will click on the view comments and be presented with all the reviews that have been posted by the business's clients. To post a review the actor will click the review button below the service and proceed to write a description of the experience they've had, once the actor clicks post the system will check for any profanity before posting. If profanity is discovered, it will prompt the actor to review their input and then to resubmit.
Moderate Content	FR04	Moderator(s)	The actor will click on the report button under a specific review/comment to trigger a flag of the post, once the post

			is flagged it will be hidden from general view until a moderator reviews the post and clears it for general view.
Purchase tour(s)	FR05	App user, Tour Operator(s), IT Admin(s), Sales and Marketing	The actor will click on purchase tour, this will trigger a “cart” action and require the actor to select the number of packages and the date desired once that has been completed the system will prompt the actor to complete the purchase through a payment option, after the system confirms payment it will email the actor confirmation of the purchase and any tickets associated with the purchase.
Rate service	FR06	App user, Tour Operator(s), Sales and Marketing	The actor will complete their review post (FR02,FR03) they will be prompted to rate the service out of 5 stars, this will be the final portion of the review. Once the actor selected the desired rating, their review/comment will be finalised and posted to the service’s reviews.
Create a booking	FR07	App user, IT Admin(s)	The actor will click the book now button and be prompted to select available dates for the service, once the actor selects their preferred dates they will be presented with their cart and the system will prompt payment through a payment option (FR05).
Send direct message(s)	FR08	App user, Hotel staff, IT Admin(s), Moderator(s) , System Admin(s)	The actor will click send a direct message under the profile of a user, the system will open a small window with a subject line and 500 character maximum body portion for the actor to fill out, once completed the actor will click send and the system will send the message to the selected user.
Create/post in discussion forum(s)	FR09	App user, Tour Operator(s), Hotel staff, IT Admin(s), Moderator(s)	The actor will click create the post button and will be prompted to fill out information regarding the topic/subject, once the information is filled out the actor will click the post button, the system will check for profanity before

		, System Admin(s)	posting. To post under the topic the actor will click the reply button and fill out the dialog console and click post, the system will check for profanity before posting the reply under the topic.
Create a day plan	FR10	App user, Tour Operator(s), Hotel staff, IT Admin(s), System Admin(s)	The actor will click planner under their profile, system will open their bookings/tours/reservations in one window and will allow the actor to view their trip as a whole, once they click create a day plan the system will automatically fill out the duration of their trip with the information from the previous screen allowing the actor to view the open slots in their schedule during the trip.

4.0 Functional Requirements

Functional Requirement List				
Requirement ID	Requirement Title	Short Description	Priority	Requester
FR01	User Accounts	The system should allow users to register for password-protected accounts.	High	Customers
FR02	Post Reviews	The system should allow users to post reviews on accommodations, restaurants, and attractions. Allowable formats: written text, photos, videos.	High	Customers
FR03	Post Comments	The system should allow registered users and guests to post comments to review.	Medium	Customers
FR04	Content Moderation	The system should allow anyone granted with admin rights to moderate posts and delete those that are in breach of the ToS.	High	System Admin

FR05	Tours	The system should allow tour operators to sell packages.	High	Tour Operators
FR06	Rate	The system should allow users to rate accommodations, restaurants, attractions, tour operators, and tour packages on a zero- to five-star scale.	High	Customers
FR07	Create booking	The system should allow users to book accommodations, make reservations at restaurants, purchase tickets to attractions, and purchase tour packages.	High	Customers
FR08	Direct Messaging	The system should allow registered users to directly message other registered users, accommodations, restaurants, attractions, and tour operators.	Medium	Customers
FR09	Forum	The system should provide a space for registered users and guests to hold space tourism related discussions.	High	Customers
FR10	Trip Day Planner	The system should allow registered users to save all bookings and details of a trip in one convenient place.	High	Customers

4.1 Use Case Description - Textual Detailed Format

UseCaseID:	FR07: Create a booking
Goal In Context:	To search flights, purchase flight tickets, confirm booking, cancel booking, and to view current bookings.
Scope:	SpaceVoyager (SV)
Last Update:	V3.4 – 2022-03-18
Status	Under review
Pre-Condition:	Actor successfully made a reservation as documented in the “Create a booking” use case.

Success End Condition:	Flight ticket has been purchased and confirmed.
Failed End Condition:	A flight ticket has not been purchased.
Primary Actor:	Customer
Trigger Event:	Selects the “Create a booking” link from application

Main Success Scenario

Step	**Actor**	**Action Description**
1	Customer	Selects the “Create a booking” use case from the application.
2	SV	Displays a screen with dates to check flight availability
3	Customer	Selects flight and seat options.
4	SV	Displays a screen requiring passenger information and input fields for: a credit card number, cardholder name, and credit card expiration date.
5	Customer	Enters passenger information and payment details.
6	Payment method	Authorizes transaction.
7	SV	Confirms reservation and displays confirmation number.
8	SV	Displays the main options screen. The message "Ticket Successfully Purchased" is also displayed.

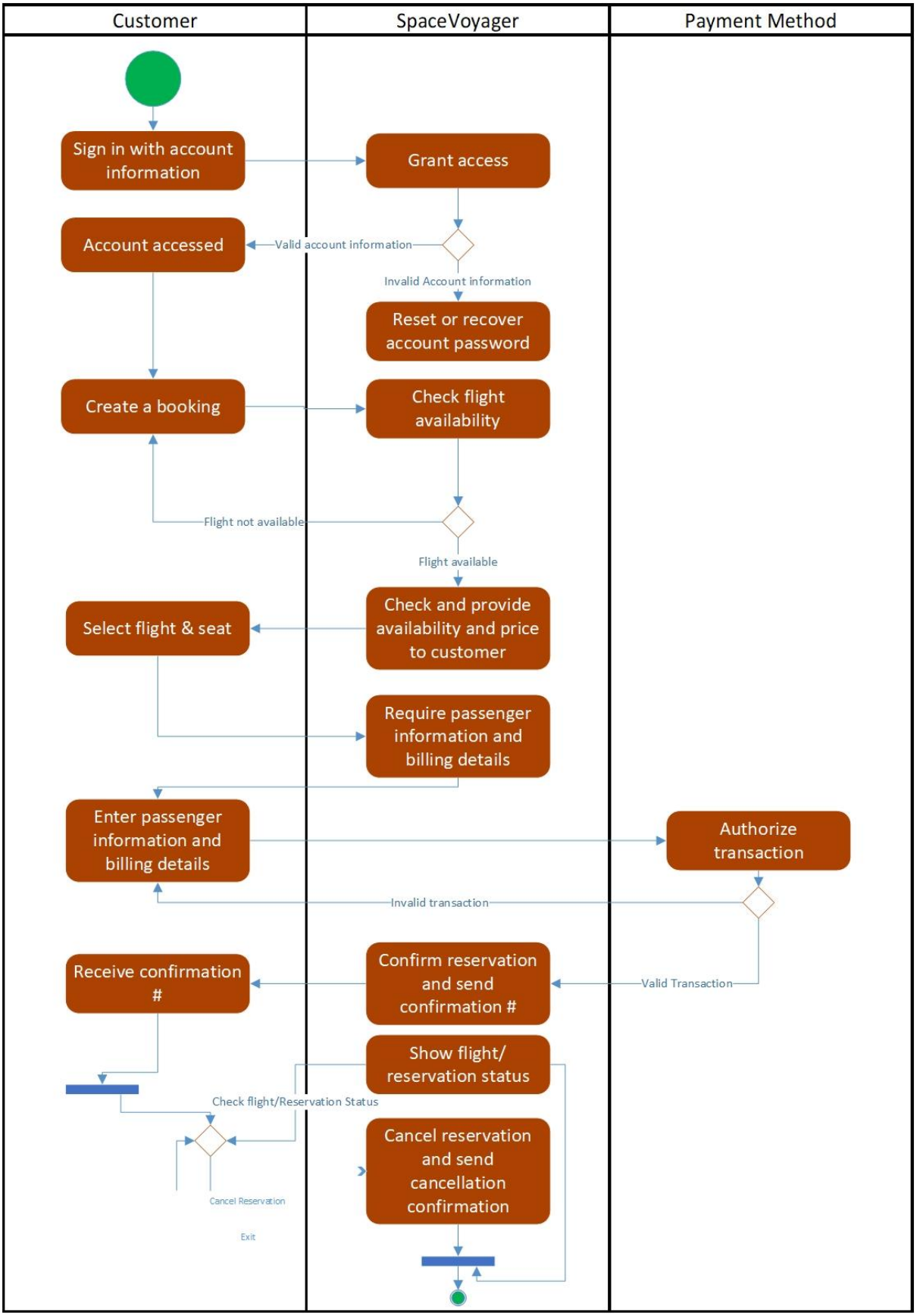
Scenario Extensions

Step	**Actor**	**Action Description**
1.a	Customer	Selects the "Cancel Reservation" option.
1.b	Customer	Selects the “Check flight/Reservation status” option.
5.a	Customer	Selects the "Use Credit Card on File" option

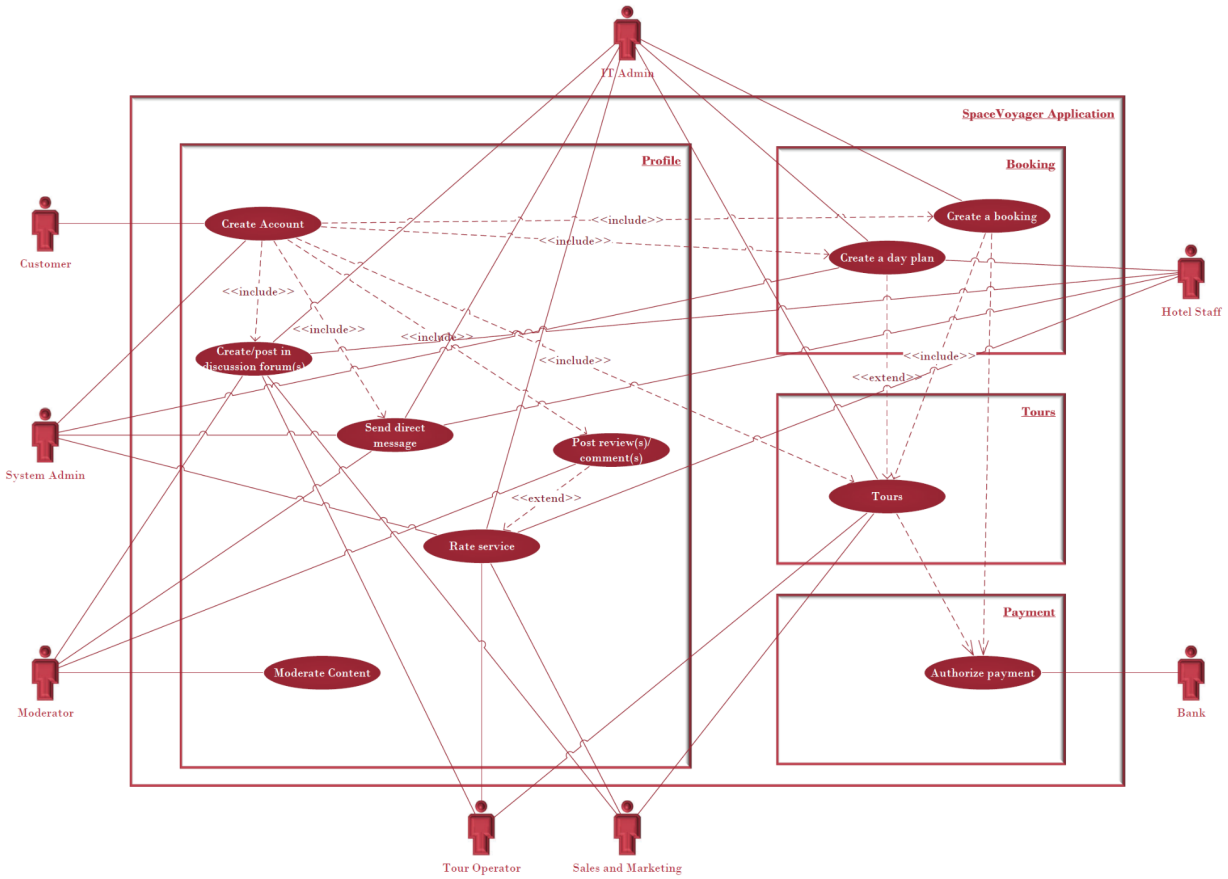
Scenario Variations

Step	**Actor**	**Action Description**
6.a	SV	Unauthorized payment message is displayed “The payment was not completed. Please check and re-enter your payment details to try again”

4.2 Swim Lane Diagram



4.3 Use Case Diagram



5.0 Non-functional Requirements

Functional Requirement List				
Requirement ID	Requirement Title	Short Description	Priority	Requester
NFR01	Localization	The system should localize currency and measurements for the following markets: Canada, United States, United Kingdom	High	Sales and Marketing
NFR02	Security	The system should adhere to the following cybersecurity standards: • NIST Cybersecurity Framework for overall security • ISO 27001 and ISO 27002 for the	High	Cyber-security Admin

		management of information security ● ISO 27040 for the management of storage security		
NFR03	Accessibility	The system should adhere to the latest Web Content Accessibility Guidelines (WCAG 2.1 as of February 2022)	High	IT Admin
NFR04	Performance	Webpages should load and fully render under 2 seconds	High	IT Admin
NFR05	OS Compatibility	The webapp should be able to run on the following: ● Windows 8.1 ● Windows 10 ● macOS 10.15 ● macOS 11 ● macOS 12 ● Android 9 ● Android 10 ● Android 11 ● Android 12 ● iOS 11 ● iOS 12 ● iOS 13 ● iOS 14 ● iOS 15	High	IT Admin
NFR06	Availability	The system should be up 99% of the time in a 30-day cycle	High	IT Admin

Appendix C: Stakeholder Register

Stakeholder Register					
Name	Position	External/ Internal	Contact Details	Operational/ Executive	Interest (High, Medium, Low)
Mlon Eusk	CEO	Internal	meusk@sv.com	Executive	High
Shane Stroud	Investors	External	shane.stroud@herkshirebathaway.com	Executive	High
Terence Chu	Customers	External	terence.chu@customerinc.com	Operational	High
Parathan Welauthan	Hotel, Restaurant, and Attraction Owners	External	parathan.welauthan@hospitalityco.com	Operational	High
Douglas Adams	Tour Operators	External	d.adams@hitchhikersguide.com	Operational	High
Zark Muckerberg	Software Engineer	Internal	zmuckerberg@sv.com	Operational	Medium
Shahwaiz Mehmood	UX Designers	Internal	smehmood@sv.com	Operational	Medium
Beff Jezos	IT Admin	Internal	bjezos@sv.com	Operational	Medium
Erry Lallison	Database Admin	Internal	elallison@sv.co	Operational	Medium
Barren Wuffett	Sales and Marketing	Internal	bwuffett@sv.com	Operational	High
Gill Bates	System Admin	Internal	gbates@sv.com	Operational	High
Parry Lage	Cybersecurity Admin	Internal	plage@sv.com	Operational	High

Stakeholder Register					
Name	Position	External/ Internal	Contact Details	Operational/ Executive	Interest (High, Medium, Low)
J. P. Morgan	Finance	Internal	jpmorgan@sv.com	Operational	Medium
Chris Hadfield	Space Logistics	Internal	chadfield@sv.com	Operational	High

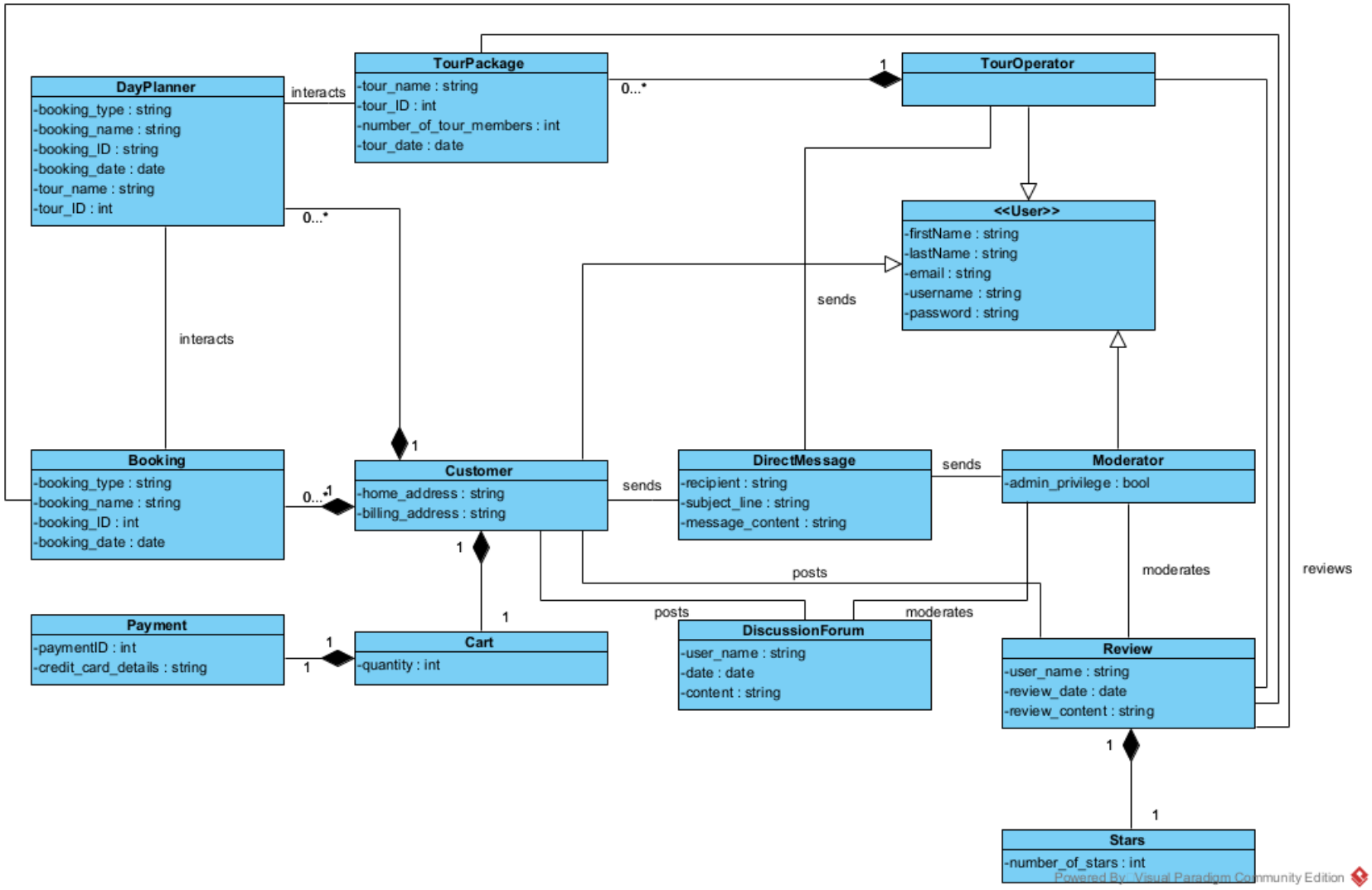
Appendix D: Interview Questions

Interview Questions		
Question	Stakeholder Position	Answer
Who are the target customers?	Sales and Marketing	The target customers are space tourists residing in Canada, the United States, and the United Kingdom.
Who will process the payments?	Finance	Our payment processors will be Interac, Visa, and Mastercard.
Who will be providing the flights into space?	Space Logistics	We will partner with SpaceX, Blue Origin and NASA to get our customers into space safely and smoothly.
Who are your accommodation partners?	Space Logistics	Initially we will be partnering with Marriott to provide primary accommodations as they are the Earth's largest hotel chain, but we plan to expand our network as more and more companies expand into the frontier of space.
What's the furthest I can go in space?	Customer	Our initial launch destinations are at the

		International Space Station and the moon, but we expect to extend our services to Mars by 2030.
Do I need to enter cryosleep?	Customer	Our current travels do not require cryosleep but when further destinations are added, cryosleep will be offered.
How long would it take to get to the moon?	Customer	Initially it would take 3 days for a one way trip to the moon but we expect our services to ramp up in the future for much quicker trips.
Are there seating areas that are cheaper than economy?	Customer	Currently our flight provides only economy and luxury areas available for booking.
How will I get service on the app in space?	Software Engineering team	By partnering with Galaxy Web* we ensure that you will have access to WiFi to use your personal devices however you see fit.
What if I'm unable to access the app?	Customer Service	If you are unable to access the app, you can call us to book/cancel/modify any reservations and in the event of access loss in space, all of our accommodation and flight providers have a direct link to our escalated customer service department that you will have access to at any point in time.
How do you make a profit?	Investors	All bookings are done through us and the prices of the tickets are set by us with a profit margin of 30%, we also sell advertisements on the flights and in our accommodation partner sites. As it becomes more efficient to travel into space our profit margins are expected to increase upto 70%.

Who are the primary competitors?	Sales and Marketing	Booking.com, Yelp, Expedia, TripAdvisor.
How would you measure the success of the webapp in the short term?	CEO	Currently, our primary competitors are not focused on space tourism. By getting the app to the market now, we will secure first-mover advantage. This will give us time to build a loyal user base. Based on user feedback, we will act quickly to add value-added services.
How would you measure the success of the webapp in the long term?	CEO	Once our larger competitors release their own product and the market matures, we need to capture at least 25% of the market.
What database system will be used?	Database Admin	Oracle
Where will the database be hosted?	Database Admin	Amazon Web Services (AWS). They are reliable and have a proven track record.
What kind of experience and emotions should the webapp elicit?	UX Designer	Space tourism is the new frontier. The webapp should reflect that. Big, bold colours will be used along with futuristic themes. Customers using the app should feel that they have stepped through a portal into the future.
What are the goals and visions for the company?	CEO	To be the first name on everyone's mind when they think of space travel.
What is the company's brand awareness?	Sales and Marketing	This will be the company's first project. We anticipate substantial targeted advertisement after the product launches on travel-related websites and magazines.
What is the timeframe for the launch of the app?	Sales and Marketing	Six months from today.

Appendix E: Diagrams and Analysis Pattern



First Cut Class Diagram

First Cut Domain Class Diagram Descriptions

- The TourOperator, Moderator, and Customer classes all inherit from the abstract User class.
- One customer can make multiple bookings.
- One customer can purchase multiple tour packages.
- One customer can have multiple day planners (e.g., for different trips).
- One customer must only have access to one shopping cart.
- The items of one shopping cart must only be purchased by one payment method.
- One tour operator can sell multiple tour packages.
- One review must only be rated once (via star system).
- The TourPackage, DayPlanner, Booking, and Cart classes cannot exist without the customer class. Therefore, they share a composition relationship.
- Payment can only be made after the cart is checked out. They share a composition relationship.
- A product can only be rated with stars via a review. Therefore, the two classes share a composition relationship.
- Tour operators offer tour packages. If there are no tour operators, tour packages cannot be offered. Therefore, they share a composition relationship.

Customers	
Responsibilities	Collaborators
-Gets home address -Gets billing address	-Tour Package -Day Planner -Booking -Cart -Direct Message -Discussion Forum -Review

Booking	
Responsibilities	Collaborators
-Gets booking type -Gets booking name -Gets booking ID -Gets booking date	-Customers -Review

Cart	
Responsibilities	Collaborators
-Gets quantity of purchase	-Customers -Payment

Payment	
Responsibilities	Collaborators
-Gets payment ID -Gets method of payment and card details	-Cart

Review	
Responsibilities	Collaborators
-Gets username -Gets review date -Gets review content	-Moderator -Customers -Stars

Stars	
Responsibilities	Collaborators
-Gets rating in stars	-Review

Tour Package	
Responsibilities	Collaborators
-Gets tour ID -Gets tour name -Gets # of tour members -Gets tour date	-Customers -Tour Operators -Review

Tour Operator	
Responsibilities	Collaborators
-Gets available tour packages	-Tour Package -Review

Day Planner	
Responsibilities	Collaborators
-Gets booking Type -Gets booking name -Gets booking ID -Gets booking date -Gets tour name -Gets tour ID	-Customers -Tour Package -Booking

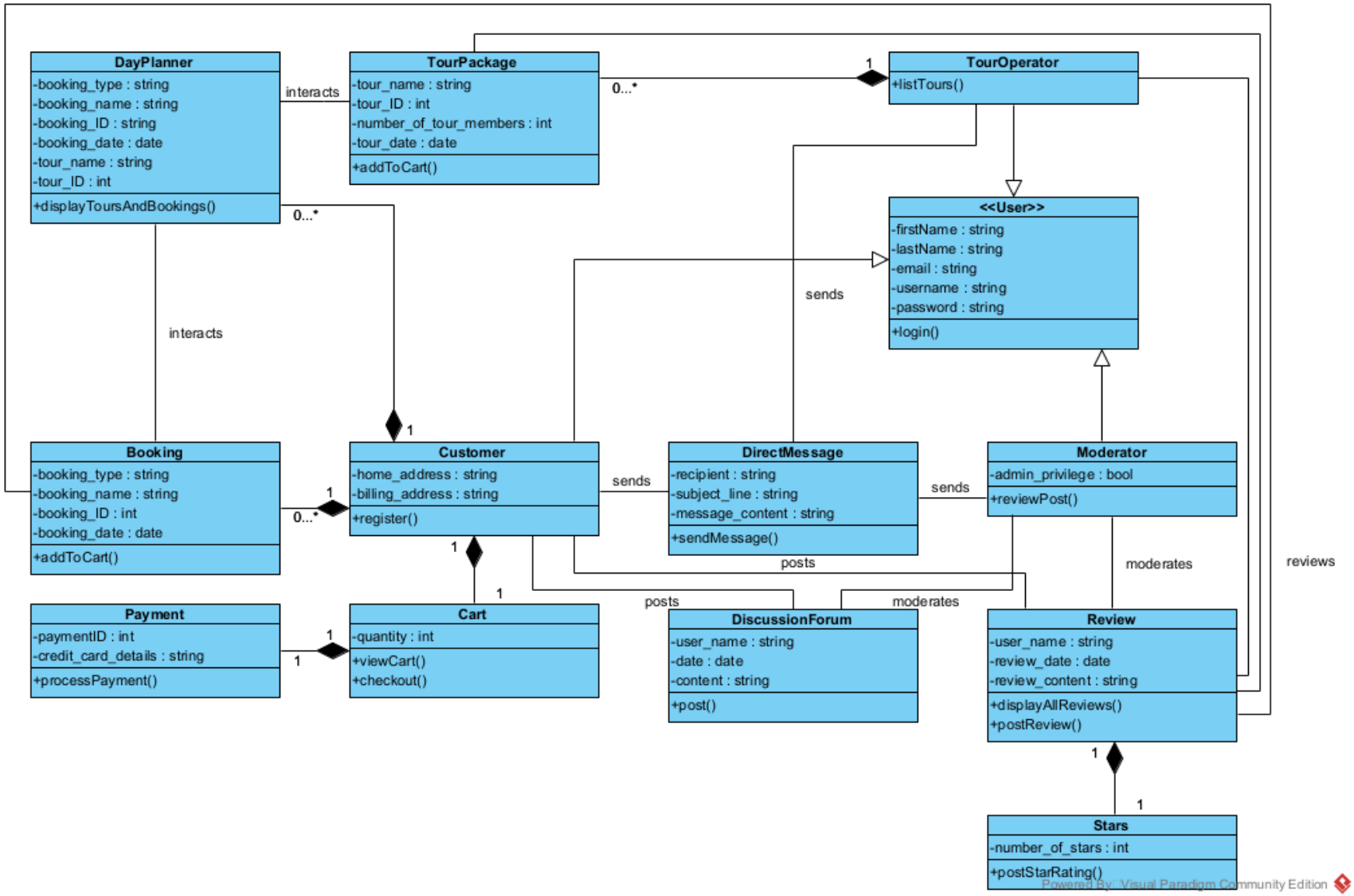
User	
Responsibilities	Collaborators
-Gets First name -Gets last name -Gets email -Gets username -Gets password	-Customer -Tour Operator -Moderator

Moderator	
Responsibilites	Collaborators
-Gets admin privileges	-User -Direct message -Discussion forum -Review

Direct Message	
Responsibilities	Collaborators
-Gets recipient -Gets subject line -Gets message content	-Customers -Moderator -Tour Operator

Discussion Forum	
Responsibilites	Collaborators
-Gets Username -Gets content -Gets date	-Customers -Moderators

CRC Cards

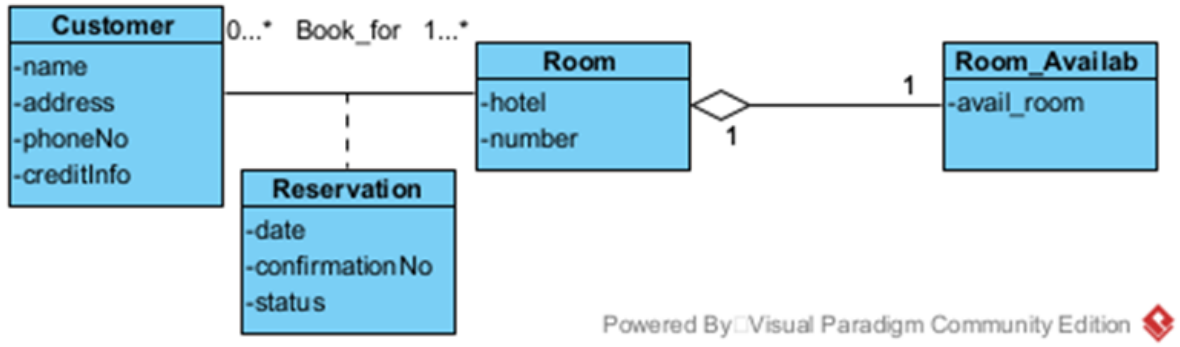


Final Class Diagram

Analysis Pattern

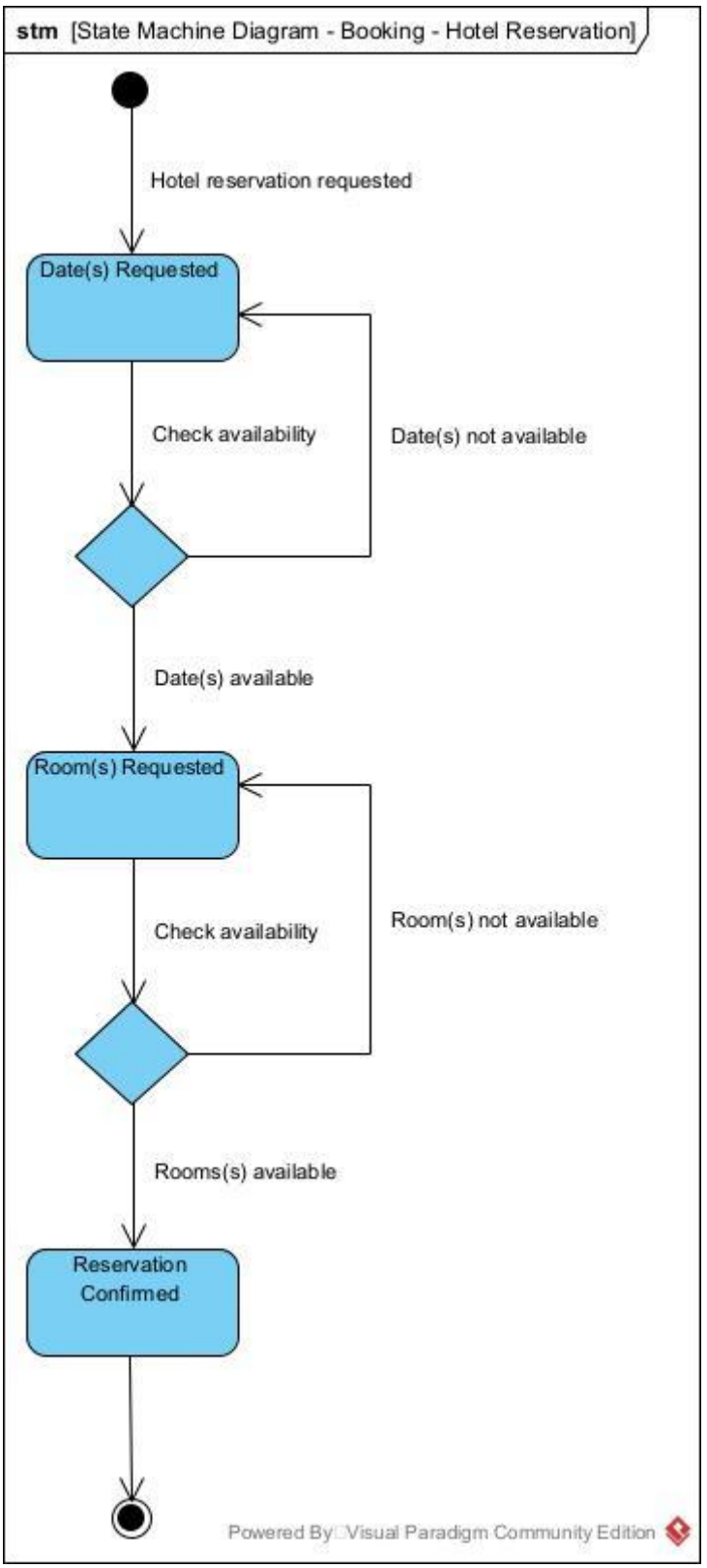
Analysis patterns are useful tools in the software development process. In general, they are pre-existing solutions to specific problems in a domain. It is important to note that these are modeling solutions, not code. As such, analysis patterns are often represented with UML class diagrams.

Fernández and Yuan (2000) proposed an analysis pattern for the reservation of “reusable entities” (e.g., hotel rooms and rental cars), which perfectly describes the hotel reservation functionality of the SpaceVoyager app. The below is the UML class diagram replicated from Fernández and Yuan (2000). A customer can make reservations for 1 or more hotel rooms. Meanwhile, a hotel room can be vacant (with no active reservations), but can also be associated with many customers over time. Additional information regarding the booking is provided by the association class, Reservation. The Room_Availab class (describing available rooms) is in an aggregate (is-part-of) relationship with the Room class.

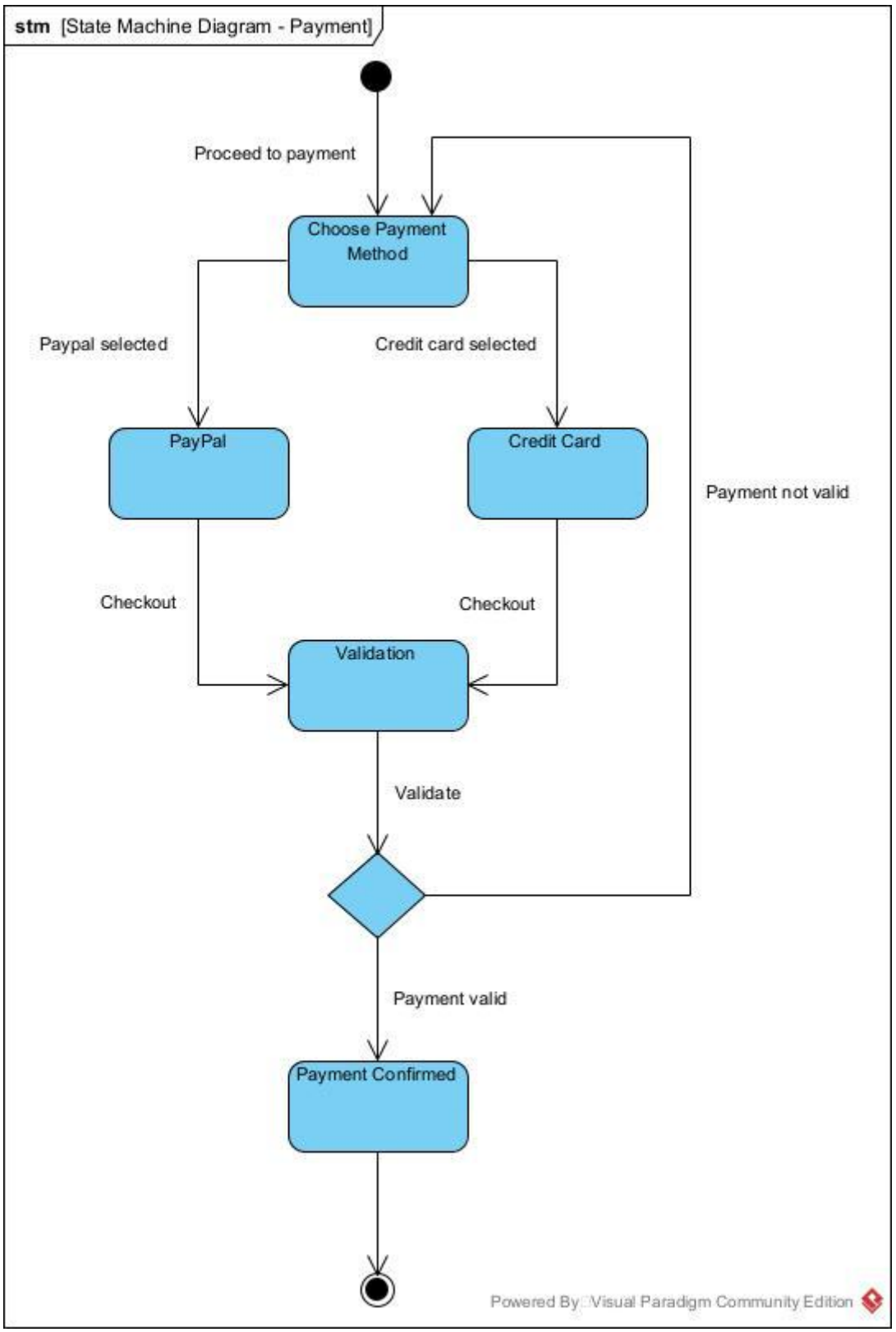


References:

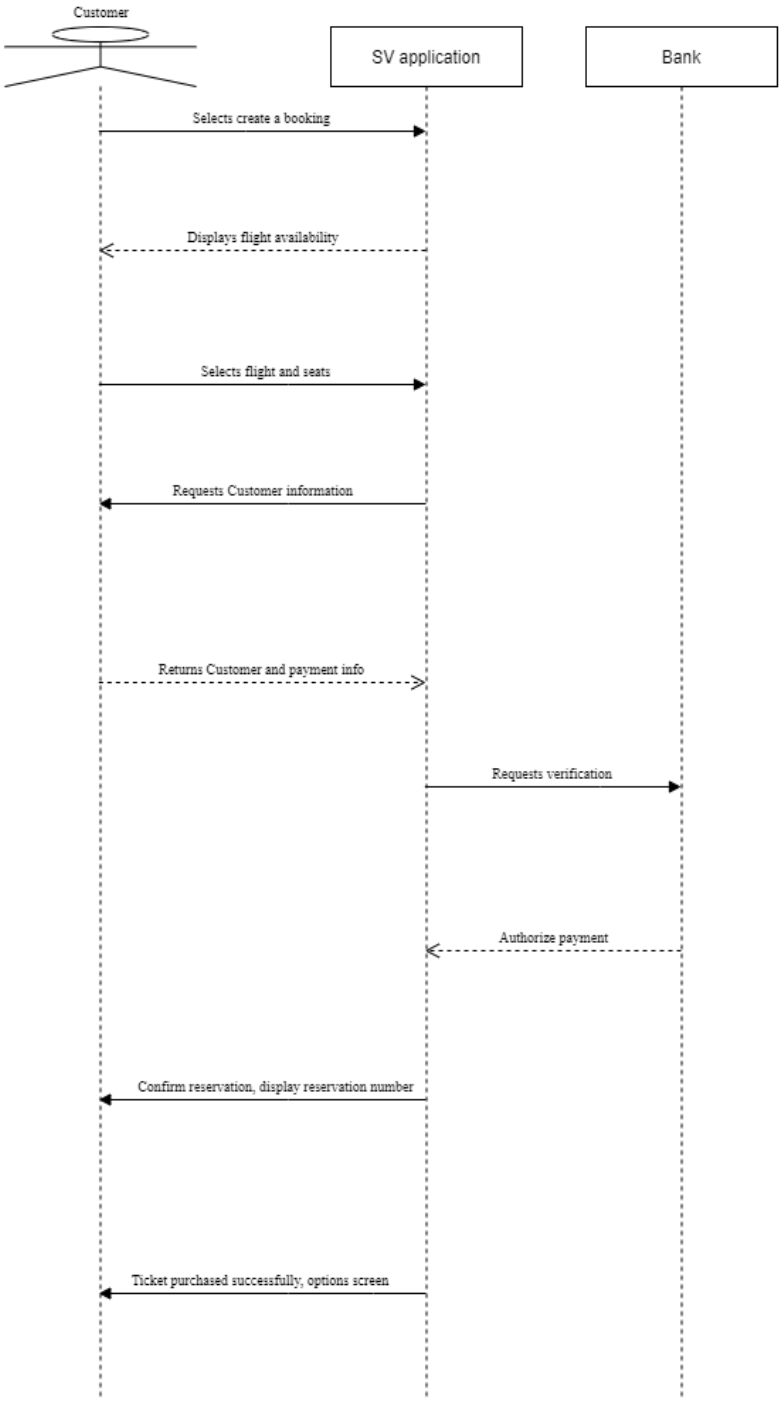
Fernández, E. B., & Yuan, X. (1999, August). *An analysis pattern for reservation and use of reusable entities* [Conference session]. Pattern Languages of Programs Conference (PLoP99), Monticello, IL, USA. https://hillside.net/plop/plop99/proceedings/Fernandez2/reservAnalysisPattern3.PDF



State Diagram - Hotel Reservation



State Diagram - Payment



Sequence Diagram