Flight Booking System

A flight booking system

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1. Summary:

The flight booking system allows users to book upcoming flights for their trips. They can browse flights before selecting a flight they want to book. Users will receive a booking number after successfully booking their flight. Users can then check their booking, cancel their flight, or edit their booking. The system also allows users to check the weather while booking their flight or while just browsing.

2. User stories:

As a customer **I need** to browse flights timetables **so that** I can plan my journey in advance.

As a customer **I need** to book a seat on a flight **so that** I can have a place on a plane for my journey.

As a customer **I need** a flight booking system **so that** I can select which seat I want to be sitting at for my flight.

As a customer **I need** to view my booking **so that** I can make sure that I have booked the correct journey.

As a customer **I need** to check the weather **so that** I can be reassured my flight will go ahead if the weather permits it.

As a customer **I need** to update my booking **so that** I can change seats if I change my mind, or I wish to upgrade for a more comfortable journey.

As a customer **I need** to cancel my booking **so that** I can cancel my journey if plans change, or I change my mind.

3. Use case diagram:

Flight booking system
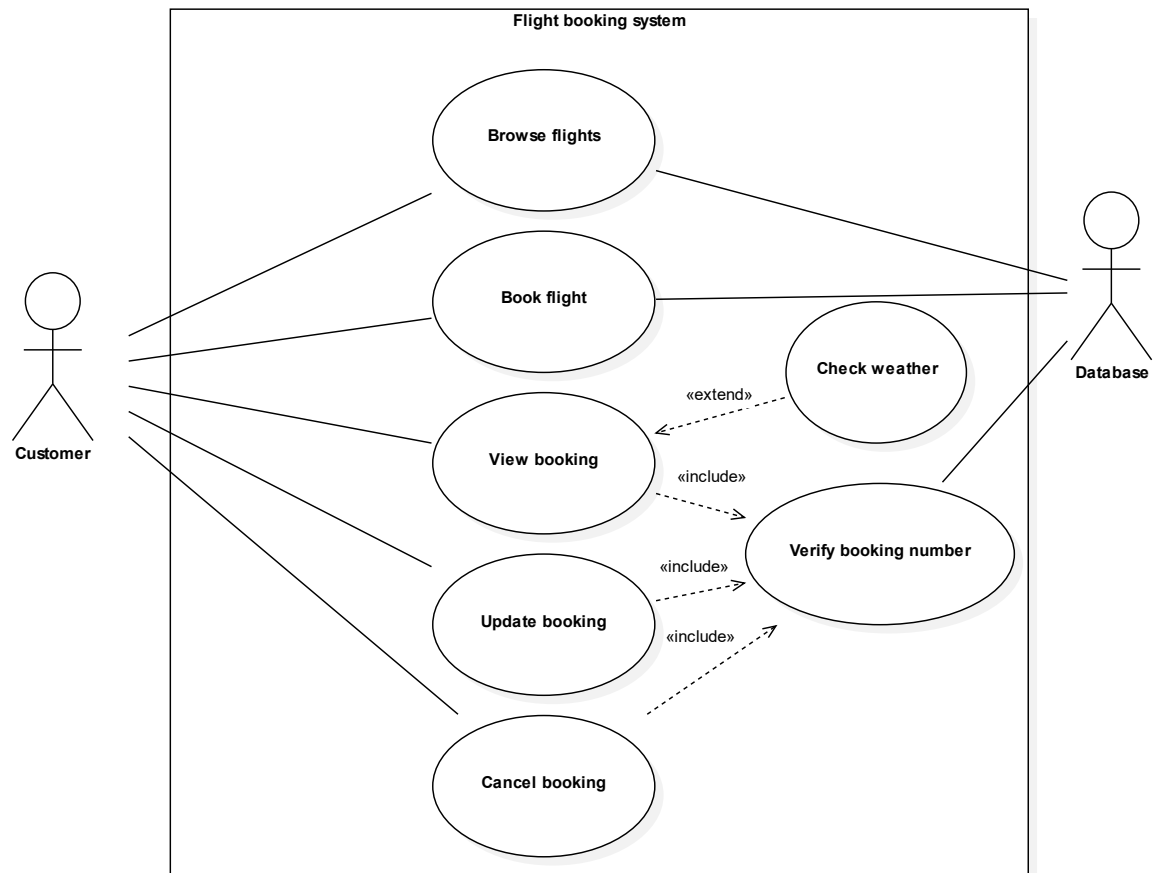
4. Use case scenarios:

Use case name: Browse flights	
UniqueID: 1	
Area: Browse flights menu	
Actor(s): Customer, Database	
Description: Customer browses flights	
Triggering Event: Customer selecting the "browse flights" button	
Trigger type: ☒External ☐Temporal	
Steps Performed (Main Path)	**Information for Steps**
1. Customer selects the browse flights button.	Customer, BrowseButton
2. Customer selects dates for a flight.	Customer
3. System retrieves flight information from the flights database.	Flight, FlightDatabase
4. System displays flight information for the user.	Flight, Display Tab
5. User can now browse all the flights shown on screen.	User, Flight

Preconditions: Customer is on the main menu tab or in a different tab	
Postconditions: Customer is now on the browse flights tab	
Assumptions: The flights database is not empty	
Requirements met: User can browse flights	
Outstanding issues: Shown flight details are unknown currently	
Priority: 1	
Risk: Normal	

Use case name: Book flight

UniqueID: 2	
Area: Browse flights menu	
Actor(s): Customer, Database	
Description: Customer wants to book a selected flight	
Triggering Event: Customer selects "book flight" button on a flight	
Trigger type: ☒External ☐Temporal	

Steps Performed (Main Path)	Information for Steps
1. Customer selects a flight and a date.	Customer, Flight, FlightDatabase
2. Customer presses the book flight details.	Customer, Flight, BookFlightButton
3. Customer selects the seat they want to have.	Customer, Flight, Seat
4. Customer inputs credentials to book the flight.	Customer, Database
5. Customer inputs payment info to pay for the flight.	Customer, Database, Payment
6. System verifies credentials with database and confirms payment.	Database, Payment
7. System creates unique booking number and reserves a place for the user on the plane.	Flight, Booking
8. Customer receives their booking number.	Customer, Booking

|	
Preconditions: Customer is on the browse flights menu	
Postconditions: Customer receives a booking number, and their seat is now booked	
Assumptions: Customer has selected a flight	
Requirements met: User can book a flight	
Outstanding issues: How should a booking number be created and stored?	
Priority: 2	
Risk: High	

Use case name: View booking

UniqueID: 3	
Area: View booking menu	
Actor(s): Customer, Database	
Description: Allows the customer to view their booking	
Triggering Event: Customer selects "view booking" button in the menu	
Trigger type: ☒External ☐Temporal	

Steps Performed (Main Path)	Information for Steps
1. Customer selects the "view booking" button.	Customer, ViewBookingButton
2. Customer enters their booking number and email address	Customer
3. System verifies credentials with database	Database, Booking
4. Customer receives access to view their booking and a button to view the weather	Customer, Booking, Flight, Seat
5. If customer chooses to view the weather, they shall be presented with the weather forecast during their flight	Customer, Weather
6. Customer leaves the weather menu and returns to their booking details	Customer, Booking, Flight, Seat

Preconditions: Customer is in the main menu or any menu where the button is accessible	
Postconditions: Customer can see their booking details	
Assumptions: Customer has previously booked a seat	
Requirements met: Customer can view their booking	
Outstanding issues: Customer has no way of viewing their details if they lose the booking number, weather forecast may be inaccurate	
Priority: 3	
Risk: Normal	

Use case name: Update booking

UniqueID: 4	
Area: View booking menu	
Actor(s): Customer, Database	
Description: Customer can update their booking details	
Triggering Event: Customer presses the "update my booking" button	
Trigger type: ☒External ☐Temporal	

Steps Performed (Main Path)	Information for Steps
1. Customer has selected the "update booking" button	Customer, UpdateBookingButton
2. Customer is presented with a few options regarding their booking	Customer, Menu

3. Customer selects to change their seat or their flight entirely	Customer, Flight, Seat, Database
4. System verifies seat and flight availability	Database, Flight, Seat
5. Customer enters payment details to pay for any upgrades if applicable	Customer, Database, Payment
6. System verifies payment information and updates the booking accordingly	Database, Payment, Flight, Seat, Booking
7. Customer receives a confirmation	Customer, Booking

| **Preconditions:** Customer has selected to view their booking details and has previously made a booking |
|---|
| **Postconditions:** Customer's booking details have been updated successfully |
| **Assumptions:** Other booking options are available |
| **Requirements met:** Customer can update their booking |
| **Outstanding issues:** Seats or flights may be unavailable, updating booking may be impossible if all flights booked |
| **Priority:** 5 |
| **Risk:** Very high |

Use case name: Cancel booking

UniqueID: 5
Area: View booking menu
Actor(s): Customer, Database
Description: Allows the customer to cancel their booking
Triggering Event: Customer selects the "cancel booking" button in the menu
Trigger type: ☒External ☐Temporal

Steps Performed (Main Path)	**Information for Steps**
1. Customer has selected the "cancel booking" button	Customer, CancelBookingButton
2. Customer is given a prompt to make sure they really want to cancel	Customer
3. System processes the request and cancels the booking and frees up the seats	Database, Booking
4. Customer gets a confirmation notification	Customer

Preconditions: Customer has selected to view their booking details and has previously made their booking
Postconditions: Customer's booking has been cancelled successfully
Assumptions: Customer has a booking to be cancelled
Requirements met: Customer can cancel their booking
Outstanding issues: Does a customer have to cancel all their seats if they want to cancel a booking?
Priority: 4
Risk: Normal

5. Class Diagram:
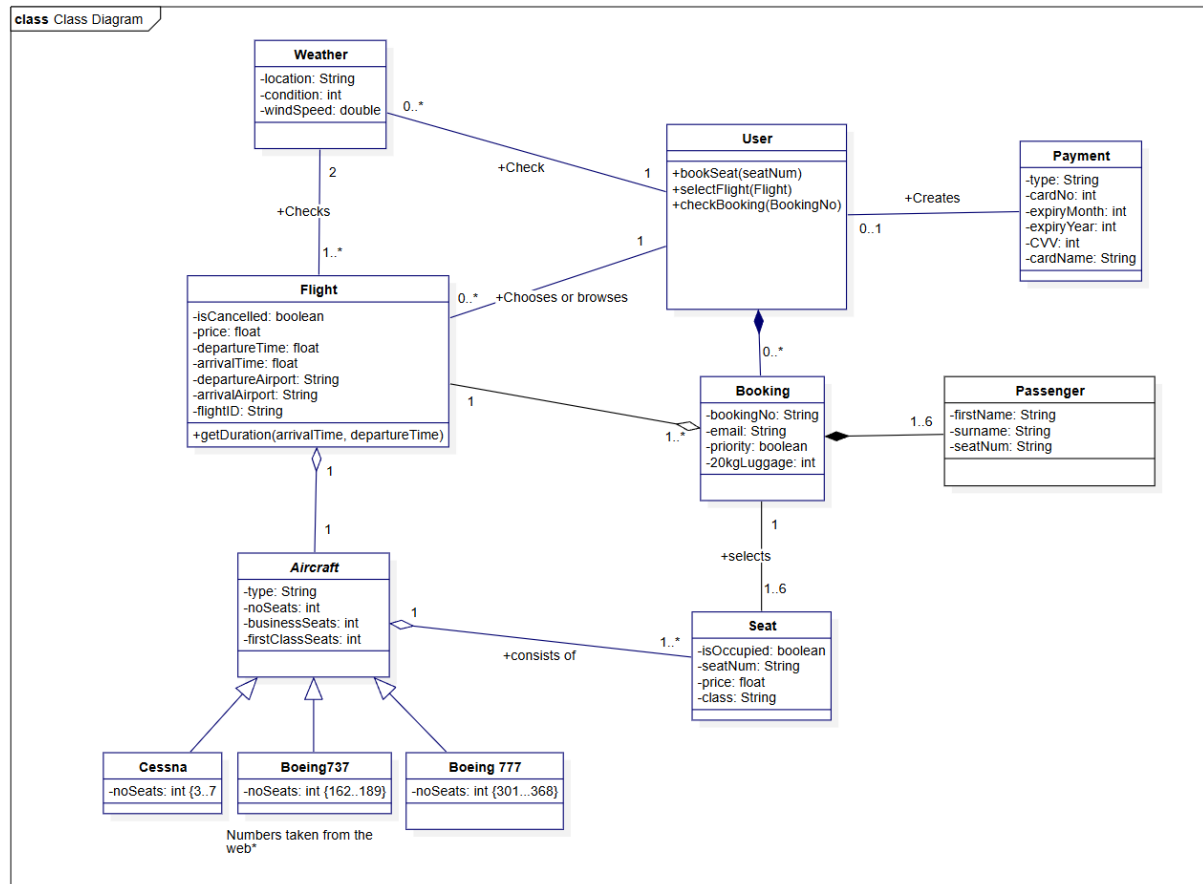
6. Sequence Diagrams:

Browse flights:
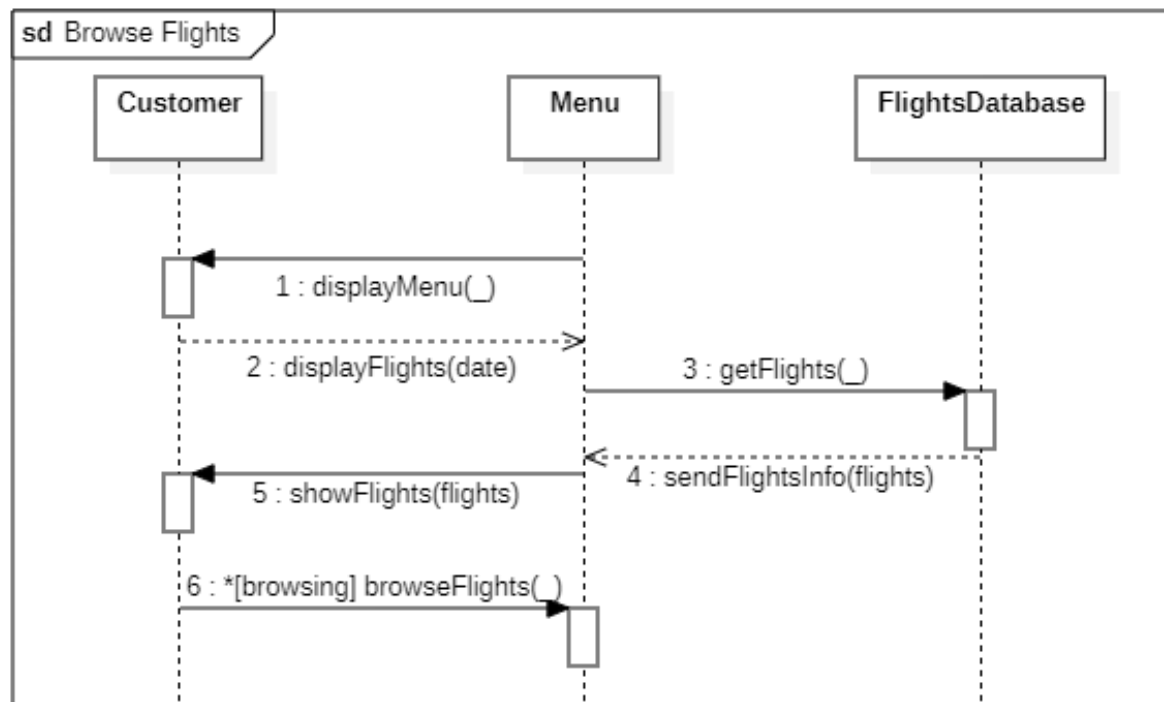
Seq No.	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1	Menu	Customer	displayMenu	Syn	-	-
2	Customer	Menu	displayFlights	Syn	date	-
3	Menu	Flights Database	getFlights	Syn	-	-
4	Flights Database	Menu	sendFlightsInfo	Syn	flights	-
5	Menu	Customer	showFlights	Syn	flights	-
6	Customer	Menu	browseFlights	Syn	-	=browsing

Book flight:
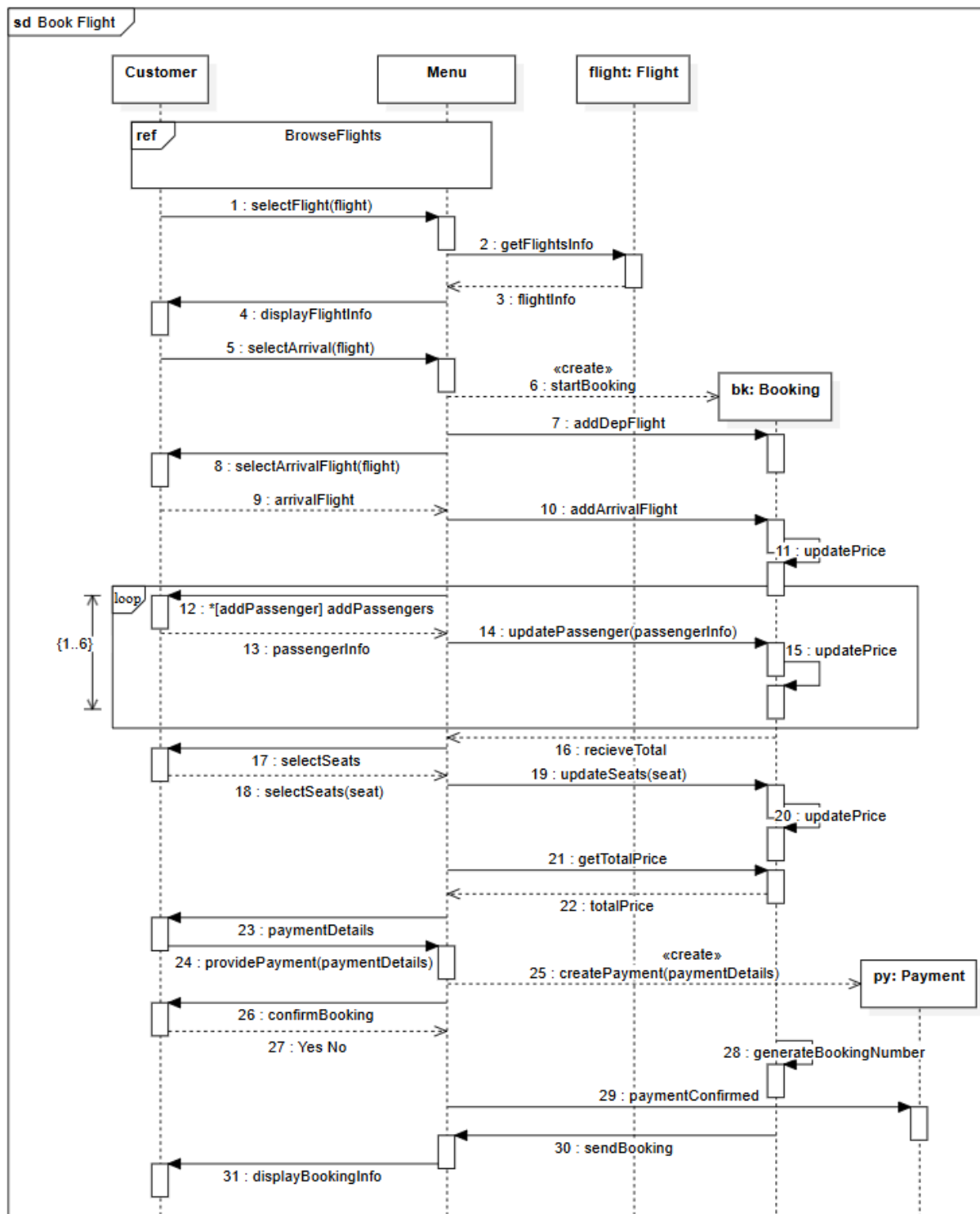
Seq No.	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
Ref	-	-	Browse Flights	Syn	-	-
1	Customer	Menu	selectFlight	Syn	flight	-
2	Menu	Flight	getFlightsInfo	Syn	-	-
3	Flight	Menu	flightInfo	Syn	-	-
4	Menu	Customer	displayFlightInfo	Syn	-	-
5	Customer	Menu	selectArrival	Syn	flight	-
6	Menu	Booking	startBooking	Syn	-	-
7	Menu	Booking	addDepFlight	Syn	-	-
8	Menu	Customer	selectArrivalFlight	Syn	flight	-
9	Customer	Menu	arrivalFlight	Syn	-	-
10	Menu	Booking	addArrivalFlight	Syn	-	-
11	Booking	Booking	updatePrice	Syn	-	-
12	Menu	Customer	addPassenger	Syn	-	=addPassenger
13	Customer	Menu	passengerInfo	Syn	-	-
14	Menu	Booking	updatePassenger	Syn	passengerInfo	-
15	Booking	Booking	updatePrice	Syn	-	-
16	Booking	Menu	recieveTotal	Syn	-	-
17	Menu	Customer	selectSeats	Syn	-	-
18	Customer	Menu	selectSeats	Syn	seat	-
19	Menu	Booking	updateSeats	Syn	seat	-
20	Booking	Booking	updatePrice	Syn	-	-
21	Menu	Booking	getTotalPrice	Syn	-	-
22	Booking	Menu	totalPrice	Syn	-	-
23	Menu	Customer	paymentDetails	Syn	-	-
24	Customer	Menu	providePayment	Syn	paymentDetails	-
25	Menu	Payment	createPayment	Syn	paymentDetails	-
26	Menu	Customer	confirmBooking	Syn	-	-
27	Customer	Menu	Yes No	Syn	-	-
28	Booking	Booking	generateBookingNumber	Syn	-	=ok
29	Menu	Payment	PaymentConfirmed	Syn	-	-
30	Booking	Menu	sendBooking	Syn	-	-
31	Menu	Customer	displayBookingInfo	Syn	-	-

Verify booking details:
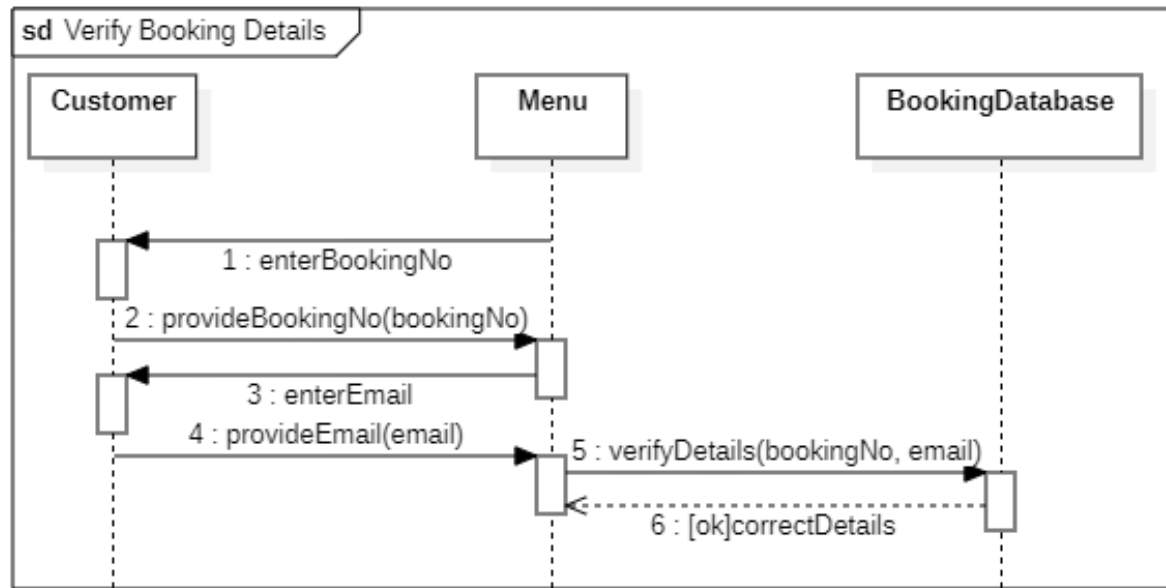
Seq No.	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1	Menu	Customer	enterBookingNo	Syn	-	-
2	Customer	Menu	provideBookingNo	Syn	bookingNo	-
3	Menu	Customer	enterEmail	Syn	-	-
4	Customer	Menu	provideEmail	Syn	Email	-
5	Menu	Booking Database	verifyDetails	Syn	bookingNo, email	-
6	Booking Database	Menu	correctDetails	Syn	-	=valid details

Check weather:
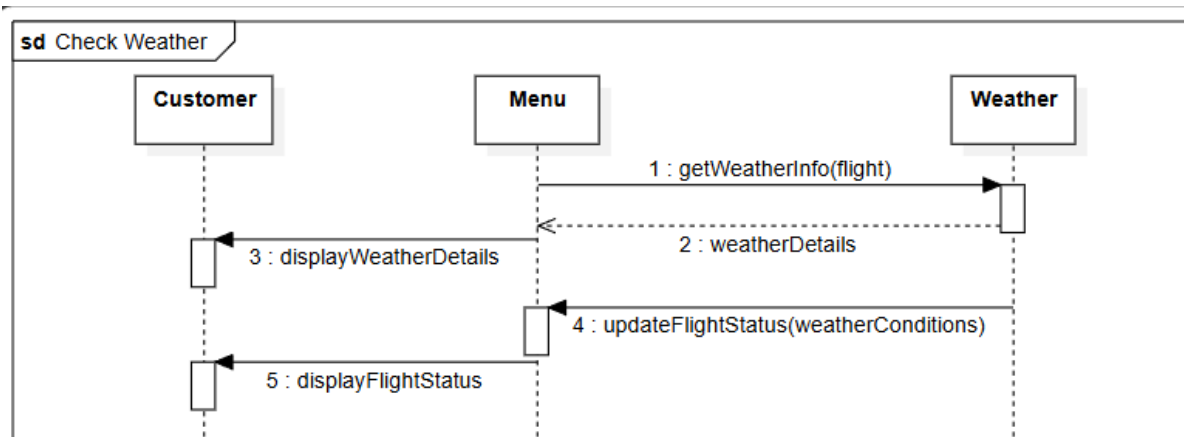
Seq No.	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1	Menu	Weather	getWeatherInfo	Syn	flight	-
2	Weather	Menu	weatherDetails	Syn	-	-
3	Menu	Customer	displayWeatherDetails	Syn	-	-
4	Weather	Menu	updateFlightStatus	Syn	weatherConditions	-
5	Menu	Customer	displayFlightStatus	Syn	-	-

View booking:
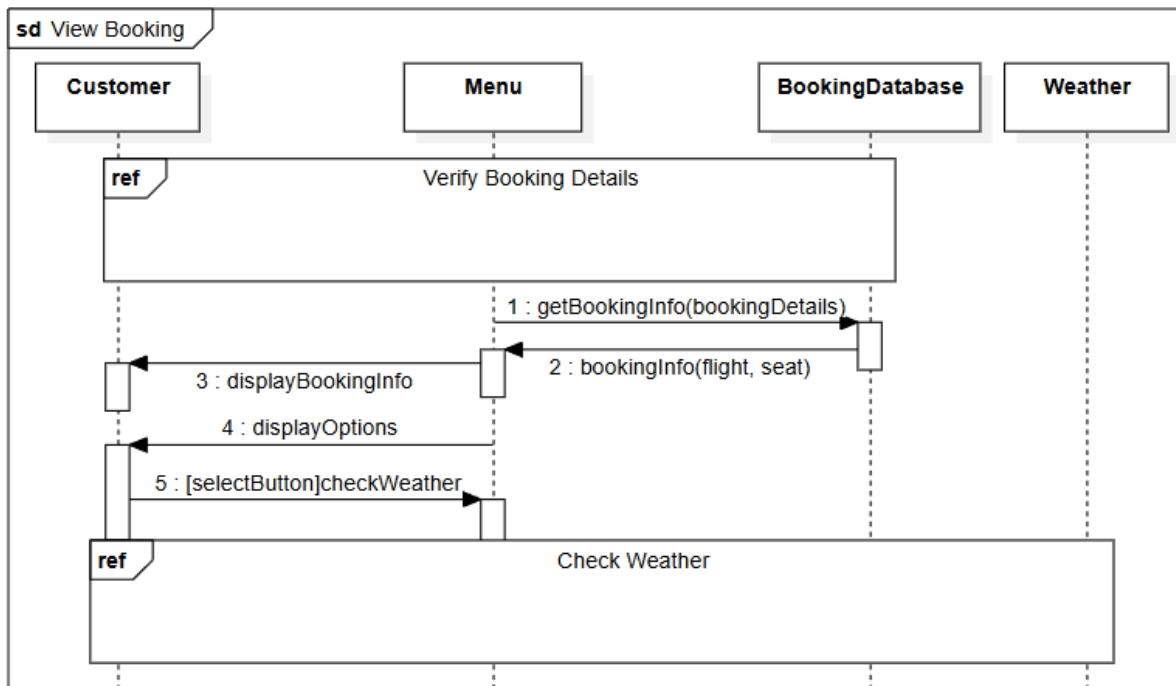
Seq No.	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
Ref	-	-	Verify Booking Details	Syn	-	-
1	Menu	Booking Database	getBookingInfo	Syn	bookingDetails	-
2	Booking Database	Menu	bookingInfo	Syn	flight, seat	-
3	Menu	Customer	displayBookingInfo	Syn	-	-
4	Menu	Customer	displayOptions	Syn	-	-
5	Customer	Menu	checkWeather	Syn	-	=button selected
Ref	-	-	Check Weather	Syn	-	-

Update booking:
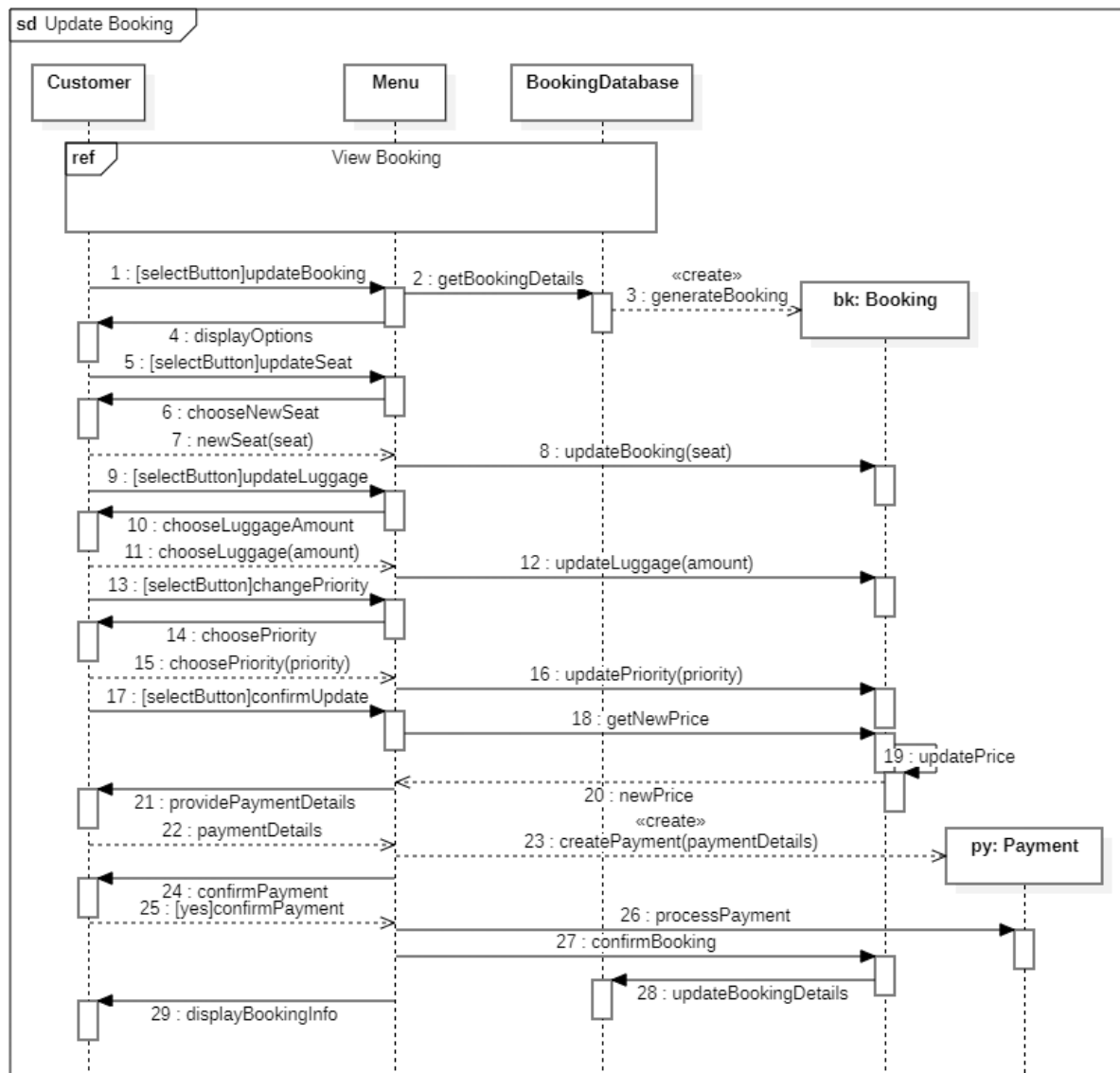
Seq No.	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
Ref	-	-	View Booking	Syn	-	-
1	Customer	Menu	updateBooking	Syn	-	=button selected
2	Menu	Booking Database	getBookingDetails	Syn	-	-
3	Booking Database	Booking	generateBooking	Syn	-	-
4	Menu	Customer	displayOptions	Syn	-	-
5	Customer	Menu	updateSeat	Syn	-	=button selected
6	Menu	Customer	chooseNewSeat	Syn	-	-
7	Customer	Menu	newSeat	Syn	seat	-
8	Menu	Booking	updateBooking	Syn	seat	-
9	Customer	Menu	updateLuggage	Syn	-	=button selected
10	Menu	Customer	chooseLuggageAmount	Syn	-	-
11	Customer	Menu	chooseLuggage	Syn	amount	-
12	Menu	Booking	updateLuggage	Syn	amount	-
13	Customer	Menu	changePriority	Syn	-	=button selected
14	Menu	Customer	choosePriority	Syn	-	-
15	Customer	Menu	choosePriority	Syn	priority	-
16	Menu	Booking	updatePriority	Syn	priority	-
17	Customer	Menu	confirmUpdate	Syn	-	=button selected
18	Menu	Booking	getNewPrice	Syn	-	-
19	Booking	Booking	updatePrice	Syn	-	-
20	Booking	Menu	newPrice	Syn	-	-
21	Menu	Customer	providePaymentDetails	Syn	-	-
22	Customer	Menu	paymentDetails	Syn	-	-
23	Menu	Payment	createPayment	Syn	payment Details	-
24	Menu	Customer	confirmPayment	Syn	-	-
25	Customer	Menu	confirmPayment	Syn	-	=yes selected
26	Menu	Payment	processPayment	Syn	-	-
27	Menu	Booking	confirmBooking	Syn	-	-
28	Booking	Booking Database	updateBookingDetails	Syn	-	-
29	Menu	Customer	displayBookingInfo	Syn	-	-

Cancel booking:
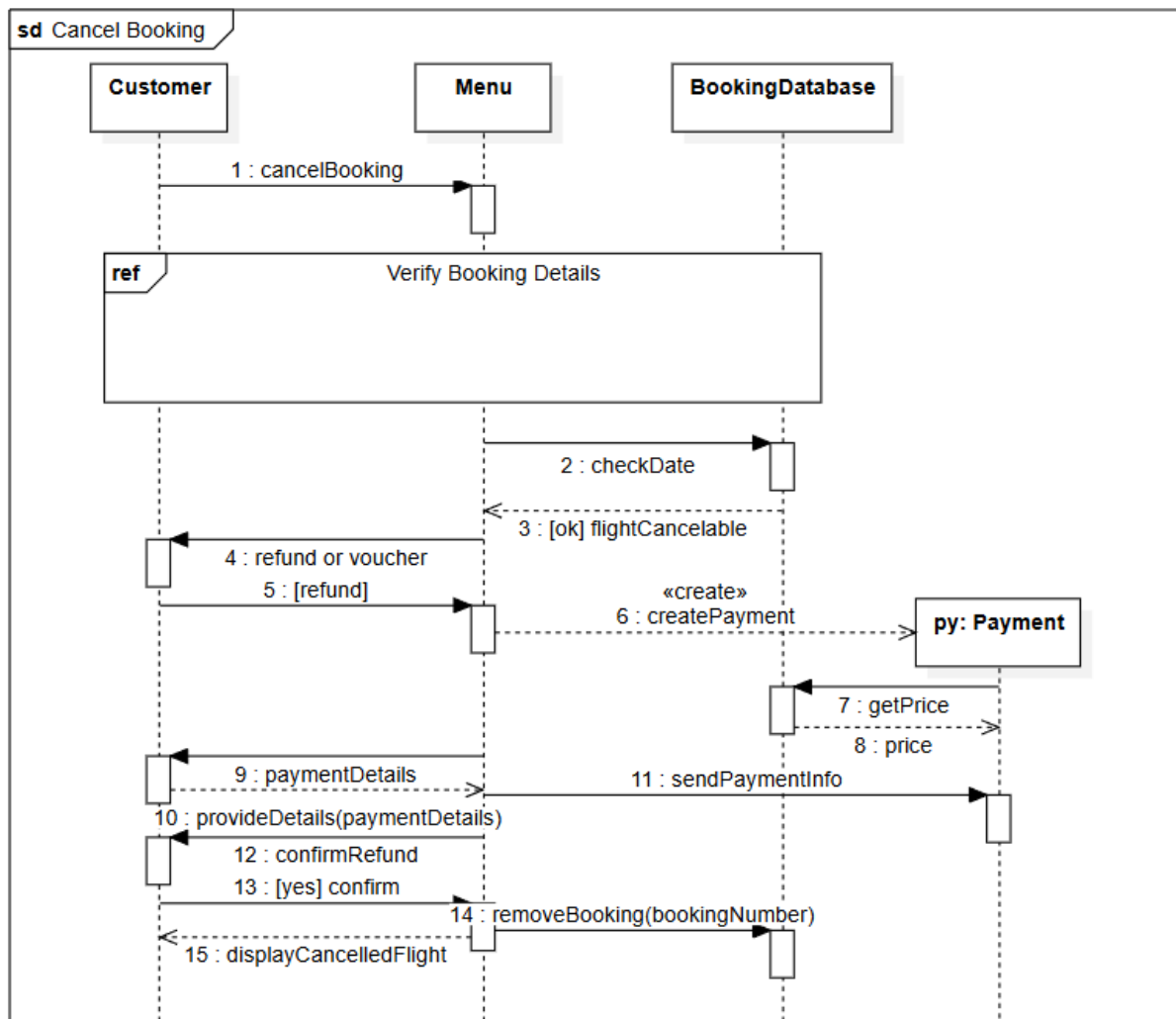
Seq No.	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1	Customer	Menu	cancelBooking	Syn	-	-
Ref	-	-	View Booking	Syn	-	-
2	Menu	Booking Database	checkDate	Syn	-	=ok
3	Booking Database	Menu	flightCancelable	Syn	-	-
4	Menu	Customer	Refund/voucher	Syn	-	=refund
5	Customer	Menu	refund	Syn	-	-
6	Menu	Payment	createPayment	Syn	-	-
7	Payment	Booking Database	getPrice	Syn	-	-
8	Booking Database	Payment	Price	Syn	-	-
9	Menu	Customer	getpaymentDetails	Syn	-	-

10	Customer	Menu	providePaymentDetails	Syn	payment Details	-
11	Menu	Payment	sendPaymentDetails	Syn	-	-
12	Menu	Customer	confirmRefund	Syn	-	-
13	Customer	Menu	Confirm	Syn	-	=yes
14	Menu	Booking Database	removeBooking	Syn	booking Number	-
15	Menu	Customer	displayCancelledFlight	Syn	-	-

7. Test Cases:

Name	Browse flights
Testcase ID	FM_BR_01
Requirement	User can browse available flights
Preconditions	There are flights in the database to view
Steps	1. Click on the "Browse flights" button 2. Select departure airport. (Dublin) 3. Select start date. (30/11/24) 4. Select arrival airport. (Barcelona) 5. Select return date. (10/12/24)
Expected results	1. The current screen is replaced with a "Browse flights" screen 2. All the flights in the database load and display in list format

Name	Book a flight
Testcase ID	FM_BR_02
Requirement	User can book a flight
Preconditions	User is browsing flights
Steps	1. Click on the flight you want to book (Dublin – Barcelona) 2. Select departure date and time (1/12/24 10am) 3. Select return date and time (7/12/24 9pm) 4. Select seats (2) 5. Select luggage (2) 6. Select priority boarding (true) 7. Enter an email address (test@gmail.com) 8. Click on the "Confirm" button 9. Enter payment details, card no = (1234567812345678), cvv = (123), expiryDate = (01/28) 10. Click on the "Pay now" button
Expected results	1. The database verifies payment details 2. The bookings database is updated with the appropriate flight details 3. Database generates a booking number 4. "Book flight" window is replaced with a "Booking confirmation" window 5. The generated booking no and email address is displayed with a confirmation message

Name	Verify booking details
Testcase ID	FM_VB_01
Requirement	User can verify their booking details
Preconditions	User has previously made a booking and has received log in details
Steps	1. Click on the "Booking no" field 2. Enter a valid booking number 3. Click on the "Email address" field 4. Enter a valid email address associated with the booking number 5. Click on the "Log in" button
Expected results	1. User is logged in 2. User is presented with a confirmation of successful login

Name	View booking
Testcase ID	FM_VB_02
Requirement	User can view their booked flight
Preconditions	User has a valid booking, and the booking has been verified
Steps	1. User has verified booking details. 2. User can press the check weather button
Expected results	1. User can press the check weather button 2. User can change their booking details.

Name	Check the weather
Testcase ID	FM_CW_01
Requirement	User can check the weather
Preconditions	User has verified booking details or is checking flights
Steps	1. User inputs weather location (Barcelona) 2. Click the confirm button.
Expected results	1. User receives weather updates 2. User sees if flight is cancelled.

Name	Update booking
Testcase ID	FM_UB_01
Requirement	User can update their booking
Preconditions	User has verified their booking details
Steps	1. User presses the update bookings button 2. User selects the manage luggage button 3. Add luggage (1 20kg bag) 4. User presses change seat button 5. Change seat (seat A17) 6. User presses change priority button 7. Change priority (Priority boarding) 8. Click confirm changes button 9. Input payment details (card details) 10. Click Confirm payment button
Expected results	1. The booking details are changed to match the changes made. 2. A payment should be taken from the user's account.

| | 3. The user should be on the view bookings menu. |
| | 4. The database updates the seating occupations. |

Name	Cancel booking
Testcase ID	FM_CB_01
Requirement	User can cancel their booking
Preconditions	User has verified their booking
Steps	1. Press the cancel button.
	2. Select compensation (Refund flight option)
	3. Input payment details (User card details)
	4. Press confirm button.
Expected results	1. User should have the booking removed from their bookings.
	2. The booking should be removed from the database.
	3. A payment, if required, should be sent to the user's account.

Contribution list:

Summary: Oliwier Jakubiec

Use case stories: Brandon Jaroszczak & Oliwier Jakubiec

Use case diagram: Brandon Jaroszczak

Scenario specification tables: Oliwier Jakubiec (1,2) & Brandon Jaroszczak (3,4,5)

Class diagram: Brandon Jaroszczak & Oliwier Jakubiec

Sequence diagrams: Oliwier Jakubiec (1,2,3,7) & Brandon Jaroszczak (3,4,5,6)

Message analysis tables: Oliwier Jakubiec (1,2,3,7) & Brandon Jaroszczak (3,4,5,6)

Test cases: Brandon Jaroszczak (1,2,3) & Oliwier Jakubiec (4,5,6)