

Phase3-Feedback: G4-s2

- [3.1] Scenarios: B/A-, some have issues, check individually
- [3.2] Actor Description: B+, reasonably written - check as a group
- [3.3] Overall Use-Case Diagram: B- , has several issues, check as a team and match with scenarios and described use cases
- [3.4] Described use-cases: C+/A-, have issues, check individually
- [3.5] Overall Activity Diagram: B+, but has some issues, check as a team.
- [3.6] Individual Activity Diagrams: C+/B+, some have issues, check individually

=> Noted Names of the members of the team who have contributed to the team-tasks, on each of the team-tasks: Actors Descriptions, Overall Use Case diagram, Activity Diagram

Overall Mark/Evaluation:(B): needs Major improvements

Individual Mark: individual mark will be combined together and provided on all individual tasks in the final report [check feedback on your individual tasks]

If issues/comments, for team-tasks and individual-tasks, are addressed for the final report, tasks may get reconsidered.

Computer Science Department - COMP433

First Semester – Fall 2025/2026

Course Project

Online Flights Booking

Phase 3: Requirements Analysis and Modelling

Instructor: Dr. Adel AlTaweel

Group Number: 4

Section: 2

Date: 10/1/2025

Group Members:

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Task 3.1: Scenario Analysis

Should be a standalone scenario for the business service?
Scenario should focus on the business, to achieve a business service

A-

Scenario #1: Book a Flight Ticket Online [Diaa]

Initial assumption, in a separate section, should describe a state at which this service can be invoked.e.g. a user must be logged in

Initial Assumption

The customer is a registered user of the airline online booking system and is fully logged in. The system is operational, connected to the external airline and airport services, and there are scheduled flights available for booking. The customer has access to the internet and possesses valid personal and travel information required for booking.

Normal

The customer books a flight ticket online through the airline booking system. The customer searches for available flights by entering the departure city, destination, travel dates, and number of passengers. The system retrieves and displays a list of available flights along with prices, and ticket classes. The customer selects a suitable flight, chooses a class (Economy, Business, or VIP), and proceeds to enter passenger details, including identification information, and contact details. The customer then selects optional services such as seat selection and baggage options. After reviewing the booking summary, the customer chooses to pay online using a valid card. The system securely processes the payment through the bank gateway, confirms the transaction, finalizes the booking, generates a booking reference number, and issues an electronic ticket (e-ticket) to the customer via email. The booking is stored in the system database successfully.

Reasonable/valid described normal scenario?- needs to be specific, normal or default method of achieving the specific business service, and provide clearer description detailing how the scenario/process to be achieved

Alternative

The customer books a flight ticket online but chooses a different business process to complete the booking. After selecting the flight, ticket class, and entering passenger details, the customer selects the "pay later / cash payment" option instead of online card payment. The system temporarily reserves the selected seats and generates a booking reference number and payment status. The customer is instructed to visit the airline office within a specified time period to complete the payment in cash. Once the payment is received by the staff, the system updates the booking status to confirmed and issues the e-ticket to the customer. The reservation is successfully completed without online payment.

Reasonable/Valid alternative, alternative should be an alternative way to achieve the task in alternative options through business processes (e.g., pay by cash, or pay by card), or through system functionalities (select a product item through Search list, or select a product item through browsing)

Error

The customer attempts to book a flight ticket online and proceeds to the payment stage using a valid card. After entering valid card details, the system sends the payment to the payment authorization service, but the transaction is declined due to an authorization failure. The system displays an error message indicating that the booking cannot be completed, and the booking is not finalized. The customer must wait for a specified timeout period, and no reservation reference or ticket is issued.

reasonable/valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, failed by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

Error

The customer books a flight ticket online and completes all booking steps. During the final confirmation stage, the system fails to save the booking due to a system connectivity error. The system notifies the customer of the error.

reasonable/ Poor valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization)

be completed and advises them to retry later or contact customer support. No ticket is issued, and the transaction is rolled back to prevent inconsistent data.

A-

Scenario #2: Change Flight Date [Nasri]

Initial Assumption

A registered customer is logged into the flight booking system and already has a paid booking with a valid reservation reference (PNR). The ticket is within the change window and its fare rules allow date changes (or allow changes only in critical cases). The customer has a critical reason (medical emergency) and can provide supporting documentation if required by policy. The system is online and connected to the airline inventory and payment gateway services.

Normal

The customer opens “My Bookings”, selects the confirmed reservation, and clicks “Change Flight Date.” The system first displays the ticket’s change policy (change window, possible fees, and fare difference rules) and asks the customer to select a critical-case reason and upload proof (medical report) if required. After the customer submits the reason, the system checks eligibility and temporarily locks the booking to prevent parallel modifications. The customer selects a new travel date, and the system lists available flights for the selected date, departure/arrival time, remaining seats, and available classes (VIP/Business). The customer selects with baggage and seat options. The customer chooses a replacement flight. The system re-checks availability in real time, validates fare rules, calculates the change fee plus the fare difference. A clear summary is shown (old itinerary, fees, total difference, and refund/charge direction). The customer pays the difference. Once the payment is authorized successfully, the system commits the transaction, releases the old seat inventory, reserves the new seat, updates the booking record, and issues an updated e-ticket/itinerary. Finally, the system sends confirmation on-screen and by email/SMS, and updates the financial records (invoice/receipt) to reflect the additional payment and the modification history for audit purposes.

Alternative

Instead of changing the date online, the customer contacts customer support (or visits the agency office) and provides the reservation reference and identification details. The staff verifies the customer identity, checks the booking’s fare rules and the airline’s critical-case policy, and requests the necessary supporting proof if it was not already provided. The staff searches for alternative flights that match the route and the customer preferences (time, class, baggage needs, special services) and proposes one or more valid options. Once the customer confirms the preferred option, the staff informs the customer of the change fee and fare difference and collects payment using an offline method such as cash or bank transfer confirmation. Once payment is confirmed, the staff confirms the transaction in the system, which updates the reservation, reserves the new seat, and issues an updated itinerary. The staff sends the new itinerary to the customer, while ensuring all financial and system logs are updated correctly.

Error

The customer selects a new flight date and the system calculates the change fee and fare difference. The customer proceeds to pay the required amount by Visa/card, but the bank/payment gateway rejects the transaction (for example, insufficient balance, incorrect card

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Scenario should focus on the business, to achieve a business service

Initial assumption, in a separate section, should describe a state at which this service can be invoked.e.g. a user must be logged in

Reasonable/valid described normal scenario?- needs to be specific, normal or default method of achieving the specific business service, and provide clearer description detailing How the scenario/ process to be achieved

POOR/Valid alternative, alternative should be an alternative way to achieve the task in alternative options through business processes (e.g., pay by cash, or pay by card), or through system functionalities (select a product item through Search list, or select a product item through browsing)

reasonable/valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

verification, or gateway timeout). As a result, the system does not confirm the modification and keeps the original booking unchanged. The system displays a clear message that payment failed, records the failed attempt, and offers the customer realistic next actions such as retrying the payment, using another payment method, or contacting customer support to complete the change through an alternative process.

Error

The customer selects the new flight and successfully completes payment for the fare difference. After payment confirmation, the system attempts to update the reservation and reserve the new seat in the airline inventory, but a system failure occurs (for example, failure to retrieve/update booking data from the database, or temporary unavailability of the airline inventory service). The modification is not completed, and the system prevents inconsistent results by keeping the original booking active and marking the change request as “failed” or “pending verification” based on policy. The system notifies the customer that the change could not be finalized due to a technical issue, provides a support reference number, and suggests the customer contact support/finance to verify the booking status and ensure receiving an updated ticket.

acceptable/valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

B

Scenario #3: Complete Pending Booking (Pay Later / Cash Payment at Office) [Omar]

Should be a standalone scenario for the business service?
Scenario should focus on the business, to achieve a business service

Initial Assumption

The customer is a registered user of the airline system and is successfully logged in. The customer has already created a pending booking for "Pay Later / Cash Payment" option, so the booking exists in the system. The pending booking is still within the allowed payment time window (before it expires). The system is operational and connected to the booking database. The airline office/authorized agent staff can access the system to confirm cash payments and update booking status. The customer has valid identification and booking information.

Initial assumption, in a separate section, should describe a state at which this service can be invoked.e.g. a user must be logged in

Normal

The customer completes a pending booking through cash payment at the airline office or authorized agent. The customer visits the office and provides the reservation reference (PNR) and identification details. The staff retrieves the pending booking details including flight information, ticket class, and the payment deadline. The staff verifies the customer's booking is still valid and not expired. The customer pays the cash. The staff records the cash payment in the system and confirms the booking status from Pending Payment to Confirmed, issues the final invoice/receipt, and stores the complete booking in the system database. The system sends booking confirmation and the e-ticket via email/SMS. The reservation is successfully completed.

Acceptable/valid described normal scenario?- needs to be specific, normal or default method of achieving the specific business service, and provide clearer description detailing how the scenario/process to be achieved

Alternative

The customer completes the pending booking but follows an alternative confirmation process. Instead of paying directly at the office, the customer pays through bank transfer (or presents a transfer receipt) and provides the proof to the staff. The staff reviews the transfer proof. After verifying the transfer details, the staff confirms it with the finance/manager account if required.

introduces unclear/new process/actors. sounds like a new service/process.

invalid alternative, alternative should be an alternative way to achieve the task in alternative options through business processes (e.g., pay by cash, or pay by card), or through system functionalities (select a product item through Search list, or select a product item through browsing)

Error

The customer attempts to complete the pending booking, but the booking has expired because the payment deadline has passed. The staff searches the PNR and the system shows that the booking status is Expired/Cancelled and displays an error message indicating that the booking is not accepted, no ticket is issued, and the booking cannot be completed through the online system.

reasonable/valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, payment by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

Error

The customer pays in cash and the staff attempts to confirm the payment, but the system fails to update the booking due to a database or connectivity error. The system notifies the staff that the confirmation process could not be completed and prevents issuing an e-ticket to avoid inconsistent data. The staff provides the customer with a manual payment receipt/reference and advises them to retry shortly or contact support. The system logs the failure for follow-up, and the booking remains Pending Payment until the issue is resolved (or the transaction is verified and completed).

poor valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

C+

Scenario #4: Search for Available Flights [Sameer]

Should be a standalone scenario for the business service?
Scenario should focus on the business, to achieve a business service

Initial Assumption

The customer is a registered user of the airline online system through the internet. The system is operational, contains scheduled flights with up-to-date schedules necessary travel information such as departure city, destination, and travel date to perform a flight search.

Initial assumption, in a separate section, should describe a state at which this service can be invoked.e.g. a user must be logged in

Normal

The customer searches for available flights in the airline booking system. The customer enters the departure city, destination, and number of passengers in the search form. The system validates the entered information against the flight database, and retrieves matching flights from the database. The system then displays the available flights including airline name, departure and arrival times, ticket prices, and the customer reviews the search results. The search process is completed successfully, and the available flight information is displayed to the customer.

Acceptable/valid but incomplete described normal scenario?- needs to be specific, normal or default method of achieving the specific business service, and provide clearer description detailing How the scenario/ process to be achieved

Alternative

The customer searches for available flights but follows an alternative search process. After viewing the search results, the customer refines the search by applying filters such as ticket class, departure time, and price. The system updates the search results dynamically. The customer may also modify the search criteria, such as check-in time, and perform the search again. The system retrieves the flights according to the new criteria, allowing the customer to view the updated results.

invalid alternative, alternative should be an alternative way to achieve the task in alternative options through business processes (e.g., pay by cash, or pay by card), or through system functionalities (select a product item through Search list, or select a product item through browsing)

Error

The customer searches for available flights by entering the departure city, destination, and number of passengers. The system does not find any matching flights for the selected criteria and displays an error message indicating that no flights are available and the search process ends without displaying any available flight results.

invalid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

Error

The customer attempts to search for available flights but receives an error message due to a database connection failure. The system displays an error message informing the customer that the search process is not completed successfully. The customer is advised to try again later. No flight data is retrieved.

reasonable/valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

A-

Scenario #5: Cancel Flight Booking and Process Refund [Ayham]

Should be a standalone scenario for the business service?
Scenario should focus on the business, to achieve a business service

Initial Assumption

The customer is a registered user of the airline online booking system and is fully logged in. The customer has an existing confirmed booking with a reservation reference (PNR). The ticket is within the allowed cancellation period according to the applicable cancellation policy. The system is operational and connected to the airline reservation system and financial/payment services. The customer has access to the internet and valid booking information.

Initial assumption, in a separate section, should describe a state at which this service can be invoked, e.g. a user must be logged in

Normal

The customer cancels a flight booking through the airline online booking system. The customer accesses the "My Bookings" section and enters the reservation reference (PNR) to view booking details. The system displays the flight information, ticket class, payment method, and applicable cancellation policy. The customer selects the cancel booking option and confirms the cancellation request. The system verifies the cancellation eligibility, calculates the refundable amount according to airline rules, and processes the cancellation. The booking status is updated to cancelled, and the refundable amount is returned to the customer using the original payment method. The system sends a cancellation confirmation and receipt to the customer via the system and email. The cancellation is successfully stored in the database.

Reasonable/valid described normal scenario? - needs to be specific, normal or default method of achieving the specific business service, and provide clearer description detailing how the scenario/process to be achieved

Alternative

The customer cancels a flight booking, but the ticket is partially refundable according to the airline policy. After confirming the cancellation request, the system calculates the refundable amount, deducts the applicable penalty or service fee, and displays the reduced refundable amount. The customer confirms the refund conditions and confirms the cancellation. The system processes the cancellation, updates the booking status to cancelled, and issues a partial refund. A cancellation confirmation with refund details is sent to the customer, and the transaction is completed successfully.

reasonable/valid alternative, alternative should be an alternative way to achieve the task in alternative options through business processes (e.g., pay by cash, or pay by card), or through system functionalities (select a product item through Search list, or select a product item through browsing)

Error

The customer attempts to cancel a flight booking, but the ticket is not eligible for cancellation according to airline policy (e.g., non-refundable ticket or cancellation deadline passed). The system displays an error message indicating that the booking cannot be cancelled and provides the reason for rejection. The booking remains unchanged, no refund is issued, and the cancellation process is terminated.

reasonable/valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed)

Error

The customer valid error, error should be due to a failure in one or more elements in the business process (e.g., card authorization, by bank, failed) or in the system (e.g., login authentication), or by system, e.g. failed retrieval of items from DB failed) but during the refund processing stage, the system fails to complete the transaction due to a payment gateway or system connectivity error. The system notifies the customer that the cancellation could not be completed successfully and advises them to retry later or contact customer support. The booking status is not updated, no refund is issued, and the transaction is rolled back to maintain data consistency.

B+

Task 3.2: Actor Analysis

[Leader: Omar, Reviewing: Sameer, Discussing: Ayham, Finalizing: Daa, Re-drawing: Nasri]

Actor	Semantics / Description
Customer	Represents an end user of the airline online booking system who must be registered and logged in. The Customer can search for available flights, view schedules, prices, and ticket classes, select flights, enter passenger details, choose optional services (seat selection, baggage, special assistance), complete bookings using online card payment or pay-later options, receive electronic tickets, view booking history and status, request flight modifications in critical cases, submit ticket cancellations according to airline policies, and contact customer support through the system.
Airline System	An external airline management system that provides core airline data and business rules to the booking system. It supplies flight schedules, seat availability, pricing information, and ticket class details. It also enforces booking policies including cancellation rules, modification policies, and fare regulations. The system manages seat inventory, generates booking references, confirms reservations, and handles booking state changes such as reservation holds and cancellations.
Booking Office Staff	Represents airline employees responsible for supporting customers and managing booking and ticketing operations. Airline Staff can review, modify, and cancel reservations, confirm offline (cash) payments made at airline offices or authorized agents, issue and reissue electronic tickets, process flight date changes, calculate applicable penalties or refunds according to airline policies, update booking statuses, and coordinate with partner airline systems when bookings involve shared or partner-operated flights.
Payment Gateway	An external financial system that securely processes online card payments. It validates payment details, authorizes or rejects transactions, and returns payment status to the airline booking system.
Partner Airline System	An external airline system that interacts with the booking system when flights are operated or shared with other airlines. It provides flight availability, pricing, and booking confirmation, and supports booking modifications or cancellations when required.
Notification System	An external system responsible for sending automated notifications. It delivers booking confirmations, electronic tickets, payment confirmations, cancellation notices, and reminder messages to customers and relevant staff.

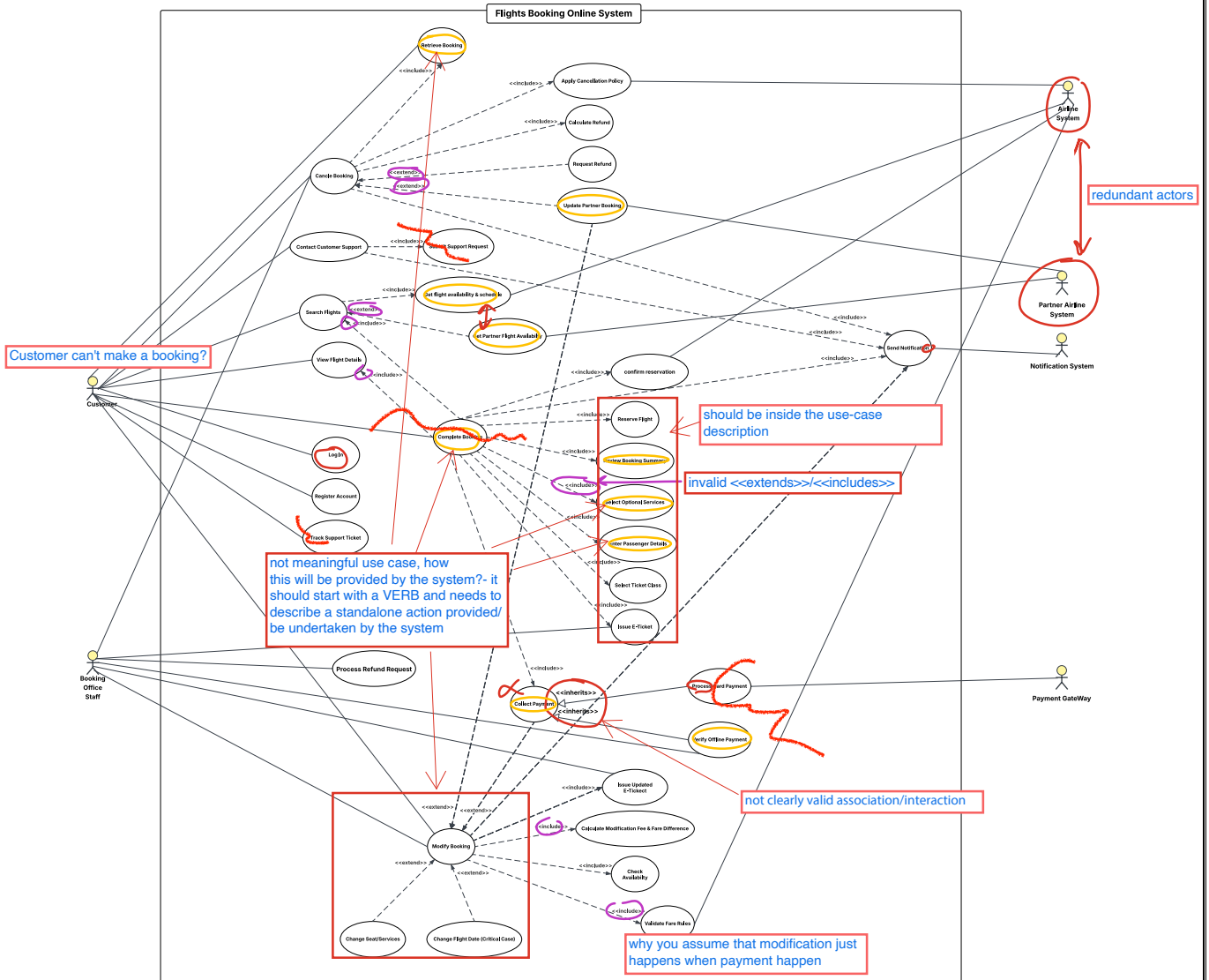
ambiguous actor

what kind of notifications? SMS? Emails? must be clarified.

B-

Task 3.3: Use-Case Modelling

[Leader: Nasri, Reviewing: Diaa, Discussing: Sameer, Finalizing: Ayham, Re-drawing: Omar]



B+

Task 3.4: Use-Case Specifications

Use-Case #1: Book a Flight Ticket Online [Diaa]

poor valid use case-Title of use case:
Should be a use case as defined in the use case diagram and related to the actor

Use Case Title	Book a Flight Ticket Online
Description	This use case describes how a registered Customer books a flight ticket online through the airline booking system. The Customer searches for available flights, selects a suitable flight and ticket class (VIP, Business, or Economy), enters passenger details, chooses optional services such as seat selection and baggage options, reviews the booking summary, and completes payment. If payment is successful, the system confirms the reservation, generates a booking reference, and issues an electronic ticket (e-ticket). The system also supports a pay-later option using cash payment through an airline office or authorized agent.
Actors	Primary Actor: Customer Secondary Actors: Payment Gateway, Notification System
Data	Flight search criteria (departure city, destination, travel date, number of passengers); Flight details (schedule, price, ticket class, seat availability); Passenger information (name, ID/passport, contact details); Optional services (seat selection, baggage options); Payment information (payment method, transaction status); Booking record (reservation reference, booking status, ticket status).
Stimulus / Trigger	The Customer selects the “ Book / Reserve ” option for a chosen flight after viewing available flight search results.
Pre-conditions	<ol style="list-style-type: none"> 1. The Customer is registered and successfully logged in to the system. 2. The system is operational and connected to the flight database and payment services. 3. There are scheduled flights available for booking. 4. The Customer has valid personal and travel information required by airline policies.
Sequence / Flow of	<p>Normal Flow (Successful):</p> <ol style="list-style-type: none"> 1. The Customer enters flight search details (departure city, destination, travel date, number of passengers). 2. The system retrieves and displays available flights with schedules, prices, and ticket classes. 3. The Customer selects a flight and chooses a ticket class (Economy, Business, or VIP). 4. The system prompts the Customer to enter passenger details and select optional services. 5. The Customer enters passenger information and selects optional services such as seat selection and baggage options.

Reasonable/poor Valid pre-conditions, should specify valid state of system on entry

Good.
Needs to be a sequence of FLOW?
Add more specific details of the exact follow to match with the scenario, Add alternative and error follows, as per your scenario
Steps Should be numbered

	<ol style="list-style-type: none"> The system validates the entered information and checks seat and service availability. The system calculates the total price and displays the booking summary. The Customer confirms the booking summary and selects online card payment. The system sends the payment request to the Payment Gateway. The Payment Gateway authorizes the transaction. The system finalizes the booking, generates a reservation reference number, and issues the electronic ticket. The system stores the booking with status Confirmed and ticket status Issued. The system sends booking confirmation and e-ticket to the Customer via the Notification System. <p>Alternative Flow (Successful – Pay Later):</p> <ul style="list-style-type: none"> 8A1. At step 8, the Customer selects pay later / cash payment. 9A1. The system temporarily reserves the seats and creates a booking with status Pending Payment. 10A1. The system displays instructions for completing payment at an airline office or authorized agent. 11A1. After payment is confirmed by staff, the system updates the booking to Confirmed and issues the e-ticket. <p>Error Flow 1 (Payment Failure):</p> <ul style="list-style-type: none"> 9E1. The Payment Gateway rejects the transaction due to authorization failure or insufficient funds. 10E1. The system displays a payment failure message and does not finalize the booking. 11E1. The system releases reserved seats after a timeout and no ticket is issued. <p>Error Flow 2 (System Failure):</p> <ul style="list-style-type: none"> 11E2. The system fails to save the booking due to a database or connectivity error. 12E2. The system notifies the Customer and rolls back the transaction to prevent inconsistent data.
Post- <div>reasonable/valid written post-conditions, should specify valid state of system on exit/end of use case</div>	<p>Successful: A booking record exists with a unique reservation reference. Booking status is Confirmed (or Pending Payment until paid in the alternative flow); ticket status is Issued once payment is confirmed; selected services are stored; confirmation and e-ticket are sent to the Customer.</p> <p>Unsuccessful: No confirmed booking exists; no e-ticket is issued; any temporary seat reservations are released; failure details are logged by the system.</p>
Comments	Online payments must be processed through a secure payment gateway. Cash payments are confirmed by airline staff. Booking finalization must be atomic to avoid partial or inconsistent reservations.

A-

Use-Case #2: Change Flight Date [Nasri]

valid use case-Title of use case:
Should be a use case as defined in the use case diagram and related to the actor

Use Case Title	Change Flight Date
Description	This use case describes how a registered user changes the travel date of an already Confirmed (paid) booking due to a critical case (medical emergency). The Customer selects a booking, submits the critical-case reason and supporting document if required, chooses a replacement flight on the same route/class, pays any fees/fare difference, and receives an updated e-ticket/itinerary. The system updates booking and seat inventory atomically and notifies the Customer.
Actors	Primary Actor: Customer Secondary Actors: Payment Gateway, Notification System, Sales Staff
Data	Booking reference (PNR) and passenger last name, booking status, fare rules/change window, critical-case reason and proof document, available flights (schedule, class, seats), change fee and fare difference, payment transaction status, updated itinerary/e-ticket, audit/modification log, notification messages.
Stimulus / Trigger	The Customer selects a confirmed booking in “My Bookings” and clicks “Change Flight Date.”
Pre-conditions	1. The Customer is registered and successfully logged in to the system. 2. A valid booking exists with status Confirmed (Paid) and has a valid booking reference (PNR). 3. The booking is within the allowed change window, and fare rules allow date change (critical cases permitted). 4. The system is operational and connected to the flight database/inventory subsystem and payment services. 5. No other modification request is currently in progress for the same booking (booking is not locked).
Sequence / Flow of Events	Normal Flow (Successful - Card Payment): 1. The Customer opens “My Bookings” and selects the booking to modify. 2. The system retrieves booking details and displays the change policy (window, fees, fare difference rules). 3. The Customer selects “Critical Case”, enters the reason, and uploads proof (if required). 4. The system validates eligibility and locks the booking to prevent parallel modifications. 5. The Customer selects the new travel date. 6. The system displays available replacement flights for the same route with schedules, classes (Economy/Business/VIP), and seat availability. 7. The Customer selects a replacement flight (same class by default). 8. The system re-checks availability and validates fare rules for the requested change.

Reasonable/poor Valid pre-conditions, should specify valid state of system on entry

Good.
Needs to be a sequence of FLOW?
Add more specific details of the exact follow to match with the scenario, Add alternative and error follows, as per your scenario
Steps Should be numbered

9. The system calculates the change fee and fare difference and displays a summary (old/new itinerary, total amount due).
10. The Customer confirms and selects card payment.
11. The system sends the payment request to the Payment Gateway/Bank.
12. The Payment Gateway authorizes the transaction successfully.
13. The system finalizes the modification: releases old seat, reserves new seat, updates the booking record, stores a modification log, issues the updated e-ticket, and notifies the Customer (email/SMS).

Alternative Flow (Successful - Pay Later / Cash or Bank Transfer at Agency):

- 8A1. After step 9 in the normal flow, the Customer selects Pay Later (Cash at Agency / Bank Transfer) instead of card payment.
- 9A1. The system places a temporary hold on the selected new seat and creates a change request with status Pending Payment.
- 10A1. The system displays instructions to pay at the airline office/authorized agent or upload bank transfer proof within the allowed time window.
- 11A1. Customer Support Staff verifies the payment and records confirmation in the system.
- 12A1. The system confirms the modification, updates booking and seat inventory, issues the updated e-ticket, and notifies the Customer.

Error Flow 1 (Payment Failure):

- 11E1. The Payment Gateway/Bank rejects the card transaction (authorization failure, insufficient funds, or timeout).
- 12E1. The system displays a payment failure message and records the failed attempt; the modification is not confirmed.
- 13E1. The original booking remains unchanged; any temporary seat holds are released after timeout; the Customer may retry or choose another payment method or contact support.

Error Flow 2 (System Failure - DB/Inventory Update Failure):

- 13E2. Payment is successful, but the system fails to save/update the booking or seat inventory due to a database/connectivity error or inventory service unavailability.
- 14E2. The system prevents inconsistent data by rolling back the update or marking the request as Pending Verification; no updated ticket is issued until resolved.
- 15E2. The system notifies the Customer with a support reference number and alerts support/finance to verify booking and payment status.

Successful: Booking itinerary is updated; new seat is reserved and old seat is released; modification log is stored; updated e-ticket/itinerary is issued and sent to the Customer.

Unsuccessful: Booking remains unchanged (or marked Pending Verification in system failure cases); no updated e-ticket is issued; holds are released; failures are logged; Customer is notified with next actions.

reasonable/valid written post-conditions, should specify valid state of system on exit/end of use case

Comments	Booking modification should be atomic to avoid partial updates. The system should lock the booking during the change process. Payment status must be verified to avoid duplicate charges. Critical-case documents must be stored securely and accessed only by authorized staff.
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B-

Use-Case #3: Complete Pending Booking (Pay Later / Cash Payment at Office) [Omar]

invalid use case-Title
of use case:
Should be a use case
as defined in the
use case diagram and
related to the actor

Use Case Title	Complete Pending Booking (Cash Payment at Office)
Description	This use case describes how a registered Customer completes an already-created booking that is in Pending Payment status by paying at the airline office/authorized agent. The Customer provides the reservation reference (PNR) and identification, the Staff retrieves and verifies the booking, collects cash payment (or verifies bank transfer proof), confirms payment in the system, and the system updates the booking to Confirmed, issues an electronic ticket (e-ticket), generates the invoice/receipt, stores the transaction, and notifies the Customer.
Actors	Primary Actor: Sales Staff (Office/Agent) Secondary Actors: Customer, Notification System, (optional Finance/Manager)
Data	Reservation reference (PNR); Booking record (status, deadline, flight details, ticket class); Passenger identification details; Amount due; Payment method (cash / bank transfer); Payment confirmation record; Booking status update (Pending Payment → Confirmed); E-ticket/itinerary; Invoice/receipt; System logs; Notification message details.
Stimulus / Trigger	The Customer visits the airline office/authorized agent and requests to complete payment for a Pending Payment booking by providing the PNR.
	<ol style="list-style-type: none"> 1. The Customer is registered and logged in the system with status Pending Payment. 2. The booking is within the allowed payment time window (not expired). 3. Sales Staff is authenticated and authorized to confirm payments and update booking status. 4. The system is operational and connected to the booking database and notification service.
Sequence /	Normal Flow (Successful – Cash Payment) <ol style="list-style-type: none"> 1. The Sales Staff opens the “Pending Bookings / Retrieve Booking” function. 2. The Customer provides the reservation reference (PNR) and identification. 3. The system retrieves the booking and displays booking details, total amount due, and payment deadline. 4. The Sales Staff verifies customer identity and checks booking validity (status Pending Payment, not expired). 5. The Customer pays the required amount in cash. 6. The Sales Staff records the cash payment and confirms it in the system. 7. The system updates booking status to Confirmed and stores the payment transaction.

poor Valid pre-conditions, should specify valid state of system on entry

Reasonable/Poor valid. Needs to be a sequence of FLOW? Add more specific details of the exact follow to match with the scenario, Add alternative and error follows, as per your scenario Steps Should be numbered

	<p>8. The system issues the electronic ticket (e-ticket) and generates invoice/receipt.</p> <p>9. The system sends booking confirmation and e-ticket to the Customer via the Notification System (email/SMS).</p> <p>10. The system logs the completion for audit purposes.</p> <p>Alternative Flow (Successful – Bank Transfer Proof)</p> <p>5A1. At step 5, the Customer pays via bank transfer and provides proof/receipt.</p> <p>6A1. The Sales Staff verifies the transfer details (amount, reference, date) and confirms it (with Finance/Manager if required).</p> <p>7A1. The system records the payment and updates booking status to Confirmed.</p> <p>8A1. The system issues the e-ticket and sends confirmation notifications.</p> <p>Error Flow 1 (Booking Expired)</p> <p>3E1. At step 3, the system finds the booking status is Expired/Cancelled (deadline passed).</p> <p>4E1. The system displays an error message and prevents payment confirmation.</p> <p>5E1. No ticket is issued; the Customer is instructed to create a new booking.</p> <p>Error Flow 2 (System/Database Failure)</p> <p>6E2. At step 6, the system fails to save/update the booking due to database/connectivity error.</p> <p>7E2. The system shows failure message and does not issue an e-ticket.</p> <p>8E2. The system logs the error; booking remains Pending Payment until resolved (or verified and completed by staff).</p>
Post-conditions, should specify valid state of system on exit/end of use case	<p>Successful: Booking status becomes Confirmed; payment transaction is stored; e-ticket is issued; receipt is generated; notification is sent to Customer; audit log is updated.</p> <p>Unsuccessful: Booking remains Pending Payment or is Expired/Cancelled; no e-ticket is issued; any failure is logged and Customer is informed of next steps.</p>
Comments	<p>Payment confirmation must be performed only by authorized staff. The system must prevent issuing tickets before successful status update to avoid inconsistent reservations. Booking completion should be atomic and fully logged for auditing and dispute handling.</p>

B-

Use-Case #4: Search for Available Flights [Sameer]

valid use case-Title of use case:
Should be a use case as defined in the use case diagram and related to the actor

Use Case Title	Search for Available Flights	
Description	This use case describes how a user searches for available flights through the airline online booking system. The Customer enters flight search criteria (departure city, destination, travel date, and number of passengers). The system validates the input, retrieves matching flights from the flight database, and displays available options including schedules, prices, and ticket classes. The system also supports refining results using filters (e.g., class, price range, airline, departure time).	
Actors	Primary Actor: Customer Secondary Actors: Airline online booking gateway, Notification gateway	
Data	<ul style="list-style-type: none"> Flight search criteria (departure city, destination city, travel date, number of passengers) Filter/sort criteria (ticket class, price range, airline, departure time) Flight results data (flight number, airline, schedule, availability, price, ticket classes) 	
Stimulus / Trigger	The Customer selects the “Search Flights” option and submits the search form.	
Pre-	<ol style="list-style-type: none"> The Customer is registered and can access the system (logged in). The system is operational and connected to the airline booking gateway. Flight schedules, availability, and prices are stored and up-to-date in the airline booking gateway. The Customer has valid travel search information (route, date, passengers). 	
Sequence / Flow of Events	<p>Normal Flow (Successful):</p> <ol style="list-style-type: none"> The Customer opens the flight search page. The Customer enters flight search details (departure city, destination, travel date, number of passengers). The Customer clicks Search. The system validates the search input (required fields and date validity). The system queries the Flight Database for matching flights. The Flight booking gateway returns available flights with schedules, prices, and ticket classes. The system displays the search results list to the Customer. The Customer reviews the results and may open a selected flight to view details. <p>Alternative Flow (Successful – Refine Results):</p> <ul style="list-style-type: none"> 7A1. At step 7, the Customer applies filters (ticket class, price range, airline, departure time). 	

poor Valid pre-conditions, should specify valid state of system on entry

Reasonable/Poor valid. Needs to be a sequence of FLOW? Add more specific details of the exact follow to match with the scenario, Add alternative and error follows, as per your scenario Steps Should be numbered

	<ul style="list-style-type: none"> • 8A1. The system re-filters/re-sorts the results and displays the updated list <p>Alternative Flow (Successful – Modify Search Criteria):</p> <ul style="list-style-type: none"> • 2A2. At step 2, the Customer changes one or more search fields (e.g., date or destination). • 3A2. The Customer submits the updated search request. • 4A2. The system repeats steps 4–7 and displays new results. <p>Error Flow 1 (No Results Found):</p> <ul style="list-style-type: none"> • 5E1. At step 5, the Flight booking gateway returns no matching flights for the entered criteria. • 6E1. The notification gateway displays a message “No flights found” and suggests trying different dates or destinations. <p>Error Flow 2 (booking gateway Failure):</p> <ul style="list-style-type: none"> • 5E2. At step 5, the system fails to retrieve flight results due to a flight booking gateway connectivity issue. • 6E2. The notification gateway displays an error message indicating the service is temporarily unavailable and logs the failure.
Post-conditions / reasonable/poor valid written post-conditions, should specify valid state of system on exit/ end of use case	<p>Successful: A flight search result list is displayed containing available flights matching the criteria (and refined filters if applied). No booking is created, and the system is ready for the Customer to proceed to flight selection/booking.</p> <p>Unsuccessful: No flight results are displayed (either no matches or system failure). The system does not create any booking, and the Customer is prompted to retry or modify criteria. Any failure details are logged by the system.</p>
Comments	Search input must be validated (e.g., travel date cannot be in the past). Flight results should be retrieved efficiently to ensure good performance under high search volume. Results must reflect real-time seat availability and updated pricing to avoid inconsistencies during later booking steps.

C+

Use-Case #5: Cancel Flight Booking and Process Refund

poor valid use case-
Title of use case:
Should be a use case
as defined in the
use case diagram and
related to the actor

separate use cases in the
use case diagram

Use Case Title	Cancel Flight Booking and Process Refund
Description	This use case describes how a registered Customer cancels an existing flight booking through the airline online booking system. The Customer retrieves the booking using a reservation reference (PNR), reviews the applicable cancellation policy, and submits a cancellation request. If eligible, the system processes the cancellation, calculates the refundable amount, updates the booking status, and issues a refund through the original payment method. A cancellation confirmation is then sent to the Customer.
	Actor: Customer Primary Actors: Payment Gateway, Airline System, Notification System
Data	Booking reference (PNR); Flight details; Ticket class; Payment information; Cancellation policy rules; Refund amount; Booking status; Transaction status; Notification details
Stimulus / Trigger	The Customer selects the "Cancel Booking" option for an existing confirmed reservation.
Pre-conditions	<ol style="list-style-type: none">1. The Customer is registered and successfully logged in to the system.2. The Customer has a valid confirmed booking with a reservation reference (PNR).3. The system is operational and connected to airline reservation and payment services.4. The booking is within the allowed cancellation period according to airline policy.
Sequence / Flow	Normal Flow (Successful Cancellation): <ol style="list-style-type: none">1. The Customer accesses the <i>My Bookings</i> section.2. The Customer enters the reservation reference (PNR).3. The system retrieves and displays booking details and cancellation policy.4. The Customer selects <i>Cancel Booking</i>.5. The system validates cancellation eligibility.6. The system calculates the refundable amount.7. The Customer confirms the cancellation request.8. The system updates the booking status to Cancelled.9. The system processes the refund through the original payment method.10. The system records the cancellation and refund transaction.11. The system sends cancellation confirmation and refund details to the Customer.

process refund is a use case related to the staff. where is the staff as an actor?

Valid pre-conditions,
should specify valid
state of system on entry

Poor valid.
Needs to be a
sequence of FLOW?
Add more specific
details of the
exact follow to match
with the
scenario, Add
alternative and error
follows, as per your
scenario
Steps Should be
numbered

no mention of most of the
previous actors?

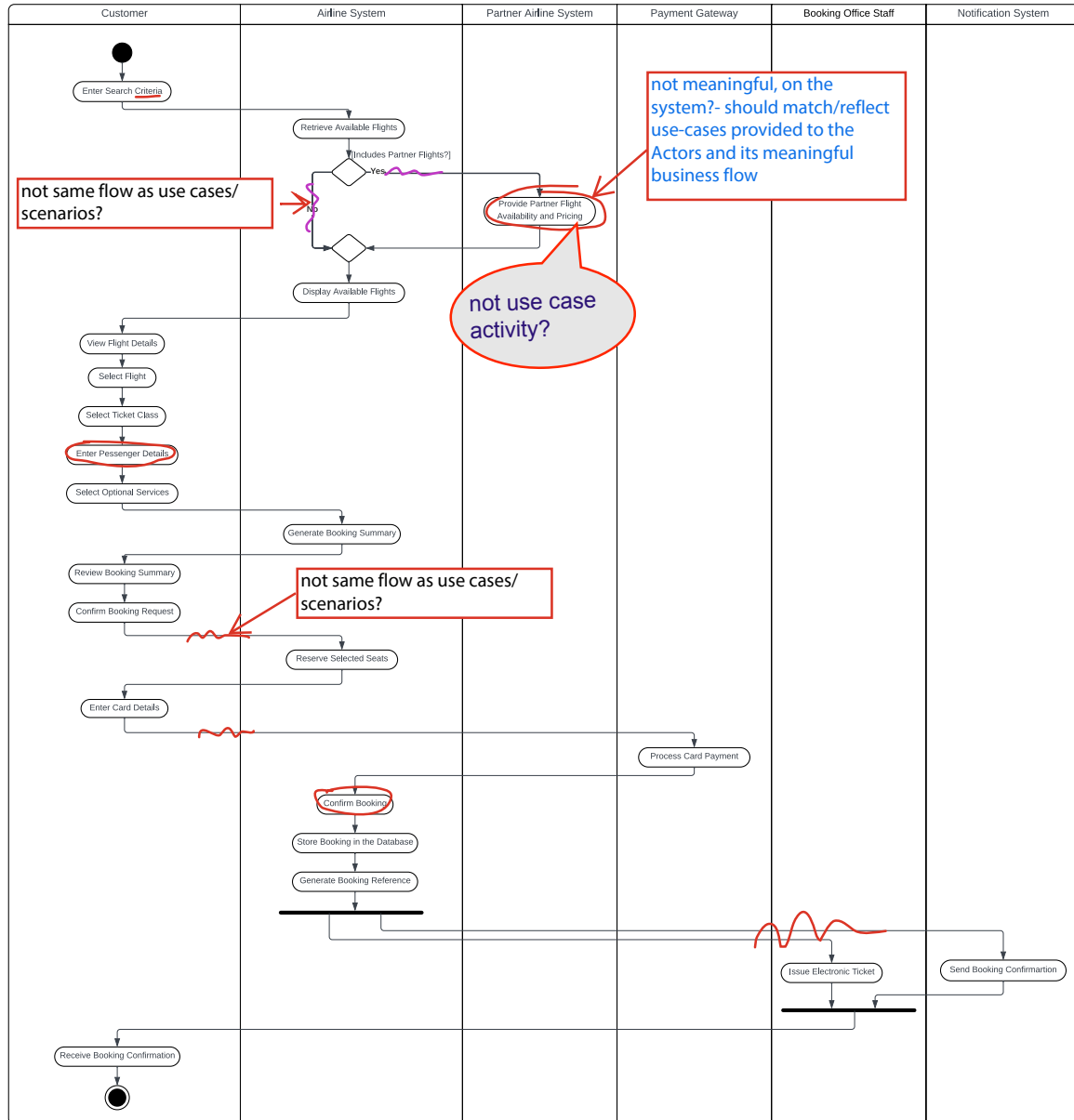
Alternative Flow	Partial Refund: 7A1. The system determines that a cancellation penalty applies. 8A1. The system displays the reduced refundable amount. 9A1. The Customer accepts the refund conditions. 10A1. The system processes the cancellation and issues a partial refund. 11A1. The system sends updated cancellation confirmation .
Error Flow 1	Cancellation Not Allowed: 5E1. The system determines the ticket is non-refundable or outside the cancellation period. 6E1. The system displays an error message explaining the rejection. 7E1. The booking remains unchanged and no refund is issued.
Error Flow 2	Refund Processing Failure: 9E2. The payment gateway fails to process the refund. 10E2. The system notifies the Customer of the failure. 11E2. The system rolls back the transaction and logs the error.
valid written post-conditions, should specify valid state of system on exit/end of use case	Successful: Booking status is Cancelled ; refund (full or partial) is issued; confirmation is sent to the Customer. Unsuccessful: Booking remains unchanged; no refund is issued; error details are logged and the Customer is notified.
Comments	Refund processing must comply with airline cancellation policies. Cancellation and refund operations must be atomic to avoid inconsistent booking or payment records.

B+

Task 3.6: Use-Case Activity Modelling

Use-Case #1: Book a Flight Ticket Online [Diaa]

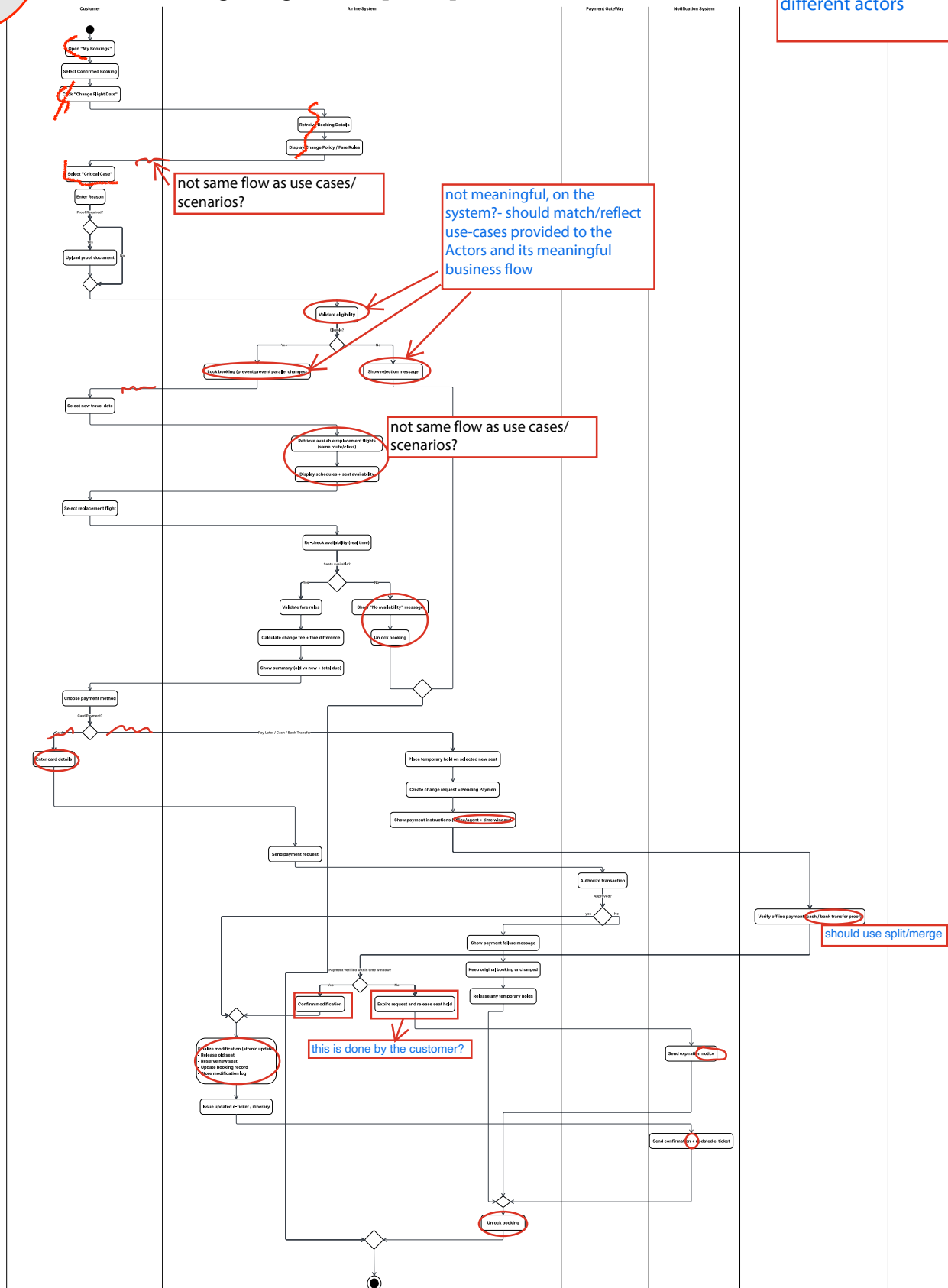
good use swim-lane -
activity flow must show
interactions between
different actors



B+

Use-Case #2: Change Flight Date [Nasri]

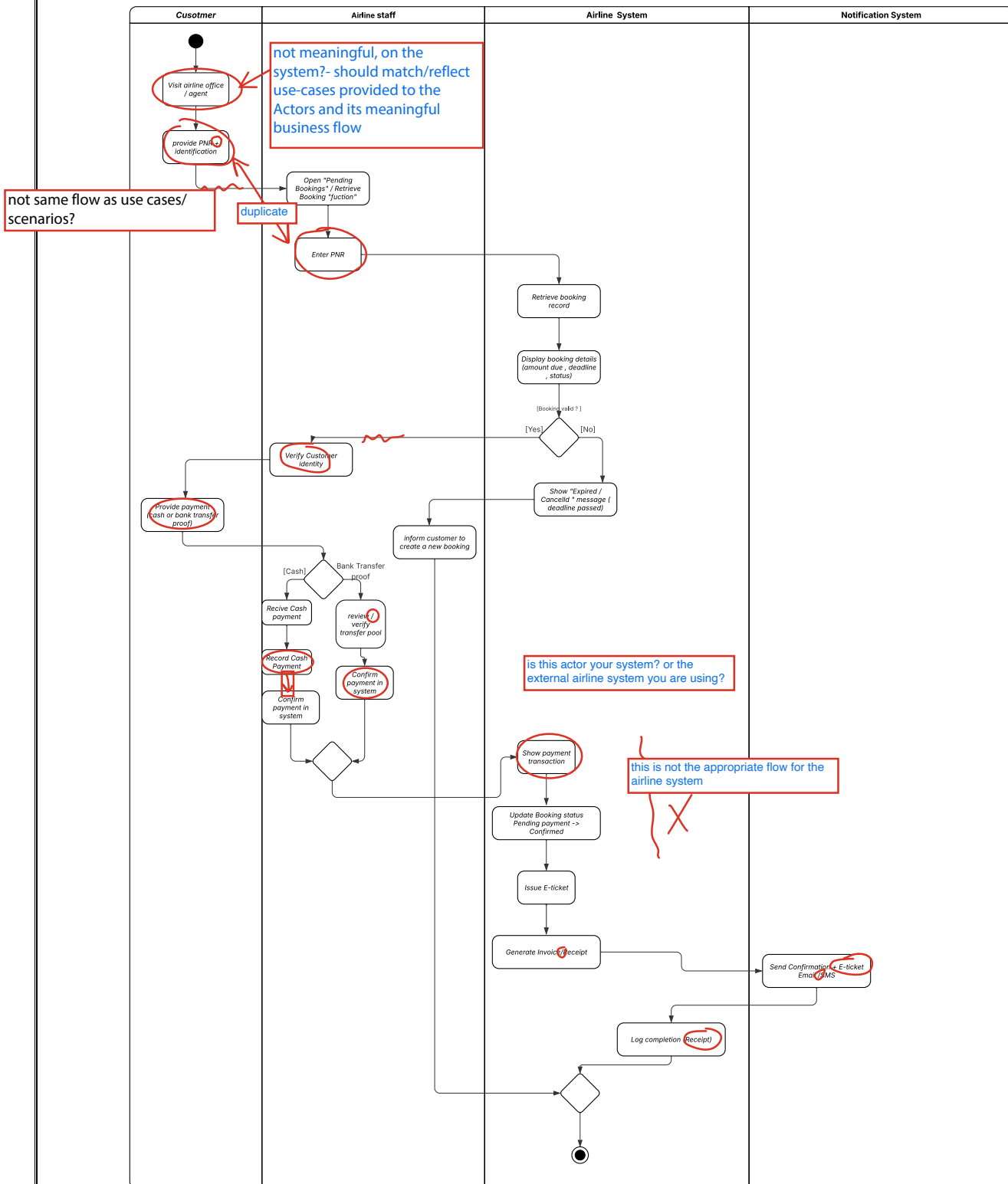
good use swim-lane -
activity flow must show
interactions between
different actors



B-

Use-Case #3: Complete Pending Booking (Pay Later / Cash Payment) [Omar]

reasonable/poor use swim-lane - activity flow must show interactions between different actors



C-

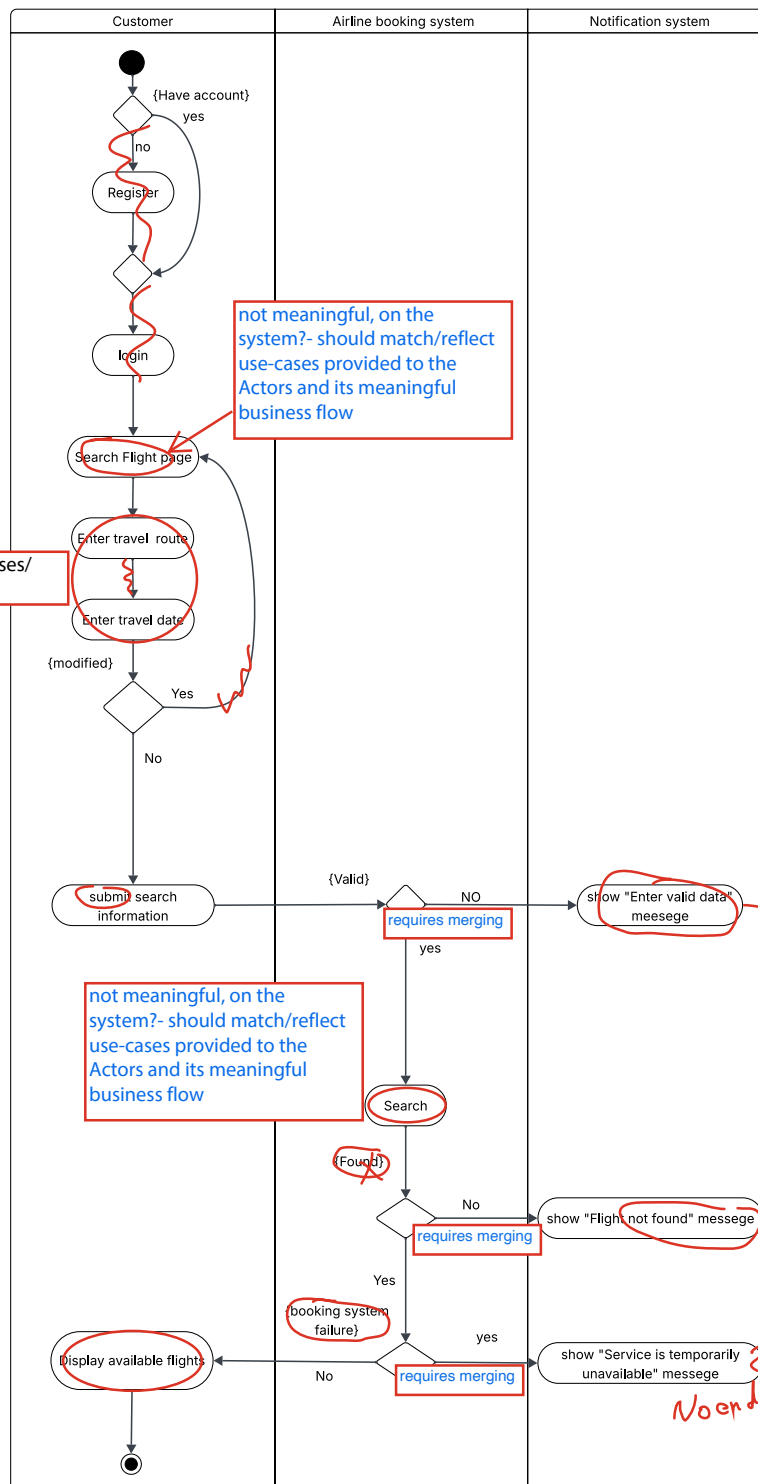
Use-Case #4: Search for Available Flights [Sameer]

very poor use swim-lane
- activity flow must show
interactions between
different actors

not same flow as use cases/
scenarios?

not meaningful, on the
system?- should match/reflect
use-cases provided to the
Actors and its meaningful
business flow

not meaningful, on the
system?- should match/reflect
use-cases provided to the
Actors and its meaningful
business flow



??
No error? X

C+

Use-Case #5: Cancel Flight Booking and Process Refund [Ayham]

very poor use swim-lane
- activity flow must show
interactions between
different actors

not meaningful, on the
system?- should match/reflect
use-cases provided to the
Actors and its meaningful
business flow

not same flow as use
cases/scenarios?

not meaningful, on the
system?- should match/reflect
use-cases provided to the
Actors and its meaningful
business flow

