Lab-3 Use Case Modeling and Product Backlog Part 3

Group-27 Flight Booking System

Sprints:

Develop sprints from the product backlog

- Specify your sprint details with an estimated timeline for development (use FP or OP for the estimation)
- Estimate how many sprints you can develop in your course project

NO.	Functionality	Sprints
1.		User Registration & Authentication
	Focus Points	● Implement user registration (Sign-up, Login). ● Develop user authentication and authorization (Session management). ● Create basic profile management (View and update profile). ● Database setup for user management.
	Front-end	● Design registration and login forms. ● Develop profile page UI.
	Back-end	● Implement user authentication using JWT/OAuth. ● Develop API endpoints for user management. ● Setup database schema for user details.
	Testing	● Unit testing for authentication and profile management. ● User acceptance testing for registration process.
2.		Flight Search & Filtering
	Focus Points	● Implement flight search functionality. ● Add filters (Date, Destination, Price, etc.).

		● Integrate third-party APIs (if required) for real-time flight data. ● Develop sorting and recommendation logic.
	Front-end	● Design search and filter forms. ● Implement flight results UI with sorting options.
	Back-end	● Develop API endpoints for flight search. ● Implement filtering and sorting logic. ● Connect to third-party flight data API.
	Testing	● Functional testing for search and filter. ● Performance testing for API calls and data fetching.
3.		Flight Booking & Payment Integration
	Focus Points	● Implement booking flow (Select flight, add-ons, seat selection). ● Integrate payment gateway (Stripe, PayPal, etc.). ● Generate and display booking receipts.
	Front-end	● Develop booking UI (Select flight, seat, add-ons). ● Design payment page UI. ● Implement receipt page.
	Back-end	● Develop booking management API. ● Integrate payment gateway and handle transactions. ● Store booking details and generate receipts.
	Testing	● End-to-end testing for booking flow. ● Integration testing for payment gateway.
4.		Admin Panel & User Management
	Focus Points	● Develop an admin panel for managing flights, promotions, and users. ● Implement flight management features (Add/Modify/Delete flights). ● Integrate user management (Block/Unblock users, manage promotions).
	Front-end	● Design admin dashboard UI. ● Implement forms for flight and promotion management.
	Back-end	● Develop CRUD operations for flights and users. ● Implement backend for promotion management.

		● Secure admin access with role-based authentication.
	Testing	● Admin panel usability testing. ● Security testing for admin features.
5.		Loyalty Program & Customer Service
	Focus Points	● Implement a loyalty program (Points system, redemption). ● Develop customer service contact features (Chat, Email). ● Manage user queries and support tickets.
	Front-end	● Design loyalty points interface in user profile. ● Implement customer service contact form.
	Back-end	● Develop loyalty program logic and integrate it with booking. ● Implement backend support for customer queries. ● Automate ticket generation and tracking.
	Testing	● User acceptance testing for loyalty program. ● Functional testing for customer service.

Function Point Estimation

Sprint 1: User Registration & Authentication
External Input (EI):

- Registration Form (User details input)
- Login Form
- Profile Update

External Output (EO):

- View Profile
- Login Response (Success/Failure)
- Registration Confirmation

External Query (EQ):

- Check Login Credentials

Internal Logical Files (ILF):

- User Database (Storing user info and authentication details)

External Interface Files (EIF):

- Third-Party Authentication (OAuth/JWT)

Measurement Parameter	Count	Weighting Factor	FP Count
# of Inputs (EI)	3	4	12
# of Outputs (EO)	3	5	15
# of Queries (EQ)	1	4	4
# of Internal Logical Files (ILF)	1	10	10
# of External Interface Files (EIF)	1	7	7
Unadjusted Function Count (UFC) :			**48**

Complexity Factors: 14 factors, each rated on a scale of 0 to 5, 0 being not important or applicable and 5 being absolutely essential.

SNo.	Complexity Factor	Rate
1	Backup and recovery	4
2	Data communication	4
3	Distributed processing functions	1
4	Is performance critical?	5
5	Existing operating environment	3
6	On-line data entry	4
7	Input transaction built over multiple screens	2
8	Master files updated on-line	4
9	Complexity of inputs, outputs, files, inquiries	3
10	Complexity of processing	5
11	Code design for reuse	4
12	Are conversion/installation included in design?	0
13	Multiple installations	0
14	Application designed to facilitate change by the user	2
	Total	**41**

Using Adjusted FP Count Formula:

AFPC = UFPC * [0.65 + 0.01 * (Total Rate of Complexity Factors)]

AFPC = 48* [0.65 + 0.01 * 41] = 48* [1.06] = **50.88** ≅ **51**

Sprint 2: Flight Search & Filtering

External Input (EI):

- Search Criteria (Input for date, destination, price, etc.)
- Filter Selection (Date, Destination, Price, etc.)

External Output (EO):

- View Search Results (Formatted flight results)
- Flight Recommendations

External Query (EQ):

- Flight Search Query
- Flight Filtering Query
- Flight Sorting Query

Internal Logical Files (ILF):

- Flight Database

External Interface Files (EIF):

- External Flight Data (Real-time flight data from third-party APIs)

Measurement Parameter	Count	Weighting Factor	FP Count
# of Inputs (EI)	2	4	8
# of Outputs (EO)	2	5	10
# of Queries (EQ)	3	4	12
# of Internal Logical Files (ILF)	1	10	10
# of External Interface Files (EIF)	1	7	7
Unadjusted Function Count (UFC) :			**47**

Complexity Factors: 14 factors, each rated on a scale of 0 to 5, 0 being not important or applicable and 5 being absolutely essential.

SNo.	Complexity Factor	Rate
1	Backup and recovery	4
2	Data communication	3
3	Distributed processing functions	2
4	Is performance critical?	5
5	Existing operating environment	3
6	On-line data entry	4
7	Input transaction built over multiple screens	2
8	Master files updated on-line	4
9	Complexity of inputs, outputs, files, inquiries	3
10	Complexity of processing	5
11	Code design for reuse	4
12	Are conversion/installation included in design?	0
13	Multiple installations	0
14	Application designed to facilitate change by the user	2
	Total	**41**

Using Adjusted FP Count Formula:

AFPC = UFPC * [0.65 + 0.01 * (Total Rate of Complexity Factors)]

AFPC = 47* [0.65 + 0.01 * 41] = 47* [1.06] = **49.82** ≅ **50**

Sprint 3: Flight Booking & Payment Integration

External Input (EI)

- Select Flight (Booking input)
- Seat Selection
- Payment Details
- Add-ons (Baggage, meals, etc.)

External Output (EO):

- Booking Confirmation
- Payment Confirmation
- Receipt

External Query (EQ):

- Flight Availability Query

Internal Logical Files (ILF):

- Booking Database

External Interface Files (EIF):

- Payment Gateway

Measurement Parameter	Count	Weighting Factor	FP Count
# of Inputs (EI)	4	4	16
# of Outputs (EO)	3	5	15
# of Queries (EQ)	1	4	4
# of Internal Logical Files (ILF)	1	10	10
# of External Interface Files (EIF)	1	7	7
Unadjusted Function Count (UFC) :			**52**

Complexity Factors: 14 factors, each rated on a scale of 0 to 5, 0 being not important or applicable and 5 being absolutely essential.

SNo.	Complexity Factor	Rate
1	Backup and recovery	4
2	Data communication	3
3	Distributed processing functions	2
4	Is performance critical?	5
5	Existing operating environment	3
6	On-line data entry	4
7	Input transaction built over multiple screens	2
8	Master files updated on-line	4
9	Complexity of inputs, outputs, files, inquiries	3
10	Complexity of processing	5
11	Code design for reuse	4
12	Are conversion/installation included in design?	0
13	Multiple installations	0
14	Application designed to facilitate change by the user	2
	Total	**41**

Using Adjusted FP Count Formula:

AFPC = UFPC * [0.65 + 0.01 * (Total Rate of Complexity Factors)]

AFPC = 52* [0.65 + 0.01 * 41] = 52* [1.06] = **55.12** ≅ **56**

Sprint 4: Admin Panel & User Management

External Input (EI):

- Add/Modify/Delete Flights
- Add/Modify/Delete Promotions
- Block/Unblock User

External Output (EO):

- View Admin Dashboard
- Flight Management Summary
- User Management Summary

External Query (EQ):

- Flight Query for Admin
- Promotion Query for Admin

Internal Logical Files (ILF):

- Promotion Database

External Interface Files (EIF):

- External Promotion Data

Measurement Parameter	Count	Weighting Factor	FP Count
# of Inputs (EI)	3	4	12
# of Outputs (EO)	3	5	15
# of Queries (EQ)	2	4	8
# of Internal Logical Files (ILF)	1	10	10
# of External Interface Files (EIF)	1	7	7
Unadjusted Function Count (UFC) :			**52**

Complexity Factors: 14 factors, each rated on a scale of 0 to 5, 0 being not important or applicable and 5 being absolutely essential.

SNo.	Complexity Factor	Rate
1	Backup and recovery	4
2	Data communication	3
3	Distributed processing functions	2
4	Is performance critical?	5
5	Existing operating environment	3
6	On-line data entry	4
7	Input transaction built over multiple screens	2
8	Master files updated on-line	4
9	Complexity of inputs, outputs, files, inquiries	3
10	Complexity of processing	5
11	Code design for reuse	4
12	Are conversion/installation included in design?	0
13	Multiple installations	0
14	Application designed to facilitate change by the user	2
	Total	**41**

Using Adjusted FP Count Formula:

AFPC = UFPC * [0.65 + 0.01 * (Total Rate of Complexity Factors)]

AFPC = 52* [0.65 + 0.01 * 41] = 52* [1.06] = **55.12** ≅ **56**

Sprint 5: Loyalty Program & Customer Service

External Input (EI):

- Loyalty Points Redemption
- Customer Query Submission

External Output (EO):

- View Loyalty Points
- Customer Query Response

External Query (EQ):

- Loyalty Points Query
- Customer Queries Retrieval

Internal Logical Files (ILF):

- Loyalty Program Database
- Customer Queries Database

Measurement Parameter	Count	Weighting Factor	FP Count
# of Inputs (EI)	2	4	8
# of Outputs (EO)	2	5	10
# of Queries (EQ)	2	4	8
# of Internal Logical Files (ILF)	2	10	20
# of External Interface Files (EIF)	0	7	0
Unadjusted Function Count (UFC) :			**46**

Complexity Factors: 14 factors, each rated on a scale of 0 to 5, 0 being not important or applicable and 5 being absolutely essential.

SNo.	Complexity Factor	Rate
1	Backup and recovery	4
2	Data communication	3
3	Distributed processing functions	2
4	Is performance critical?	5
5	Existing operating environment	3
6	On-line data entry	4
7	Input transaction built over multiple screens	2
8	Master files updated on-line	4
9	Complexity of inputs, outputs, files, inquiries	3
10	Complexity of processing	5
11	Code design for reuse	4
12	Are conversion/installation included in design?	0
13	Multiple installations	0
14	Application designed to facilitate change by the user	2
	Total	**41**

Using Adjusted FP Count Formula:

AFPC = UFPC * [0.65 + 0.01 * (Total Rate of Complexity Factors)]

AFPC = 46* [0.65 + 0.01 * 41] = 46* [1.06] = **48.76** ≅ **49**

- **Estimated Function Points completed per week = 3**
- **Number of developers = 8**
- **Estimated time of completion = Function Points/(3*8)**

Sprints	Function Points	Est. time of completion
Sprint 1	51	2
Sprint 2	50	2
Sprint 3	56	2.5
Sprint 4	56	2.5
Sprint 5	49	2
Total	**262**	**11**

- **Estimated time of completion of entire project = 262/(3*8) = 10.917 ≅ 11 weeks**