

Lab 1 – Railway Ticketing Portal

1. Create a detailed list of functional and non-functional software requirements for the Railway ticketing portal system.

Functional Requirements:

1. *User Authentication and Authorization:*

- a. Account creation and secure login
- b. Different user roles (user, admin, etc.) with specific access permissions
- c. User profile management with add, edit, and view functions

2. *Ticket Booking:*

- a. Basic Search – includes one-way, round trip and multi-city ticket searching by date, time and train options
- b. Advanced Search – includes filtering and sorting options, only available trains are displayed

3. *Pricing and Discounts:*

- a. Distance-based pricing for train tickets
- b. Dynamic pricing rules:
 - Rush hour pricing with full fare during specific times.
 - Saver ticket discounts.
 - Senior discounts with an 'over 60s' rail card.
 - Child discounts with or without a family rail card.

4. *Shopping Cart:*

- a. Users can add, modify and remove tickets
- b. Cart details should be available for a week

5. *Booking Management:*

- a. Users can create, modify, and cancel reservations
- b. Access to previous reservations across booking channels
- c. Ability to apply promotions and discount coupons during the booking process

6. *Multi-Language Support:*

- a. Customers can select preferred languages
- b. Additional language support can be added upon request

7. *Payment Integration:*

- a. Secure payment processing for ticket purchases
- b. Integration with external accounting systems (e.g., SAP, QuickBooks, Microsoft AX) for supplier payments and reconciliation

Non-Functional Requirements:

1. **Performance:**

- a. The system must handle a high volume of concurrent users (over 1000) and transactions efficiently
- b. Fast response time (under 500ms) during searching, booking, etc.

2. **Security:** user authentication and data encryption, HTTPS

3. **Reliability:**

- a. 24/7 availability with minimal downtime for maintenance
- b. Backup and recovery mechanisms (hybrid cloud backups, Backup and Disaster Recovery)

4. **Scalability** - the system should be able to scale in order to accommodate increased user traffic

Concurrent Users	Time (ms)	Throughput (tps)
1	10	100
50	500	100
100	1000	100
150	1500	100
200	2000	100

5. **Usability:**

- a. Localization (multiple languages available)
- b. Responsive design for different screen sizes

6. **Compatibility:**

- a. Cross-browser and cross-platform compatibility
- b. Mobile-responsive design for smartphones and tablets

7. **Integration:** ability to integrate with external systems (SAP, Intuit, QuickBooks and Microsoft AX)

2. Write 3 Features using Gherkin Syntax.

1. **Feature:** Ticket Booking

Scenario: User books a one-way ticket

Given the user is on the ticket booking page

When the user selects a one-way trip

And specifies the destination and date of travel

And chooses a train option

And chooses discount option or full amount

And clicks the confirm button

Then the user should be directed to the payment page

Scenario: User pays the ticket without discount/ full fare

Given the user is on the payment page

When the user enters payment details

And the user sees the amount for payment

And clicks the "Pay" button

Then the user should see a confirmation message for the payment

Scenario: User pays for saver ticket

Given the user is on the payment page

When the user enters payment details

And the user sees the amount for payment with a 5% discount

And clicks the "Pay" button

Then the user should see a confirmation message for the payment

Scenario: User pays for senior ticket

Given the user is on the payment page

When the user enters payment details

And the user sees the amount for payment with a 34% discount

And clicks the "Pay" button

Then the user should see a confirmation message for the payment

Scenario: User pays for family ticket without family card

Given the user is on the payment page

When the user enters payment details

And the user sees the amount for payment with a 10% discount

And clicks the "Pay" button

Then the user should see a confirmation message for the payment

Scenario: User pays for family ticket with family card

Given the user is on the payment page

When the user enters payment details

And the user adds family card information
And the user sees the amount for payment with a 50% discount
And clicks the "Pay" button
Then the user should see a confirmation message for the payment

2. **Feature:** Multi-Language Support

Scenario: User changes the language preference
Given the user is on the settings page
When the user selects the language preference as "German"
And saves the changes
Then the user should see the application's interface in German

Scenario: User requests an additional language
Given the user is on the settings page
When the user requests to add the language "Italian"
And submits the request
Then the user sees the requested language in the list with language options

3. **Feature:** User Profile Management

Scenario: User updates their profile information
Given the user is logged in and on his profile page
When the user updates their contact information (e.g., email, phone number)
And saves the changes
Then the user should see a confirmation message
And their profile information should be updated accordingly

Scenario: User adds a new passenger to their profile
Given the user is logged in and on his profile page
When the user adds a new passenger with details (e.g., name, date of birth)
And specifies the passenger type (e.g., adult, child)
And saves the new passenger information
Then the new passenger should be listed in the user's profile