Car Management System — User Stories

Auth Service (Authentication & Authorization)

1. **User Registration**

   ○ **As a new user, I want to register an account with my email and password so that I can access the system.**

2. **User Login**

   ○ **As a registered user, I want to log in and receive a JWT so that I can access secured endpoints.**

3. **Role Assignment**

   ○ **As an admin, I want to assign roles (`ADMIN` / `USER`) to users so that access to certain actions can be controlled.**

4. **JWT Expiration & Refresh**

   ○ **As a user, I want my token to expire and be refreshable so that my session remains secure but convenient.**

Car Service

5. **Add a Car**

   ○ **As an admin, I want to add a new car with details (brand, model, year, owner) so that it is available for rentals.**

6. **Update Car Details**

   ○ **As an admin, I want to update car information so that it remains accurate.**

7. **Delete a Car**

- ○ **As an admin, I want to remove a car only if it's not currently rented so that data consistency is maintained.**

8. **View Cars**

   - ○ **As a user, I want to view all available cars so that I can choose one to rent.**

9. **Search/Filter Cars**

   - ○ **As a user, I want to search or filter cars by brand, model, or year so that I can find the car I want.**

10. **Car Availability Check**

    - ○ **As a system, I want to mark cars as unavailable when rented so that conflicts are prevented.**

11. **Car Scoring / Recommendation**

    - ○ **As a user, I want the system to rank or recommend cars based on age, usage, and popularity so that I can make better rental choices.**

Rental Service

12. **Rent a Car**

    - ○ **As a user, I want to rent a car for a specific period so that I can use it.**

    - ○ **The system should prevent double-booking by checking existing rentals.**

13. **Return a Car**

    - ○ **As a user, I want to mark a car as returned so that it becomes available for others.**

    - ○ **The system calculates any late return penalties automatically.**

14. **View My Rentals**

- ○ **As a user, I want to see all my active and past rentals so that I can track them.**

15. Multi-Car Rental

- ○ **As a user, I want to rent multiple cars in a single transaction so that I can manage multiple trips efficiently.**

16. Dynamic Pricing(Bonus)

- ○ **As a system, I want to adjust rental prices based on demand, duration, or car popularity so that pricing reflects real-world conditions.**

17. Rental History (Admin)

- ○ **As an admin, I want to view all rentals by all users so that I can monitor usage and revenue.**

Cross-Service / API Gateway

18. Secure Endpoints

- ○ **As a system, I want all microservices to validate JWT tokens so that only authorized users can access them.**

19. Route Requests

- ○ **As a user, I want requests to `/api/cars`, `/api/rentals`, and `/api/auth` to be routed correctly via the API Gateway so that the system functions seamlessly.**

20. SSL Access

- ○ **As a user, I want all communications to be encrypted via HTTPS so that my data is secure.**

21. Service-to-Service Communication

- ○ **As a system, I want services to communicate when needed (e.g., Rental Service checking Car Service for availability) so that data consistency is**

maintained.

22. Event Notifications (Bonus)

- ○ **As a system, I want services to notify others asynchronously when a car is rented or returned so that updates propagate efficiently.**