Mutigolla Shadyman, Nurbol Zhaksylyk, Zhanibek Satygul

Assignment 5: Minimum Viable Product

MVP Development and Testing Report: Online Parking Reservation System

1. Define the Main Task of the Product The online parking reservation system is designed to offer users a simple and effective way to book parking spaces in advance. Many drivers struggle with finding available parking, which leads to wasted time and frustration. This system provides a solution by allowing users to check availability and reserve a spot before reaching their destination, making parking more predictable and stress-free.

It is intended for:

- Individuals who commute daily and need guaranteed parking.
- Businesses managing employee parking.
- Parking lot owners looking to optimize space utilization.

The system is particularly useful in urban areas where demand for parking is high and real-time availability is a necessity.

2. Customer Journey Map A typical user experience consists of several key steps:

1. **Registration/Login** – Users create an account or log in to access the system.
2. **Searching for Parking** – Users enter their location, date, and time to find available parking spots.
3. **Reservation and Payment** – Users select a preferred spot, complete the payment, and receive confirmation.
4. **Navigation and Check-in** – The system provides directions to the reserved location, and users check in digitally upon arrival.

5. **Check-out and Feedback** – Users confirm their departure and provide feedback to improve service quality.
6. **Admin Panel for Parking Owners** – Parking lot owners can list, manage, and monitor their available spaces in real time.

3. Key Features of the MVP The MVP will focus on delivering three primary functions:

- **Real-time Parking Availability** – Users can view which spaces are open at any given moment.
- **Secure Online Payment** – A seamless and encrypted transaction process using Stripe or PayPal.
- **Navigation and Check-in** – Users receive directions and can check in digitally to validate their reservation.

Additional features such as a customer loyalty program, extended reservations, user ratings, and live chat support will be introduced in future iterations based on feedback.

4. Design and Architecture The system is built with a modern tech stack to ensure efficiency and scalability:

- **Frontend:** Angular
- **Backend:** Node.js with Express.js
- **Database:** MongoDB
- **Payment Processing:** Stripe/PayPal integration
- **Mapping and Navigation:** Google Maps API
- **Security:** JWT authentication and role-based access control (RBAC)

To enhance security, all transactions and sensitive data are encrypted, and users are authenticated via secure token-based access.

5. Initial MVP Development The first version of the system includes:

- A user-friendly interface for registration, search, reservation, and payment.
- Digital check-in and navigation assistance.
- An admin dashboard for parking lot owners to manage their spaces.

The system is deployed on a cloud-based server to ensure accessibility and scalability.

6. Alpha and Beta Testing

- **Alpha Testing:** A limited group of users will test the system in a controlled environment to detect bugs and usability issues.
- **Beta Testing:** A broader audience, including real users in selected locations, will provide insights on performance, usability, and security. Their feedback will help refine the platform before launch.

7. Continuous Improvement and Refinement Feedback from beta testers will guide improvements in:

- UI/UX design for better usability.
- Optimizing search and filtering options.
- Enhancing security for online transactions.
- Developing a mobile application for better accessibility.

Further testing will be conducted after these refinements to ensure stability before a full-scale release.

8. Future Enhancements Once the MVP proves successful, future updates will include:

- **AI-based Dynamic Pricing** – Adjusting fees based on demand and availability.
- **Subscription Plans** – Offering monthly and yearly passes for frequent users.

- **Smart Parking Sensors** – Providing real-time occupancy updates.
- **Blockchain-based Transactions** – Enhancing security and transparency.
- **Multi-language Support** – Expanding accessibility to a global audience.
- **Automated Entry and Exit Integration** – Allowing smart cars to interact with the system for seamless parking.

The long-term goal is to create a comprehensive, intelligent parking system that simplifies urban parking, reduces congestion, and improves overall efficiency. By continuously refining the platform based on user needs, the service will evolve into a robust solution for modern parking management.