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Part A: Individual Contribution

For my senior design project, I primarily focused on developing the mobile application for the Smart Parking System using Dart and Flutter. I designed and implemented the user interface, ensuring it was intuitive and aligned with best practices for mobile development. Additionally, I integrated the frontend with the backend, which was developed using ASP.NET and C#. This required implementing API calls to fetch real-time parking data from the IoT sensors and display it to users. Throughout the development process, I applied my prior knowledge of mobile app development, database management, and backend integration, all of which I had gained through coursework and co-op experiences. While working on the project, I deepened my understanding of state management in Flutter, API handling, and OAuth authentication for secure user login.

One of my major successes was building a functional and responsive UI that could handle real-time data updates efficiently. I also successfully implemented OAuth for authentication, ensuring secure access for users. However, I faced challenges in integrating real-time sensor data with the app, particularly due to inconsistencies in the API responses. Debugging these issues required extensive testing and collaboration with my teammates working on the backend. Additionally, learning C# for backend-related tasks was initially challenging, but I was able to overcome this by leveraging my experience with other backend technologies like Java and Spring Boot. Overall, this project strengthened my skills in mobile development, API integration, and real-time data handling, all of which are valuable competencies for my future career.

Part B: Team Contribution

As a team, we successfully developed a functional Smart Parking System that connects IoT sensors to a mobile application, allowing users to check real-time parking availability. Our team effectively divided tasks based on individual strengths, with some members focusing on hardware and sensor deployment, while others worked on backend development and database management. We established a clear workflow for integrating each component, ensuring that the system functioned cohesively. Despite encountering technical hurdles, such as sensor calibration issues and backend data inconsistencies, we were able to troubleshoot problems collaboratively and make necessary improvements. This experience reinforced the importance of communication, documentation, and iterative testing in team-based software development.

One of the key lessons I learned about teamwork is the significance of proactive communication and role clarity. Our team functioned well when we regularly updated each other on progress and challenges. However, there were moments when delays occurred due to misalignment in expectations between the high-level app development and lower-level hardware development. Clearer documentation and earlier testing of API endpoints could have mitigated some of these issues. In terms of contributions, I believe I played a significant role in ensuring a smooth user experience for the mobile app. That said, special recognition should be given to my teammate who worked on the IoT hardware setup, as their efforts were crucial in making real-time parking

detection possible. Overall, our combined efforts resulted in a well-integrated and impactful project.