* **Traffic Signal System Implementation in C Report**

1. **Project Overview**
   * We have developed a traffic signal control system implemented in the C programming language. This system is designed to manage traffic flow efficiently at intersections, enhancing road safety and reducing congestion.
2. **Objective**
   * The primary objective of this project is to create a reliable and efficient traffic signal system that can be easily integrated into existing traffic management infrastructure, utilizing the robustness and performance efficiency of the C programming language.
3. **Implementation Details**
   * **Signal Timing Control:** Implemented algorithms to manage signal timing (green, yellow, and red lights) based on predefined schedules and real-time traffic data.
   * **Hardware Interface:** Developed functions for interfacing with traffic signal hardware, ensuring that signal changes are executed promptly and reliably.
   * **Safety Checks:** Incorporated multiple safety checks to prevent signal conflicts and ensure that the signal timing adheres to traffic safety regulations.
   * **Fault Tolerance:** Designed the system to be fault-tolerant, with mechanisms to detect and respond to hardware failures or communication errors.
4. **Key Features**
   * **Adaptive Timing:** The system adjusts signal timings based on real-time traffic conditions, optimizing traffic flow and reducing wait times.
   * **Manual Override Capability:** Integrated functionality for manual control of traffic signals by authorized personnel for emergency situations or special events.
   * **Logging and Monitoring:** Implemented comprehensive logging for system actions and traffic data, facilitating system monitoring and performance evaluation.
5. **Compliance and Standards**
   * We conducted a review of our code against MISRA guidelines to ensure compliance with automotive software safety and reliability standards. Necessary adjustments were made to adhere to these guidelines, enhancing the system's safety and maintainability.
6. **Future Directions**
   * **Enhanced Adaptability:** Plans to incorporate more advanced algorithms for adaptive signal control based on predictive modeling of traffic patterns.
   * **Integration with Smart City Infrastructure:** Exploring possibilities for integrating our system with broader smart city infrastructure for coordinated traffic management across multiple intersections.
7. **Conclusion**
   * The development of the traffic signal system in C represents a significant step forward in our efforts to improve traffic management and safety. The system's design and implementation focused on reliability, efficiency, and compliance with industry standards, setting a strong foundation for future enhancements.

* **MISRA Compliance Report for Traffic Signal System Implementation**

1. Introduction
   * We undertook a review of our traffic signal system code to assess its compliance with MISRA (Motor Industry Software Reliability Association) guidelines, which are critical for ensuring the safety, reliability, and maintainability of automotive software systems.
2. Key Findings
   * The MISRA compliance report identified several instances where our code does not adhere to best practices as outlined by MISRA guidelines. Specifically, the report highlighted the use of "magic numbers" in our implementation.
3. Details of Findings
   * Use of Magic Numbers: The report flagged specific instances where hard-coded numerical values were used in the code, notably for signal timing. These include:
   * Yellow signal time set to 5 seconds.
   * All-red signal time set to 2 seconds.
   * Green signal time set to 60 seconds, used in two distinct places.
   * These instances were flagged under the check ID "RECOMMENDED\_08", indicating a recommendation against the use of magic numbers.