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Assignment 2

Develop a case study analyzing the implementation of SDLC phases in a real-world engineering project. Evaluate how Requirement Gathering, Design, Implementation, Testing, Deployment, and Maintenance contribute to project outcomes.

Case Study : Building a Smart Traffic Management System

This case study analyzes the implementation of SDLC phases in the development of a Smart Traffic Management System (STMS) for a large city.

1. Requirement Gathering

- ✓ **Activities:** Interviews with city officials, traffic engineers, and citizens. Data collection on traffic patterns, accident hotspots, and infrastructure capabilities.
- ✓ **Outcomes:** Clear understanding of traffic problems, desired functionalities (e.g., real-time signal adjustments, incident alerts), and stakeholder needs. Well-defined requirements ensure the STMS addresses actual issues.

2. Design

- ✓ **Activities:** Designing system architecture, defining communication protocols between sensors, traffic lights, and central control system. User interface (UI) design for control center and citizen information displays.
- ✓ **Outcomes:** A blueprint for the STMS, considering scalability, security, and integration with existing infrastructure. A well-designed system is efficient, maintainable, and user-friendly.

3. Implementation

- ✓ **Activities:** Programming the control software, developing mobile apps for citizens, and installing sensors and traffic light controllers. Integrating the STMS with existing traffic light systems.
- ✓ **Outcomes:** A functional STMS prototype. Careful implementation ensures the system functions as designed and meets technical requirements.

4. Testing

- ✓ **Activities:** Unit testing of software modules, integration testing of the entire system, and user acceptance testing (UAT) with real users. Simulating various traffic scenarios to identify bugs and performance issues.

- ✓ **Outcomes:** A reliable and robust STMS. Thorough testing minimizes bugs and ensures the system functions effectively in real-world situations.

5. Deployment

- ✓ **Activities:** Gradual rollout of the STMS in phases, starting with a limited area. Monitoring system performance and user feedback. Training city personnel on operating the STMS.
- ✓ **Outcomes:** A smoothly transitioned STMS with minimal disruption to traffic flow. A well-planned deployment minimizes risks and ensures user adoption.

6. Maintenance

- ✓ **Activities:** Bug fixes, software updates for new features, and system optimization based on usage data. Addressing security vulnerabilities and adapting to changes in traffic patterns.
- ✓ **Outcomes:** A continually improved and functional STMS. Effective maintenance ensures the system remains reliable, secure, and meets evolving needs.

Evaluation –

Each SDLC phase contributes significantly to project outcomes –

- ✓ **Requirement Gathering:** A solid foundation for the entire project. Clear requirements minimize rework and ensure the final product addresses user needs.
- ✓ **Design:** Creates a roadmap for development and avoids costly errors during implementation.
- ✓ **Implementation:** Transforms design into a working system.
- ✓ **Testing:** Guarantees quality and identifies issues before deployment.
- ✓ **Deployment:** Ensures a smooth transition from development to real-world use.
- ✓ **Maintenance:** Extends the life of the system and keeps it performing optimally.
