**Project Design Phase**

**Problem – Solution Fit Template**

| Date | 25 JUNE 2025 |
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| Team ID | LTVIP2025TMID21159 |
| Project Name | SmartSDLC – AI-Powered Software Development Lifecycle Optimization |
| Maximum Marks | 2 Marks |

### Problem

Software development teams and organizations face numerous inefficiencies in the Software Development Lifecycle (SDLC), including:

* Manual and error-prone **requirement classification**
* Time-consuming **code writing**, especially for repetitive components
* Difficulty in locating and **fixing bugs** quickly
* Lack of **automated test case generation**
* Poorly **documented code**, leading to knowledge silos
* Lack of accessible **SDLC assistance** for developers and testers

These issues lead to delays, increased costs, and inconsistent software quality — especially in fast-paced or resource-constrained development environments.

### Solution

**SmartSDLC** is an AI-powered automation platform designed to optimize the Software Development Lifecycle by leveraging **transformer-based NLP models** and **generative AI**.

Key features include:

* **Requirement Classification**: Automatically extracts and classifies text from PDFs into SDLC phases.
* **Code Generation**: Converts natural language requirements into functional Python code.
* **Bug Fixing**: Identifies and corrects errors in Python code using LLM logic.
* **Test Case Generation**: Creates pytest-compatible test scripts for existing code blocks.
* **Code Summarization**: Produces natural language explanations of code for easier understanding and documentation.
* **SDLC Chatbot**: Offers intelligent assistance for SDLC-related questions and tasks.

This drastically reduces development effort, improves software quality, and enhances team productivity.

### Purpose

SmartSDLC helps teams:

* **Accelerate development** by automating repetitive and complex tasks.
* **Reduce human error** through NLP-powered validations and fixes.
* **Improve collaboration** with AI-generated summaries and documentation.
* **Adapt easily** by integrating with standard workflows through its web UI and FastAPI backend.

### Benefits of Fit

* **Solves real pain points** for developers, QA engineers, and project managers.
* **Works with natural behavior** — integrates into familiar text-based inputs (requirements, code).
* **Improves adoption** due to its intuitive UI and task-based modules.
* **Builds trust** through transparency (e.g., code summaries, fallback model support, logging).
* **Offers performance** with GPU-aware execution and fallback APIs (like Groq).

**Template:**

Calendar

Description automatically generated

References:

1. <https://www.ideahackers.network/problem-solution-fit-canvas/>
2. <https://medium.com/@epicantus/problem-solution-fit-canvas-aa3dd59cb4fe>