OPERATING SYSTEM PROGRESS REPORT

PHASE 2

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| **Project Title** | **: Intelligent Unix Shell** |
| **TEAM NAME** | **: TEAM ANSHIKA** |

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| **Objective** | To design and implement an intelligent Unix shell capable of executing user commands, managing history, supporting background jobs, and integrating with a suggestion system through IPC using Unix domain sockets. |
| **Key Features Implemented** | - **Core Shell Loop:** Implemented read–parse–execute structure.  - **Command Parsing:** Supports background job operator  - **Built-in Commands:** Added cd, exit, and history.  - **SQLite Integration:** Logs command history with timestamps.  - **Inter-Process Communication:** Uses Unix domain sockets to connect with Python suggestion server.  - **Signal Handling:** Handles SIGINT gracefully. - **Process Management:** Supports background execution and PID tracking. |
| **Current Status** | - Shell compiles and runs successfully on Unix systems.  - SQLite database integration functional.  - Command suggestion system tested via socket communication.  - Core modules working as expected |
| **Pending / Next Steps** | - Implement advanced parser (handle pipes, quotes, and redirection).  - Integrate ML-based suggestion model for smarter predictions.  - Enhance user interface with colored prompts.  -Add automated testing and error logging |
| **Challenges Faced** | -GCC not recognized in non-Unix environments (Windows compatibility issue).  - Debugging socket timeout responses.  - Managing concurrent background processes efficiently |
| **Upcoming Milestones** | **M1:** Advanced parser and I/O redirection  **M2:** ML-based suggestion server integration **M3:** Testing and performance optimization **M4:** Final documentation and presentation |

| **Team Member** | **Role / Title** | **Responsibilities / Assigned Modules** |
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| **Anshika Saklani** | **Core System Developer** | - Develops and maintains the main Unix shell core.  - Implements command parsing, process management, and signal handling.  - Designs and integrates built-in commands (cd, exit, history). - Ensures smooth command execution and shell stability. |
| **Akriti Rawat** | **ML Suggestion & Model Engineer** | - Builds and trains the **machine learning model** for intelligent command suggestions.  - Implements the **Python-based suggestion server** that interfaces with the shell through sockets.  - Optimizes model performance and accuracy for real-time suggestions. |
| **Ayush Chand** | **Database & History Manager (SQLite3)** | - Handles **SQLite3 database** integration for command logging and history retrieval.  - Creates and manages database schema (commands.db).  - Ensures data persistence, indexing, and query optimization. |
| **Rakhi** | **IPC & Communication Engineer** | - Manages **Inter-Process Communication (IPC)** via **Unix domain sockets**.  - Establishes secure, efficient communication between the shell and the ML suggestion server.  - Handles socket connection errors, timeouts, and data transfer protocols. |