**Movie Theater Reservation System Project Documentation**

**1. Project Overview**

**1.1 Project Title**

Movie Theater Reservation System

**1.2 Project Description**

The Movie Theater Reservation System is a console-based application designed to manage the reservation system of a movie theater. It allows users to view available movies, screenings, make reservations, and enables administrators to add new movies and screenings. The system ensures data persistence by storing information in a JSON file.

**2. Solution Principle**

The solution follows a modular and structured approach. It leverages Python for the backend logic and a JSON file for data storage. The application is designed to be user-friendly, with a main menu guiding users through various actions. The structure is modular, allowing for easy expansion and maintenance.

**3. Project Structure**

**3.1 Functions and Modules**

* **Main Menu Module**
  + Functions for displaying the main menu and handling user input.
* **Data Handling Module**
  + Functions for loading and saving data to/from the JSON file.
* **Movie Functions Module**
  + Functions for viewing movies and adding new movies.
* **Screening Functions Module**
  + Functions for viewing screenings and adding new screenings.
* **Reservation Functions Module**
  + Functions for viewing available seats, making reservations, and updating seat status.
* **Utility Functions Module**
  + Utility functions for common tasks, such as input validation and formatting.
* **Main Execution Module (movie\_theater\_reservation.py)**
  + Integrates all modules and handles the overall flow of the application.

**4. Functions and Interrelationships**

**4.1 Main Menu Module**

* **display\_main\_menu()**: Displays the main menu.
* **handle\_menu\_choice(choice)**: Handles user input and redirects to the appropriate module.

**4.2 Data Handling Module**

* **load\_data(file\_path)**: Loads data from the JSON file.
* **save\_data(file\_path, data)**: Saves data to the JSON file.

**4.3 Movie Functions Module**

* **display\_movies(data)**: Displays available movies.
* **add\_movie(title, genre, release\_date, director, duration\_minutes, rating, data)**: Adds a new movie to the system.

**4.4 Screening Functions Module**

* **display\_screenings(movie\_index, data)**: Displays screenings for a specific movie.
* **add\_screening(movie\_index, time, seats, data)**: Adds a new screening for an existing movie.

**4.5 Reservation Functions Module**

* **display\_seats(movie\_index, screening\_index, data)**: Displays available seats for a screening.
* **make\_reservation(movie\_index, screening\_index, seat\_index, data)**: Makes a reservation for a seat.

**4.6 Utility Functions Module**

* **validate\_integer\_input(prompt, min\_value, max\_value)**: Validates user input as an integer within a specified range.
* **format\_datetime(datetime\_str)**: Formats datetime strings for display.

**5. Use of Possible External Libraries**

The project currently relies only on the standard library provided by Python. No external libraries are used for this console-based application.

**6. Division of Responsibilities**

The project is developed as an individual effort.

* **Developer- Ashish Gupta**
  + Responsible for overall project design and implementation.
  + Develops and maintains the project codebase.
  + Creates and updates project documentation.
* **Tester - Ashish Gupta**
  + Responsible for testing the application's functionality.
  + Provides feedback on usability and identifies potential issues.
  + Collaborates with the developer for bug fixes.

**7. Conclusion**

The Movie Theater Reservation System is structured to be modular, ensuring easy maintenance and scalability. The functions are organized into logical modules, and the project adheres to standard Python practices. The use of external libraries is minimized to keep the application lightweight and self-contained.

Project Highlevel Plan:

**1. Timeline**

**1.1 Milestones**

* **Week 1: Planning and Setup**
  + Define project requirements (Week 1).
  + Set up the project repository and initial structure (Week 1).
  + Create main menu and navigation (Week 2).
* **Week 2: Core Functionality & Data Management**
  + Develop functions for viewing movies, screenings, and seats (Week 2).
  + Implement reservation functionality (Week 2).
  + Implement data loading and saving (Week 2).
  + Add functionality for adding movies and screenings (Week 2).
* **Week 3: Testing ,Refinement and Documentation**
  + Conduct thorough testing (Week 3).
  + Refine user interface and functionality based on feedback (Week 3).
  + Create project documentation (Week 3).
* **Week 3-4: Finalization and Delivery**
  + Address any outstanding issues (Week 3).
  + Finalize the project for delivery (Week 4).

**2. Conclusion**

This project plan outlines a structured approach for the development of the Movie Theater Reservation System. Regular monitoring, communication, and risk management are crucial for the successful completion of the project.