**Virtual Classroom Manager User Manual**

**Table of Contents**

1. [Introduction](#introduction)
2. [Code Overview](#code-overview)
3. [Prerequisites](#prerequisites)
4. [Running the Application](#running-the-application)
5. [Using the Application](#using-the-application)
6. [Commands](#commands)
7. [Troubleshooting](#troubleshooting)

**Introduction**

The **Virtual Classroom Manager** is a command-line application designed to facilitate the management of classrooms, students, and assignments. It allows educators to efficiently organize their virtual classroom environment, track student enrollments, and manage assignments.

**Code Overview**

**Main Components**

1. **ClassroomManager**:
   * Implements the singleton design pattern to ensure only one instance exists.
   * Manages multiple classrooms, providing functionality to add, list, and remove them.
2. **Classroom**:
   * Represents a single classroom with a name and lists of students and assignments.
   * Provides methods to add students, schedule assignments, and manage submissions.
3. **Student**:
   * Represents individual students identified by unique IDs.
   * Facilitates tracking of student enrollments within classrooms.
4. **Assignment**:
   * Represents assignments within classrooms.
   * Allows for tracking student submissions to avoid duplicates.
5. **VirtualClassroomManagerApp**:
   * The entry point for the application that handles user input and invokes methods on the manager and classroom classes.

**Design Patterns**

* The application utilizes the **singleton pattern** for the ClassroomManager, ensuring that only one instance manages the entire classroom system, promoting efficient resource usage.

**Commands**

**Command List**

| **Command** | **Usage** | **Description** |
| --- | --- | --- |
| **Add Classroom** | add\_classroom <classroom\_name> | Creates a new classroom with the specified name. |
| **Add Student** | add\_student <student\_id> <classroom\_name> | Enrolls a student with the given ID into the specified classroom. |
| **Schedule Assignment** | schedule\_assignment <classroom\_name> <assignment\_name> | Schedules a new assignment for the specified classroom. |
| **Submit Assignment** | submit\_assignment <student\_id> <classroom\_name> <assignment\_name> | Allows a student to submit a specific assignment. |
| **List Classrooms** | list\_classrooms | Displays a list of all available classrooms. |
| **List Students** | list\_students <classroom\_name> | Displays a list of all students enrolled in the specified classroom. |
| **List Assignments** | list\_assignments <classroom\_name> | Displays a list of all assignments scheduled for the specified classroom. |
| **Remove Classroom** | remove\_classroom <classroom\_name> | Removes the specified classroom from the system. |
| **Help** | help | Displays a list of available commands and their usage. |
| **Exit** | exit | Closes the application. |

**Troubleshooting**

* **Command Not Recognized**: If an unknown command is entered, the application will prompt you to type 'help' for guidance.
* **Classroom or Student Not Found**: Ensure that the names and IDs provided are correct; the system will display an error message if the specified classroom or student does not exist.