**Project Report: Gradebook Management System**

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**1. Introduction**

The Gradebook Management System is a Java program designed to facilitate the management of student grades within an educational institution. This system allows educators to add, remove, and display student information and grades, as well as save and load data from files. It provides a user-friendly interface for efficient management of student academic records.

**2. System Overview**

The system consists of two main classes: Student and GradebookManagementSystem. The Student class represents individual students and their grades, while the GradebookManagementSystem class manages the collection of students and provides methods for interacting with the system.

**3. Class Structure**

**Student Class**

* Attributes:
  + name: String - Represents the name of the student.
  + id: int - Unique identifier for each student.
  + grades: HashMap<String, Integer> - Stores assignment names and corresponding grades.
* Methods:
  + addGrade(String assignment, int grade): Adds a grade for a specific assignment.
  + removeGrade(String assignment): Removes a grade for a specific assignment.
  + calculateFinalGrade(): Calculates the final grade based on all grades.
  + printReportCard(): Prints the student's report card.

**GradebookManagementSystem Class**

* Attributes:
  + students: ArrayList<Student> - Stores a list of Student objects.
* Methods:
  + addStudent(Student student): Adds a student to the system.
  + removeStudent(int id): Removes a student from the system based on ID.
  + addGrade(int id, String assignment, int grade): Adds a grade for a specific student.
  + removeGrade(int id, String assignment): Removes a grade for a specific student.
  + displayStudentGrades(Scanner scanner): Displays grades for all students or a specific student.
  + saveDataToFile(String filename): Saves data to a file.
  + readDataFromFile(String filename): Reads data from a file.

**4. Main Method and User Interface**

The main method provides a menu-driven interface for user interaction. Users can perform various actions such as adding/removing students, adding/removing grades, displaying grades, and saving/loading data from files.

**5. File Handling**

The system supports file handling for data persistence. Users can save student data to a file and load it back into the system for future use. This feature enhances the usability and flexibility of the system.

**6. Conclusion**

The Gradebook Management System provides a comprehensive solution for managing student grades efficiently. It offers a user-friendly interface and supports essential features for educators to track student progress effectively.