ReflectionLog CourseGrades and GradeBook

CourseGrades

```java
public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);

    //Number of students and tests
    int students = 12;
    int tests = 5;
```

This code initializes a Scanner object to take user input and defines two integer variables: students (set to 12) and tests (set to 5). These variables represent the number of students and the number of tests (or grades) that will be processed in the program

```java
//Create a GradeBook object
    GradeBook gradeBook = new GradeBook(students, tests);

    //Input grades for all students and tests
    for (int student = 0; student < students; student++) {

        System.out.println("Please Enter Test Grades For Student " + (student + 1) + ":");

        for (int test = 0; test < tests; test++) {

            System.out.print("Test " + (test + 1) + ": ");

            int grade = scanner.nextInt();

            gradeBook.setGrade(student, test, grade);
        }
    }
```

This code creates a GradeBook object to store grades for multiple students and tests. It then uses nested loops to prompt the user for test grades for each student, with the outer loop iterating over the students and the inner loop iterating over the tests. The grades entered by the user are stored in the GradeBook object using the setGrade method. This allows the program to capture and store the grades for further processing.

```
//Display all grades
gradeBook.showGrades();

//Calculate and display average grades for each student
for (int student = 0; student < students; student++) {

    System.out.println("The Average grade for Student " + (student + 1) + ": " +

            gradeBook.studentAvg(student));
}
```

This code displays all the grades stored in the GradeBook object by calling the showGrades() method. It then calculates and prints the average grade for each student by using the studentAvg() method inside a loop. Each student's average grade is printed with the corresponding message. This provides both a detailed view of all grades and an average score for each student.

```
//Calculate and display average grades for each test
for (int test = 0; test < tests; test++) {

    System.out.println("The Average grade for Test " + (test + 1) + ": " +

            gradeBook.testAvg(test));
}
```

This code calculates and displays the average grade for each test by iterating through each test using a loop. For each test, the testAvg() method is called to compute the average grade, and the result is printed with a message. This allows the program to show the average grade for each test across all students.

GradeBook

```java
//Constructor to initialize grades array
public GradeBook(int students, int tests) {

    grades = new int[students][tests];
}
//Method to set a grade for a specific student and test
public void setGrade(int student, int test, int grade) {

    grades[student][test] = grade;
}
//Method to display all grades
public void showGrades() {

    System.out.println("Grades:");

    for (int student = 0; student < grades.length; student++) {

        System.out.print("Student " + (student + 1) + ": ");

        for (int test = 0; test < grades[student].length; test++) {

            System.out.print(grades[student][test] + " ");
        }
        System.out.println();
    }
}
```

This code defines a GradeBook class that uses a two-dimensional array to store grades for students and tests. The constructor initializes the array based on the number of students and tests. The setGrade() method sets a grade for a specific student and test, while the showGrades() method displays all the grades in a readable format. This structure allows for managing and displaying grades for multiple students across various tests.

```java
//Method to calculate the average grade for a specific student
public double studentAvg(int student) {

    int total = 0;

    for (int test : grades[student]) {

        total += test;
    }
    return total / (double) grades[student].length;
}
//Method to calculate the average grade for a specific test
public double testAvg(int test) {

    int total = 0;

    for (int[] studentGrades : grades) {

        total += studentGrades[test];
    }
    return total / (double) grades.length;
}
```

The studentAvg(int student) method calculates the average grade for a specific student by summing their grades across all tests and dividing by the number of tests. The testAvg(int test) method calculates the average grade for a specific test by summing the grades of all students and dividing by the number of students. Both methods return the average as a double. These methods help compute the average grades for either individual students or tests.