CourseGrades Mastery ReflectionLog

First rendition of CourseGrades.java:

```java
package Mastery;

import java.util.Scanner;

public class CourseGrades {

    private static int[][] grades;

    private static void getGrades() {
        //Preparing for user input
        Scanner userInput = new Scanner(System.in);

        for (int student = 0; student < 5; student++) {
            System.out.println("Student " + (student + 1) + ":");
            for (int course = 0; course < 5; course++) {
                System.out.print("Course " + (course + 1) + ": ");
                grades[student][course] = userInput.nextInt();
            }
        }
    }

    private static void showGrades() {
        for (int student = 0; student < 5; student++) {
            System.out.println("\nStudent " + (student + 1) + ":");
            for (int course = 0; course < 5; course++) {
                System.out.print("Course " + (course + 1) + ": " + grades[student][course] + " ");
            }
        }
    }

    public static void main(String[] args) {

        //Preparing for user input
        Scanner userInput = new Scanner(System.in);

        grades = new int[5][5];

        getGrades();

        showGrades();

    }

}
```

I started by making 2 objects, titled getGrades() and showGrades(). When getGrades() was called it would run two nested for-loops that would record 5 grades for 12 different students in a multidimensional array. When the showGrades() object was called it would print the grades for each student using two nested for-loops. Within the main method I initialized the grades array and called both methods. For ease of use when testing I only set the array to include 5 students, rather than the 12.

Second rendition of CourseGrades.java:

```
private static int studentAvg(int studentNumber) {
    int average = 0;

    for (int course = 0; course < 5; course++) {
        average += grades[studentNumber - 1][course];
    }

    average = average / 5;

    return average;
}
```

```
public static void main(String[] args) {

    //Preparing for user input
    Scanner userInput = new Scanner(System.in);

    grades = new int[5][5];

    getGrades();
    showGrades();

    System.out.println("\nStudent average for: ");
    int studentNumber = userInput.nextInt();
    System.out.println("Average for student " + studentNumber + " is: " + studentAvg(studentNumber));

}
```

Second, I included a studentAvg() method that would return an int value of the average. To get the average the method would take in the desired student, then using an for-loop it would append each grade value to an average variable for each test. Finally it would divide this value by five, and return the result. Within the main method I prompted the user for the desired student, then I printed the result by calling the method with the aforementioned student.

Third rendition of CourseGrades.java:

```
private static int studentAvg(int studentNum) {
    int averageStudent = 0;

    for (int course = 0; course < 5; course++) {
        averageStudent += grades[studentNum - 1][course];
    }

    averageStudent = averageStudent / 5;

    return averageStudent;
}

private static int testAvg(int testNum) {
    int averageTest = 0;

    for (int student = 0; student < 5; student++) {
        averageTest += grades[student][testNum - 1];
    }

    averageTest = averageTest / 5;

    return averageTest;
}



public static void main(String[] args) {

    //Preparing for user input
    Scanner userInput = new Scanner(System.in);

    grades = new int[5][5];

    getGrades();
    showGrades();

    System.out.print("\nStudent average for: ");
    int studentNum = userInput.nextInt();
    System.out.println("Average for student " + studentNum + " is: " + studentAvg(studentNum));

    System.out.print("\nTest average for: ");
    int testNum = userInput.nextInt();
    System.out.println("Average for test " + testNum + " is: " + testAvg(testNum));

}
```

Third, I included a testAvg() method that would return an int value of the average. To get the average the method would take in the test number, then using an for-loop it would append each grade value to an average variable for each test. Finally it would divide this value by twelve, and return the result. Within the main method I prompted the user for the desired test number, then I printed the result by calling the method with the aforementioned test number.

Final rendition of CourseGrades.java:

```
        private static int studentAvg(int studentNum) {
            int averageStudent = 0;

            for (int course = 0; course < 5; course++) {
                averageStudent += grades[studentNum - 1][course];
            }

            averageStudent =   (int) Math.round((double) averageStudent / 5);

            return averageStudent;
        }

        private static int testAvg(int testNum) {
            int averageTest = 0;

            for (int student = 0; student < 12; student++) {
                averageTest += grades[student][testNum - 1];
            }

            averageTest = (int) Math.round((double) averageTest / 12);

            return averageTest;
        }
public static void main(String[] args) {

    //Preparing for user input
    Scanner userInput = new Scanner(System.in);

    grades = new int[12][5];

    getGrades();
    showGrades();

    int choice = 0;

    while (choice != 3) {
        System.out.println("\nWhat would you like to calculate?");
        System.out.println("1. Average of a student.");
        System.out.println("2. Average of a test.");
        System.out.print("3. Quit.\n: ");
        choice = userInput.nextInt();

        if (choice == 1) {
            System.out.print("\nStudent average for: ");
            int studentNum = userInput.nextInt();
            System.out.println("Average for student " + studentNum + " is: " + studentAvg(studentNum));
        } else if (choice == 2) {
            System.out.print("\nTest average for: ");
            int testNum = userInput.nextInt();
            System.out.println("Average for test " + testNum + " is: " + testAvg(testNum));
        }

    }

}
```

In the final rendition I changed the testAvg() method to type cast the average to a double value, round, and type cast back to an int. This way the int division wouldn't remove any remainders, and would round properly. Then within the main method I prompted the user for their desired average, and within a while loop and if-else-if statement I would print the respective result.