**Unit 2 Assignment**

**Specification**

This program creates an array to store the data for different tests for different students. It allows you to name the students, fill in the grades, and calculate the averages for each student or test. It does this using a two dimensional array. The program begins by prompting the user for the number of tests and students. The program then prompts you for a possible action. Until the grades are filled, however, no other action may be performed correctly. Once the grades are filled you can display all of the grades or calculate the average for a student or a test stored in the main array. It does this by looping through either the test’s or the student’s scores, the columns or rows respectively. The average is calculated as a double to allow for decimals. The printing for this is done in the holding class for the array. The holding class also contains 3 show methods for displaying the grades or the tests or the students names. Test and student have reference numbers along with them for easy referencing to the test or student.

**Algorithm**

1. Prompt user for the number of tests and students
2. Creates the array of size test by students
3. Prompts user to fill in the grades for the tests for each student
4. Runs a loop filling in grades as they are input
5. Prompts user for desired action
6. Executes desired action
   1. Possible actions:
   2. Get the test average
   3. Get the student average
   4. Show the scores for all of the tests for all of the students

**Flowchart**

See the flowchart file stored along with this case study

**Code Design**

**Class** –

A class is used to create a custom data type. It can store any other data types within it and keeps them all in one place. A class can be referenced statically or using an instance called an object. The object can store proprietary data within it. The statically referenced class is only for methods and not for storing data specific to the instance.

**Objects** –

Objects are an instance of a class. They are used to store data specific to the instance and execute any desired actions with them.

**Arrays** –

Arrays are used to store a large series of data in one variable. It is all stored next to each other in memory and can easily be accessed by an index number.

**Do-While** –

Do-While loops are used to loop until some condition is met. They can loop infinitely and are used instead of a for loop in the case where you do not know a specific number of iterations to execute. Used to prompt user action until they enter q for quit.

**Double** –

A double is used to create a variable to store a 64-bit number that may or may not contain decimals. Used when calculating the averages for tests and students.

**Integer** –

An integer is used to create a 32 bit number without decimal places. It stores the number in memory and can be accessed through the assigned name.

**2D Arrays** –

2D Arrays are used to create a memory type storing a bunch of the same type data in one location under one name.

**Implementation**

See the java files stored along with this case study

**Testing and Debugging**

I ran into some errors along the way.

These include not initializing variables and giving null values.