Assignment Report for Assignment 04

Course and Section	CSC215.28
Assignment Name	Assignment 04
Due Date and Time	10-11-2024 @ 11:55 PM
First Name and Last Name	Miguel Antonio Logarta
SFSU Email Account	923062683@sfsu.edu
First Name and Last Name of Teammate	N/A
SFSU Email Account of Teammate	N/A

PART A

Question Description and Analysis:

This part of the assignment asks me to create a standard array and a staggered array. I have to create a single method that prints both types of arrays.

Answer:

1. Problem analysis: From this problem, I understand that I have to create two different arrays. The first array is a regular m x n matrix. The second array is a staggered array. I then have to create a single method that has the ability to handle both of these types of arrays and print out their contents. I also have to align the contents to the right. From my understanding, an array of arrays holds pointers to arrays. For example, if we have char[][] content, content holds pointers that lead to more arrays that store the char data type.

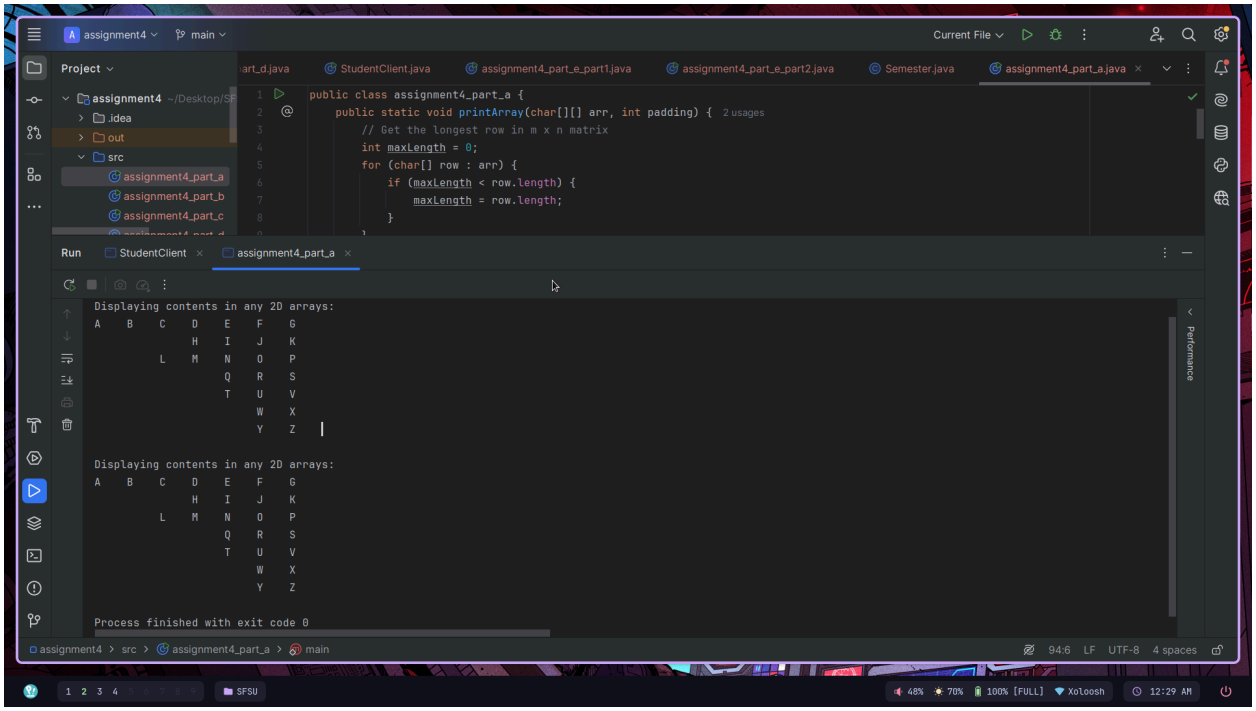
   If I want to have a method that can iterate through staggered arrays without going out of bounds, I have to get the length of the array when I am looping through each row of the 2D array. To right-align the content of the array, I can find the row with the most

characters in the 2D array. I can then multiply the maximum length by the amount of spaces the client wants.

3. From my results, I feel that I fulfilled the client's request. I even included a feature where they can customize the spacing between each of the characters when printing out the array. I found that the original output was an n x n matrix, but I made the method able to handle an m x n matrix. In the future, I can maybe improve this program by being able to handle 2D arrays with other data types different from char[][].

Screenshots of Outputs and Explanation:

These screenshots show what I accomplished



PART B

Question Description and Analysis:

This part of the assignment asks me to ask the user for input of different data types. I then have to create an Object[][] array that contains different data types. I then have to display the data types in this 2D array and print out their values.

Answer:

1. This problem is asking me to ask the user to input data of different types. The different data types in this case are a sequence of integers, a sequence of characters, a sequence of strings, then finally an integer, character, and string. I then have to store this data into a 2D array using Object[][]. Next, I have to display the different data types stored in this array (Data Type View). Finally, I have to show the values stored in this 2D array (Data Value View).

   I know ahead of time that Integer, Character, and String, all inherit the Class class, which inherits the Object class. After looking up documentation on the Object class from Oracle, I found that I can get the class of the Object with getclass(). From there, I can call the Class object's getsimplename() method to get the name of the object. The name of the object is our data type. The Object class also has a toString() method which I can call to display the contents of the object.

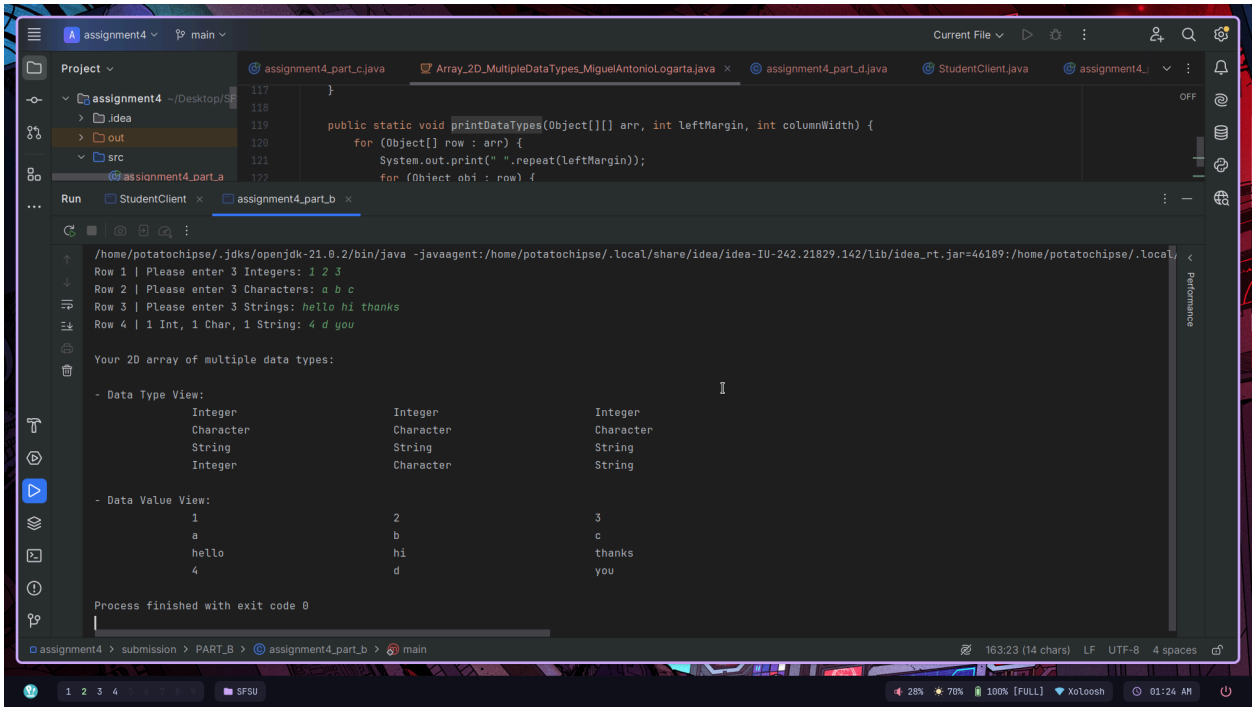
   To get input from the user, I have to implement many different methods that can handle Integers, Characters, and Strings separately. I also need to handle the cases where the user might not input valid data.

3. My program compiles and satisfies all the client's requirements. It takes in the inputs from the user and gives a data type view and a data value view. I also decided to add

some error handling if the user doesn't input valid data. However, with the way I structured my code, there is some code duplication when taking the user's input. I also added an option to adjust the amount of padding and space that each column in the array takes up when printing it.

Screenshots of Outputs and Explanation:

These screenshots show what I accomplished



PART C

Question Description and Analysis:

This part of the assignment asks me to create a java program that tracks the growth of the plant. I have to take input from the user and create a table that tracks the growth. It shows the month, average temperature, rainfall, plant growth, plant height, and maximum plant height.

Answer:

Problem Analysis:

From my understanding of the problem, I know that the client is going to provide us with data, and we have to calculate new data and display it in a table. In this case, the provided data is the average rain and temperature. Then we have to receive data from the user such as the minimum temperature for the plant, the maximum temperature for the plant, and the minimum rainfall for the plant. We then have to use all of these inputs to calculate the plant growth, the plant height, and the maximum plant height. Finally, we print the table containing all of our data. We will have a total of 6 columns and 12 rows. Each row is supposed to represent each month which tracks the growth of the plant depending on the average weather conditions. We also have to have a yellow highlight showing which months had the plant at its highest height. For each month, in order for our plant to grow, it needs to be within the right temperature with its growth being the average rainfall that month minus the minimum rainfall for the plant. If those conditions are not fulfilled, the plant shrinks in height.

Here are my 5 most meaningful methods:

1. ***public static String stripAnsiCodes(String s)*:**

   This function is important because it removes all of the ANSI codes in the string. ANSI codes are sequences of characters in the string that tell the terminal what color and background to use for the printed text. These are useful, however, ANSI codes contain zero-width characters which means that they are invisible when printed on the terminal. If

you try and get the length of the string, you will end up with a number bigger than you think since the length also counts the number of invisible characters in the string. I use this function when I want to get the length of the string without counting the invisible characters inside of it. It is useful for alignment.

2. ***public static String padRight(String s, int totalLength)***

   This function is useful because I use it to pad a string on the right with spaces. In this program, I used padRight to help create my table columns. It prints the string s, then pads it with spaces until the resulting string equals the total length.

3. ***public static void printTable(String[] headers, String[] months, int[] avgTemp, int[] avgRain, PlantData plantData)***

   This function helps hide the logic for printing out the table for the program. It is responsible for printing out the data in my program. It automatically takes care of the formatting for me, while also printing out the table headers and table data.

4. ***public static void printTableData(String[] months, int[] avgTemp, int[] avgRain, int[] plantGrowth, int[] plantHeight, int maxHeight)***

   This function takes care of the logic of printing all the table data. It automatically takes care of the formatting for the table and ensures that each column is printed correctly.

5. ***public static PlantData calculatePlantData(int[] avgTemp, int[] avgRain, int minTemp, int maxTemp, int minRainfall)***

   This function is responsible for calculating the plant data given the average temperature, rain, minimum temperature, maximum temperature, and minimum rainfall. After we receive all of these inputs from the user, we feed them into this function to get the plant growth, plant height, and maximum plant height. To return all of these calculations, I

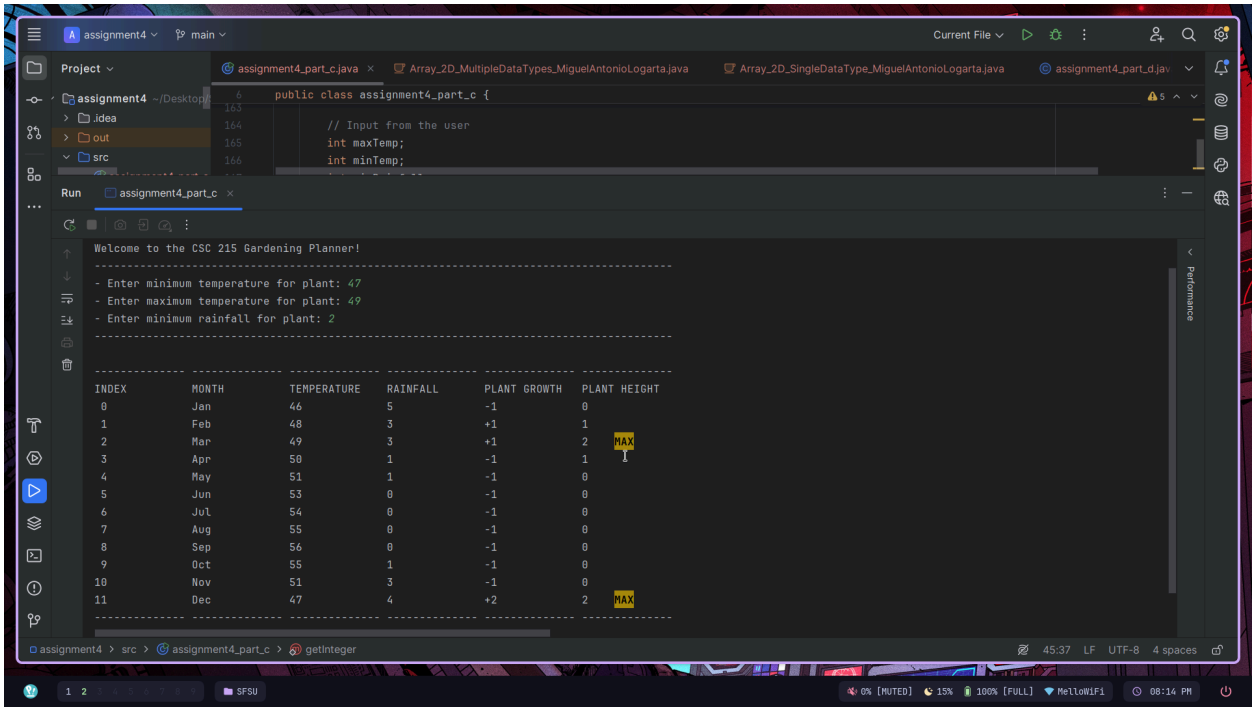
created a PlantData class to return multiple values all at once. In my opinion, it also makes the code more readable.

Result Analysis and Future Development:

My program compiles and satisfies all the client's requirements. It prints out all the data with proper formatting and passes all the test cases shown in the examples. In the future, I can make the program have some flexibility when it comes to formatting. For example, I can make it so that the user can access settings and change the spacing of the columns. I could also create a table that can insert additional columns of data just in case the client wants to add more columns to their program. I could also add more documentation to each of the functions so that any software engineer that comes after me can easily refactor my code.

Screenshots of Outputs and Explanation:

These screenshots show what I accomplished…



PART D

Question Description and Analysis:

This part of the assignment asks me to enter student information and print out the information of the students. It also asks me to create a student search function that updates the information of the selected student.

Answer:

Problem Analysis and Problem-Solving:

For this program, I have three sections to work on. The first section involves me creating 3 students using OOP. I can do this by using the Student class and creating an array that stores an array of Student objects. I can create a Student object by instantiating an instance of the Student Class. The second part of the program involves me printing out all the students from the Student array. Luckily for me, the Student class already has a toString() method which gives me a string that can be used to print out the contents of the Student to the console. Finally, the third part of the program asks me to take in the input from the user to search the existing students and update their information. I can change the information of the student by iterating through the Student array and then using the setter methods to change the values stored within the Student object.

Here are my top 5 methods:

1. ***public static Student[] createStudents(int n)***

This function creates n amount of Students objects and stores them in an array of size n. It returns the array to the user. It's useful because it instantiates the objects and the Student array for you.

2. ***public static Student searchStudent(Student[] students)***

   This function searches through the provided Students array and returns a reference to the Student object in the array. This is useful because it asks the user for input, then you can use it to get access to the searched student

3. ***public static void updateStudent(Student student)***

   This function asks the user for input and directly updates the student object.

Result Analysis and Future Development:

Screenshots of Outputs and Explanation:

These screenshots show what I accomplished…

PART #

Question Description and Analysis:

This part of the assignment asks that…

Answer:

This is my answer…

Screenshots of Outputs and Explanation:

These screenshots show what I accomplished…