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CS 2102

CS 211 - Practice Assessment 2

Instructions

Write your analysis of the code provided, not just its summary or explanation, but the reflective and critical breakdown of its structure, purpose, and behavior. Here is a quick guide for you to do that.

Step 1. Understand the Purpose and Context

What is the goal of the code?

The code's goal is to print the multiples of each row into each column depending on the value of the first element of each row. So if the first element of row 4 is an integer 4, the subsequent elements in that row will be multiples of 4.

What kind of data or structure does the code operate on?

The code uses Arrays, specifically 2D arrays in this particular case.

Step 2. Examine Control Flow and Structure

Identify the main constructs: loop types, array declarations, method signatures.

Loop types:

One for-loop, for assigning the values to the array.

One for-each loop, used for printing and the calculation for the total sum of the entire array.

Array declarations:

The code used dynamic allocation to initialize the array, using the "new" operator for the array "nums".

Method signatures:

The code did not include any other methods other than the main method.

How did the "for-each" loop iterate through rows and columns? How does it navigate the 2D array?

The for-each loop iterated through the array similarly to the for loop. It first declares the iterator with the type and name (`int[] rvals`) then references that to "nums", which would iterate through the number of rows in the arrays. Within this loop, another for-each loop is found, this time referencing the current row (`rvals`) and iterates through the elements of that row (`int cvals`).

The loop navigates through the array by first starting in the first row from the first for-each loop, then going through the columns corresponding to the current row using the second for-each loop. Once this is finished, the next loop starts with the second row, and again for the columns corresponding to the second row. This continues until the entire array is iterated through.

Step 3. Consider Behavior & Output

What values does the code process, and how does it output or manipulate data?

The code processes integers, it outputs the length of the rows and columns, the values within the array in their appropriate positions, and the summation of all the elements within the array.

If you execute it, what would you expect to see, and why?

I'd expect to see all the elements that the code assigned to the array in their respective rows and columns, and also the correct summation of all the elements within the array.

Step 4. Summarize Your Insights

Conclude with a concise reflection, using the guide I provided.

The code provided for this assessment demonstrates how loops and arrays can be utilized in Java. In this demonstration, the code's goal was to display multiples of numbers, kind of like a multiplication table, and also displaying the summation of all of the displayed numbers.

It manages to do this by making use of a multi-dimensional array, a for loop, and a for-each loop. It first initializes the array itself, using dynamic allocation to provide flexibility to the code, it also initializes "int sum" to assign the name for the summation of all the elements in the array. Then it checks if there is at least one row declared using an if-else statement, by this point, the code displays the number of rows and columns that the array has. After doing so it then starts assigning values by using a

After the entire array has its values assigned, printing of the array and the calculation of the sum starts. Using a for-each loop, the elements of the array are printed in the same way the for loop did previously, but they also get added to the “sum” variable each time an element is printed. The entire array is eventually printed, after which the sum variable is also printed, in which its value is the sum of all the elements of the array.

[illegible]