**i. Nature of the Problem:**

The problem addressed in CS1313 Programming Project 6 involves modifying a statistics program developed in Programming Project #5. The objective is to convert various calculations into user-defined functions, and these functions are then called from the main function. The primary task is to calculate the regression line of inputted lists of elements using these user-defined functions.

**ii. Abstract Description of the Method:**

The program utilizes user-defined functions to perform specific statistical calculations. The main function is responsible for handling input, dynamically allocating memory for arrays, and calling these functions to calculate the regression line parameters. The user-defined functions include calculating the sum of an array, the sum of squares, the sum of pairwise products of two arrays, the linear regression slope, and the linear regression intercept.

**iii. Implementation Steps:**

1. **Declaration Subsection:** Declare constants, variables, and function prototypes.
2. **Input Subsection:** Input the shared length of arrays, idiotproof the input, allocate memory, and input values for the two lists.
3. **Calculation Subsection:** Utilize user-defined functions to calculate the sum of array elements, sum of squares, sum of pairwise products, linear regression slope, and intercept.
4. **Output Subsection:** Output the calculated statistics, including the regression line.
5. **Deallocate Arrays:** Free the allocated memory for arrays.

**iv. Issues and Problems Addressed:**

* **Memory Allocation:** Ensuring successful memory allocation and idiotproofing against allocation failure.
* **Input Validation:** Idiotproofing the shared length input to prevent calculation errors.
* **Function Design:** Designing and implementing user-defined functions for various statistical calculations.

**v. Concepts Learned:**

* **Modular Programming:** The project emphasizes the importance of breaking down a program into modular functions, promoting code reusability and maintainability.
* **User-Defined Functions:** Understanding the creation and usage of functions to encapsulate specific functionalities, enhancing code readability.
* **Error Handling:** Implementing idiotproofing techniques to handle potential issues and errors during runtime.

**vi. References:**

* “CS 1313 010: Programming for Non-Majors, Fall 2022 Programming Project #6: Big Statistics Functions Due by 10:20am Wednesday Nov.” *CS 1313*, http://cs1313.ou.edu/proj6.pdf. Accessed 26 November 2023.