Module 4: Critical Thinking

Looping Construct with Floating Point Numbers:
Write a program that utilizes a while-loop to read a set of five floating-point values from user input. Include code to prevent an endless loop. Ask the user to enter the values, then print the following data:

- *Total*
- *Average*
- *Maximum*
- *Minimum*
- *Interest on total at 20%*

Pseudocode via Comments: The following section contains the pseudocode that was used to detail the steps of the Module 4 Java application; the pseudocode was written using Java's comment functionality. A screenshot of the pseudocode written inside of the Eclipse IDE is provided.

```
//START
	//Import Scanner class
	//Set up Document

	//Initialize new scanner (scr)
	//Set up variables
				// Data structures: double, String, boolean

					// double num1;
					// double num2;
					// double num3;
					// double num4;
					// double num5;

					// double max;
					// double min;

					// boolean startInitialLoop;
					// boolean startCalculationsLoop;

			// Initialize Loop Structure
				//Do you want to start?
					//YES - begin
					//NO - terminate program

				// Enter 5 floating point numbers
					/*	num1 = scr.nextDouble();
						...
						num5 = scr.nextDouble(); */

				// Simple calculations
					// Average, Sum Total, Interest @ 20%

				// Question "Are you satisfied with the numbers entered?
					//If YES - startLoop = true;
					//If NO - option to reenter values

					// Loop begins, while (startLoop == true)
					// System.out.println("Your data is being calculated...");

					/* Find Max Value
						while (num1 >= 0) {

							max = num1;

							if (num2 > num1) {
								max = num2;
							}
							if (num3 > num2) {
								max = num3;
							}
							if (num4 > num3) {
								max = num4;
							}
							if (num5 > num4) {
								max = num5
							}

							break;
						}
					*/

					/* Find Min Value

						while (num >= 0) {
```

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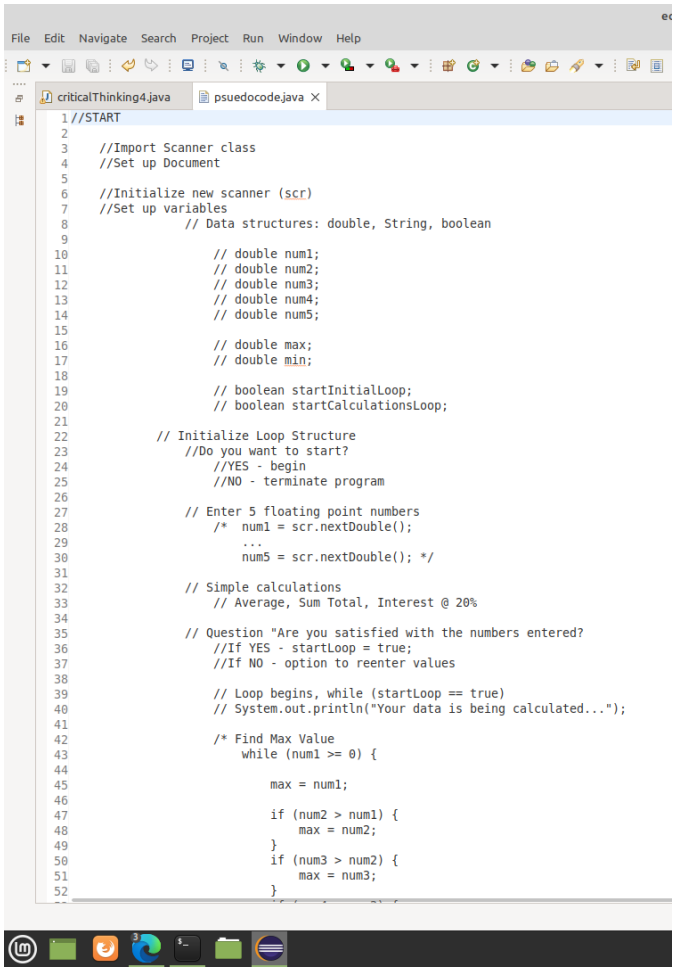
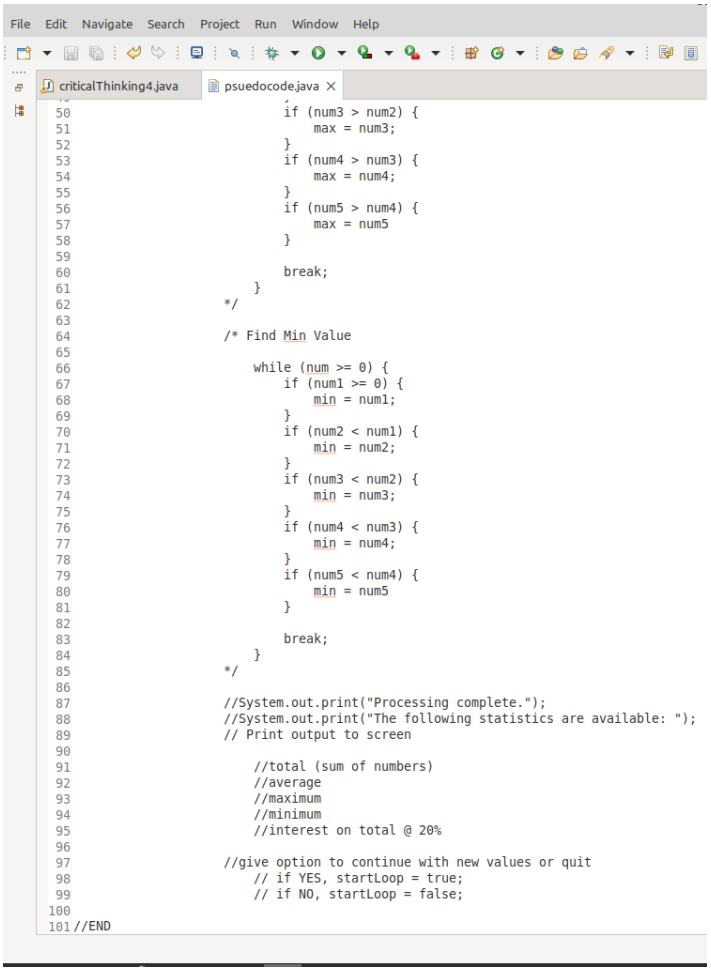
```
                                        if (num1 >= 0) {
                                                min = num1;
                                        }
                                        if (num2 < num1) {
                                                min = num2;
                                        }
                                        if (num3 < num2) {
                                                min = num3;
                                        }
                                        if (num4 < num3) {
                                                min = num4;
                                        }
                                        if (num5 < num4) {
                                                min = num5
                                        }

                                        break;
                                }
                        */

                        //System.out.print("Processing complete.");
                        //System.out.print("The following statistics are available: ");
                        // Print output to screen

                                //total (sum of numbers)
                                //average
                                //maximum
                                //minimum
                                //interest on total @ 20%

                        //give option to continue with new values or quit
                                // if YES, startLoop = true;
                                // if NO, startLoop = false;

//END
```

Pseudocode Screenshots:





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Source code: This section contains the source code for Module 4's Java application. Changes were made within the source code to account for error handling functionality and errors found within the original pseudocode. Screenshots of the source code and the application being executed within the Eclipse IDE are provided.

```
//Import Scanner class
//Set up Document
import java.util.Scanner;
public class criticalThinking4 {
	public static void main(String[] args) {

		//Initialize new scanner (scr)
		Scanner scr = new Scanner(System.in);

		//Set up variables

		double num1 = 0;
		double num2 = 0;
		double num3 = 0;
		double num4 = 0;
		double num5 = 0;

		double maxNum = 0;
		double minNum = 0;

		String userResponse;

		boolean startInitialLoop = false;
		boolean startCalculationsLoop = false;

		// Initialize Loop Structure
		System.out.println("Would you like to begin?");
		userResponse = scr.next();

		if (userResponse.equals("yes") || userResponse.equals("Yes") || userResponse.equals("y") || userResponse.equals("Y")) {
			startInitialLoop = true;

			while (startInitialLoop == true) {                                          //BEGIN MAIN LOOP

				if (startInitialLoop == true) {
					// Enter 5 floating point numbers
					System.out.println("Enter 5 floating point numbers...");

					//Error handling mechanism for non-numeric input
					if (scr.hasNextDouble()) {
						num1 = scr.nextDouble();
					} else {
						System.out.println("Invalid input. Please enter a floating point number.");
						startInitialLoop = false;
					}

					if (scr.hasNextDouble()) {
						num2 = scr.nextDouble();
					} else {
						System.out.println("Invalid input. Please enter a floating point number.");
						startInitialLoop = false;
					}

					if (scr.hasNextDouble()) {
						num3 = scr.nextDouble();
					} else {
						System.out.println("Invalid input. Please enter a floating point number.");
						startInitialLoop = false;
					}

					if (scr.hasNextDouble()) {
						num4 = scr.nextDouble();
					} else {
						System.out.println("Invalid input. Please enter a floating point number.");
						startInitialLoop = false;
					}

					if (scr.hasNextDouble()) {
						num5 = scr.nextDouble();

						// Question "Are you satisfied with the numbers entered?
						System.out.println();
						System.out.println("Are you satisfied with the numbers entered? Press Y for yes or N for no");

					} else {
						System.out.println("Invalid input. Please enter a floating point number.");
						startInitialLoop = false;
					}

				}

				// Calculate Average, Sum Total, Interest @ 20%
				double sumNum = (num1 + num2 + num3 + num4 + num5);
				double averageNum = ((num1 + num2 + num3 + num4 + num5) / 5);
				double interestNum = ((num1 + num2 + num3 + num4 + num5) * 0.20);

				// User response from previous question starts branches
					// YES - startCalculationsLoop = true;
					// NO - option to reenter numbers or quit will be given
				userResponse = scr.next();
				if (userResponse.equals("yes") || userResponse.equals("Yes") || userResponse.equals("y") || userResponse.equals("Y")) {
					startCalculationsLoop = true;
				}

				// MIN & MAX VALUE CALCULATIONS BEGIN
				if (startCalculationsLoop == true) {
					System.out.println("Your data is being processed...");

					// Find Max Value
					while (num1 >= 0) {
```

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```
                                                maxNum = num1;

                                                if (num2 > num1) {
                                                        maxNum = num2;
                                                }
                                                if (num3 > num2) {
                                                        maxNum = num3;
                                                }
                                                if (num4 > num3) {
                                                        maxNum = num4;
                                                }
                                                if (num5 > num4) {
                                                        maxNum = num5;
                                                }

                                                break;

                                        }

                                // Find Min Value

                                        while (num1 >= 0) {

                                                minNum = num1;

                                                if (num2 < num1) {
                                                        minNum = num2;
                                                }
                                                if (num3 < num2) {
                                                        minNum = num3;
                                                }
                                                if (num4 < num3) {
                                                        minNum = num4;
                                                }
                                                if (num5 < num4) {
                                                        minNum = num5;
                                                }

                                                break;

                                        }

                                        startCalculationsLoop = false;

                                        //Print strings for program aesthetics

                                        System.out.println("...............");
                                        System.out.println("...............");
                                        System.out.println("...............");

                                        //Output messages
                                        System.out.println("Processing complete.");
                                        System.out.println();
                                        System.out.println("The following statistics are available: ");
                                        System.out.println();

                                        // Print Calculations to screen
                                        System.out.printf("\t Number total: %.2f\n", sumNum);
                                        System.out.printf("\t Number average: %.2f\n ", averageNum);
                                        System.out.printf("\t Max number: %.2f\n", maxNum);
                                        System.out.printf("\t Min number: %.2f\n ", minNum);
                                        System.out.printf("\t 20%% interest of number total: %.2f\n", interestNum);
                                        System.out.println();

                                }
                                                                                                        // END OF MIN & MAX VALUE CALCULATIONS
                                else {
                                        startInitialLoop = false;
                                        System.out.println("No data found...");
                                        System.out.println();
                                }

                                //give option to continue with new values or quit
                                System.out.println("Would you like to enter new numbers? Press Y for yes or N for no" );
                                userResponse = scr.next();

                                // if YES, startLoop = true;
                                if (userResponse.equals("yes") || userResponse.equals("Yes") || userResponse.equals("y") || userResponse.equals("Y")) {
                                        startInitialLoop = true;
                                } else {                                                                // If user responds no, option to reenter numbers or quit will be given
                                        startInitialLoop = false;

                                        //Terminate program message
                                        System.out.println("Ok, have a nice day.");
                                }

                        }
                                                                                                        //END OF MAIN LOOP

                }
                                                                                                        //END OF IF-STATEMENT

                else {
                                                                                                        //EXIT PROGRAM

                //Terminate program message
                System.out.println("Ok, have a nice day.");

                }

        }

}
```

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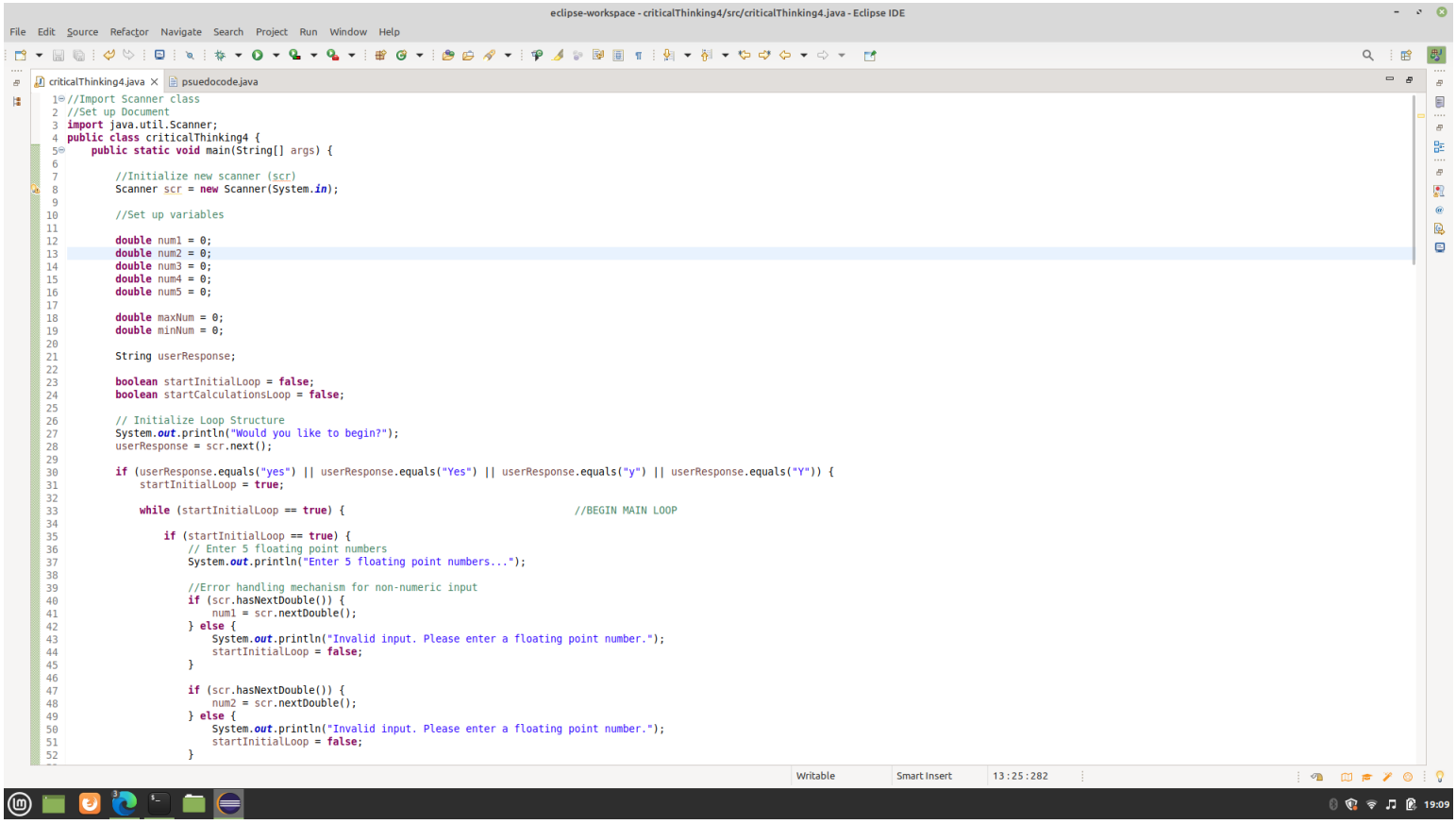
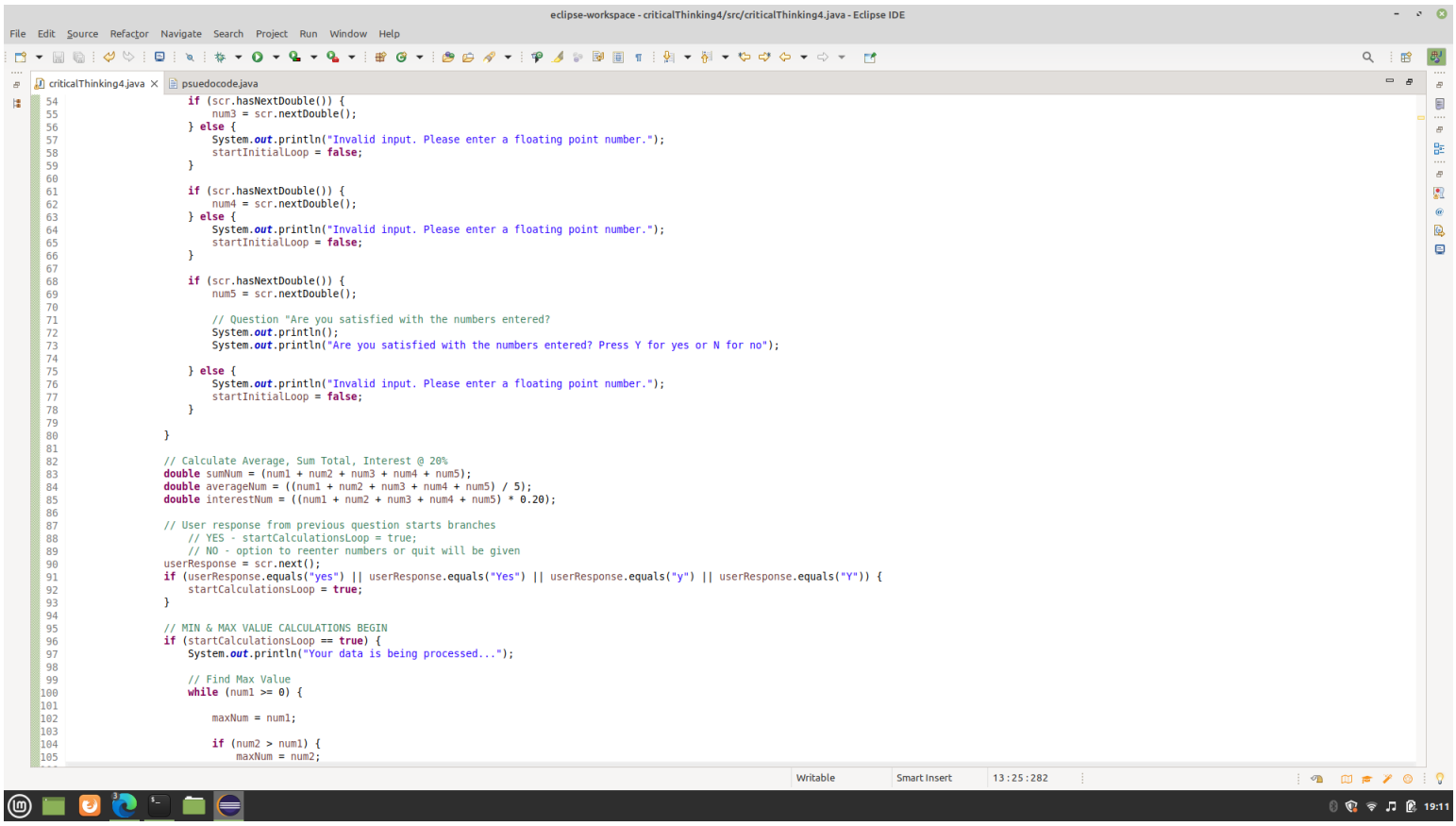
Source code Screenshots:





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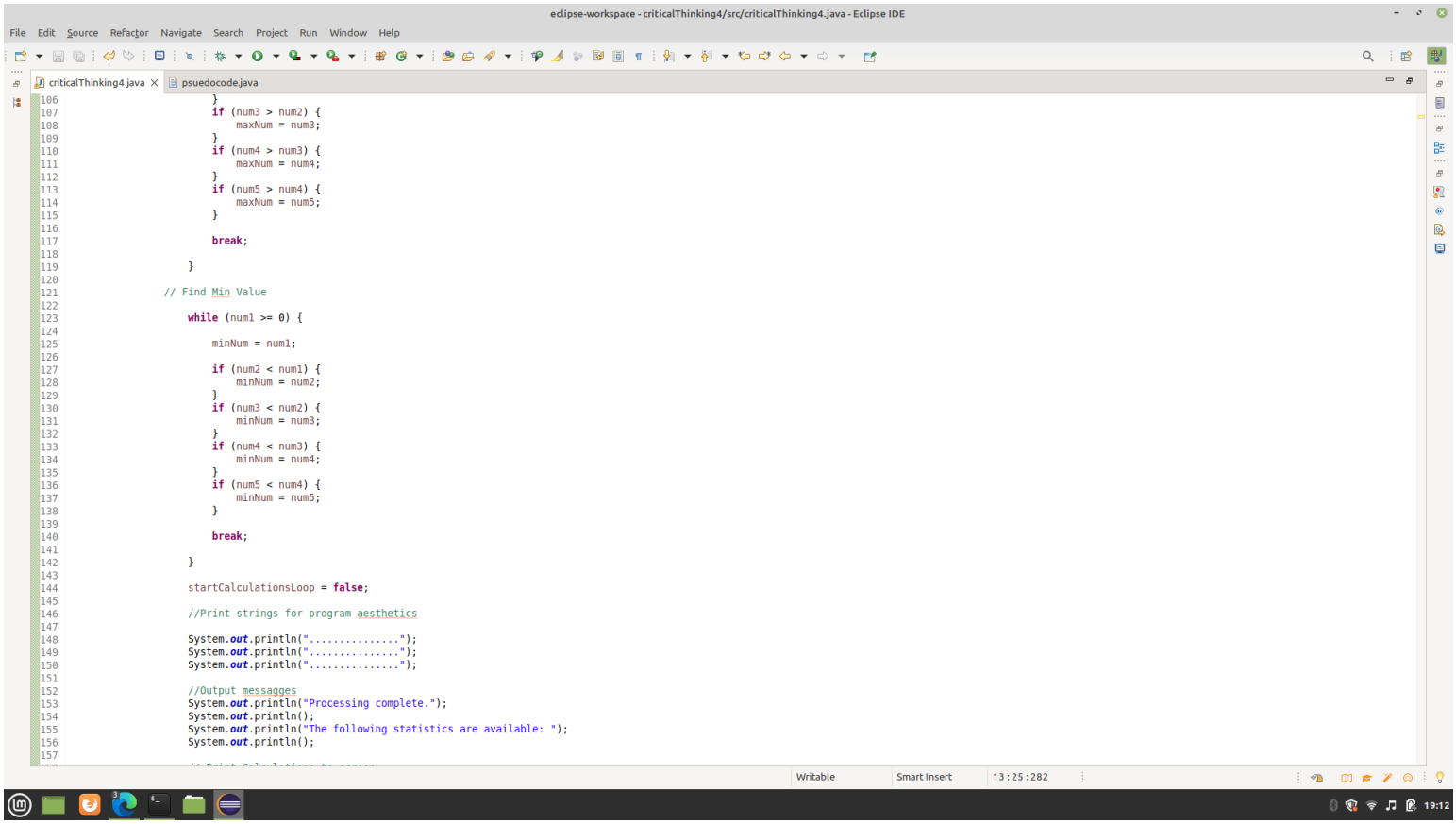

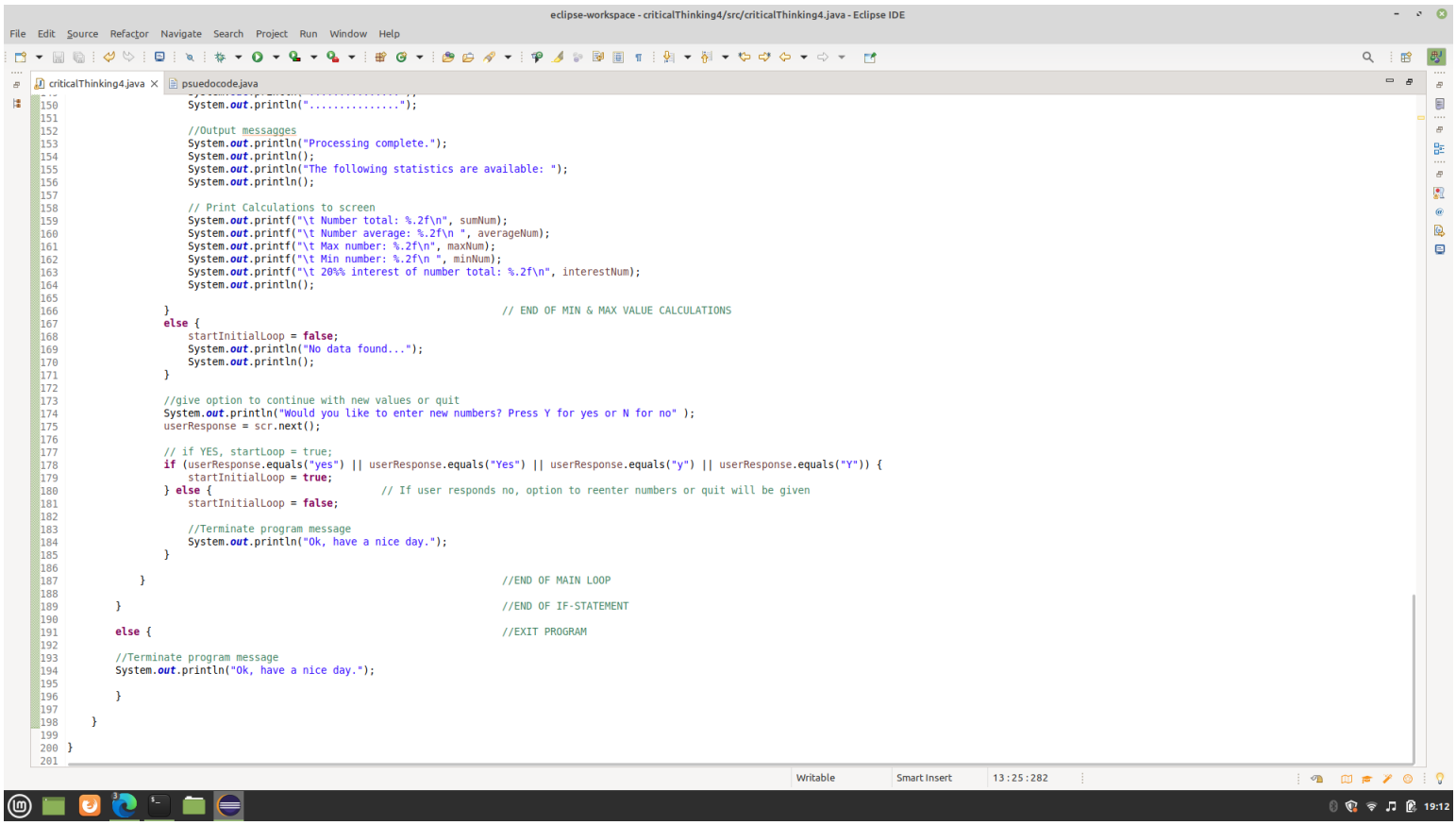

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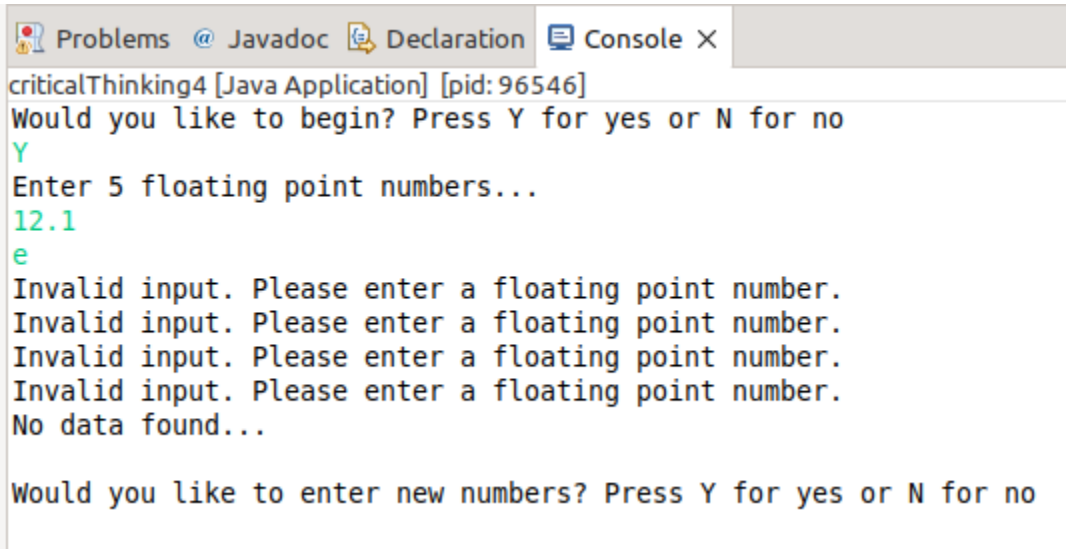
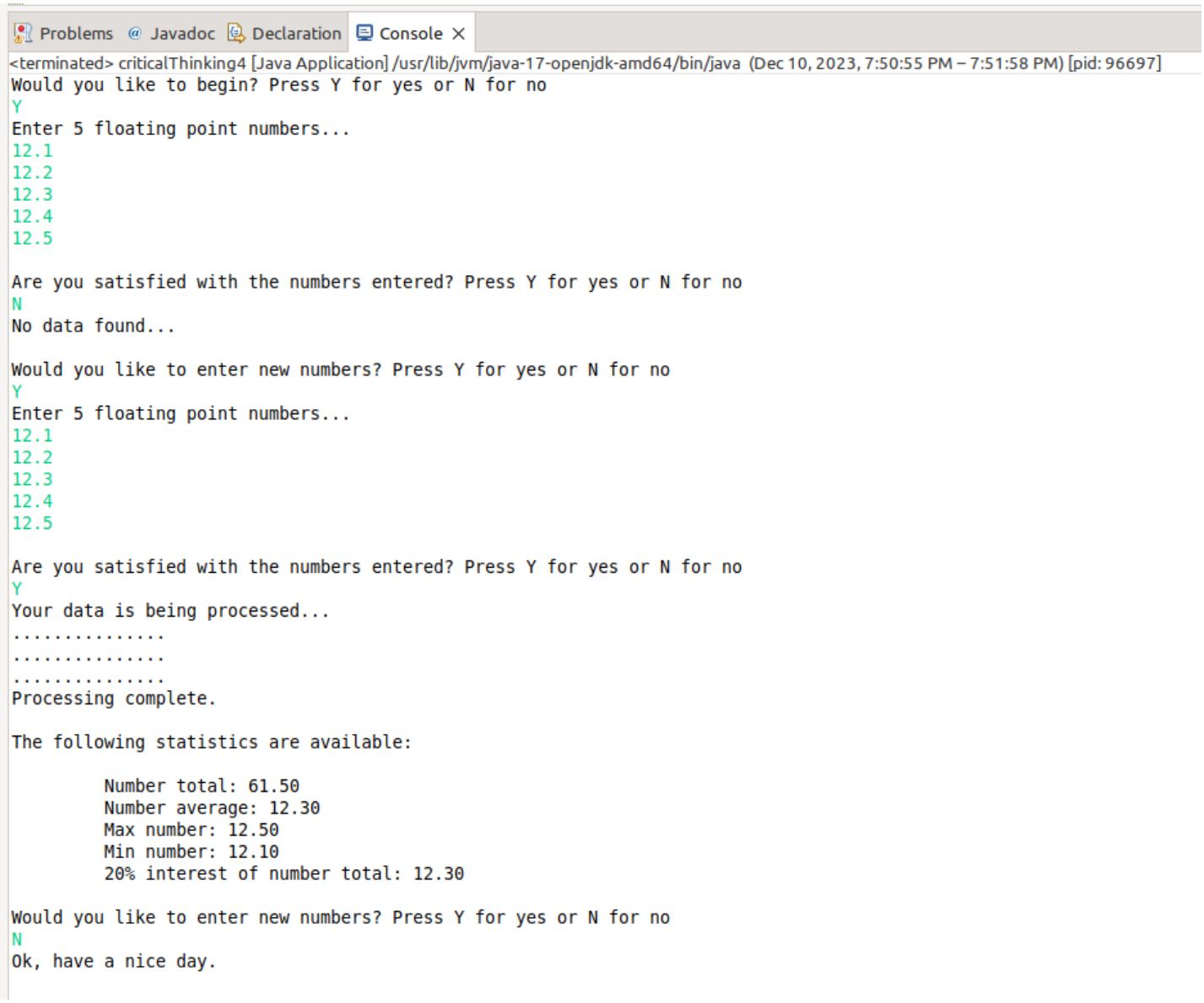
Screenshots of the application executing

- *User input error handling*



- *Code execution & results*



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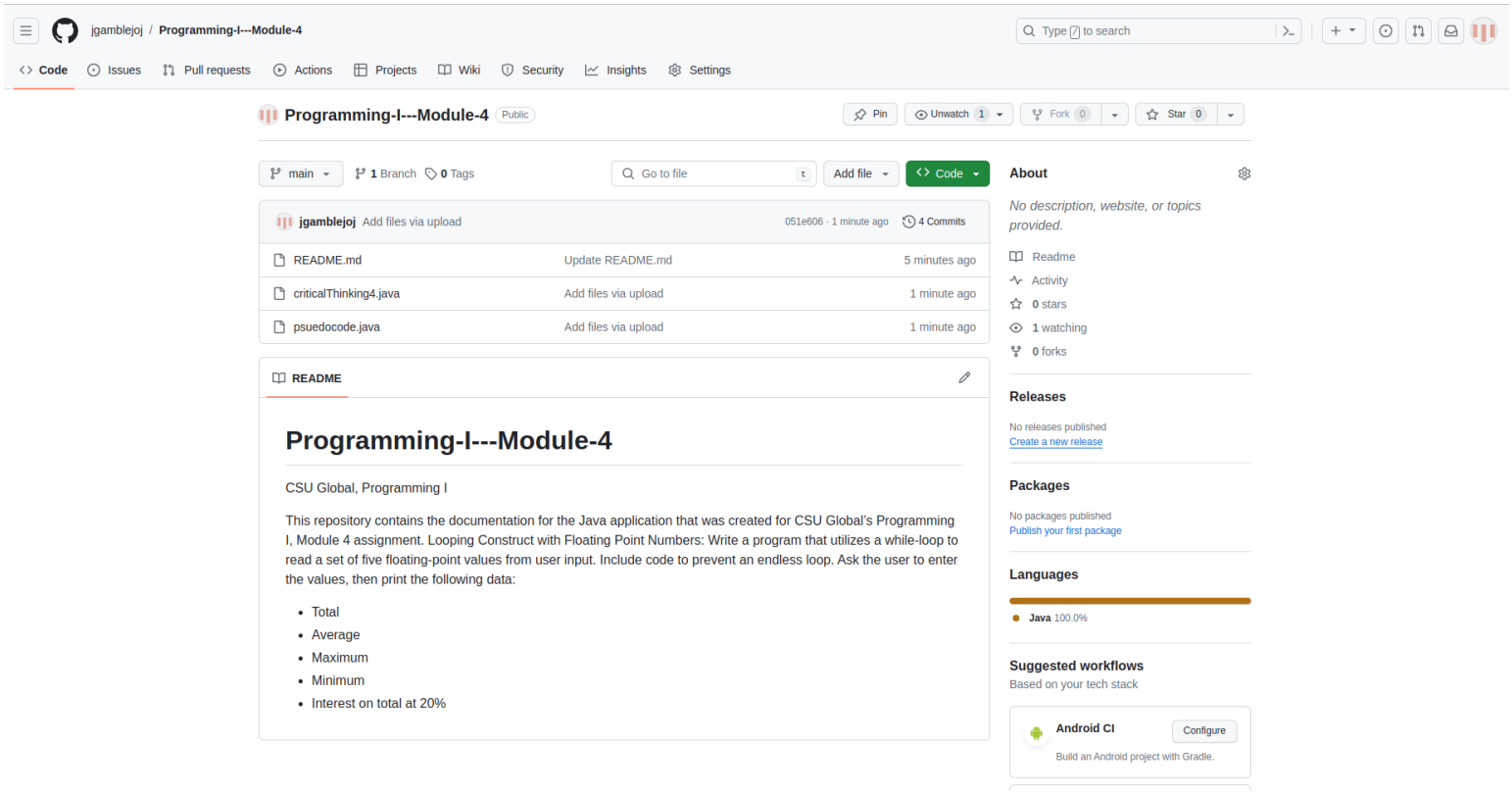
Screenshot of Git Repository



Here is the link to the assignment's Git repository: https://github.com/jgamblejoj/Programming-I---Module-4