

**Project Report:**  
**Critical Thinking 3 - Capture Grade Statistics Using For-loop**

Alejandro Ricciardi  
Colorado State University Global  
CSC320: Programming 1  
Professor Herbert Pensado  
May 12, 2024

## Project Report:

### Critical Thinking 3 - Capture Grade Statistics Using For-loop

This documentation is part of the Critical Thinking 3 Assignment from CSC320: Programming 1 at Colorado State University Global. This Project Report is an overview of the program's functionality, pseudocode, and detailed testing scenarios including console output screenshots. The program is coded in Java JDK-21; and is named Critical Thinking 3 (Capture Grade Statistics Using For-loop). The program is composed of a Main class and a GradesStatCalculator class.

#### The Assignment Direction

Write a program that will provide important statistics for the grades in a class. The program will utilize a for-loop to read ten floating-point grades from user input. Include code to prevent an endless loop. Ask the user to enter the values, then print the following data:

- Average
- Maximum
- Minimum

Compile and submit your pseudocode, source code, and screenshots of the application executing the application, the results and GIT repository in a single document.

#### ⚠ My note:

- The assignment calls for floating-point grades, not decimals.
- The Capture Grade Statistics Using For-loop assignment is found in the GradesStatCalculator Class.
- **For the source code please see Main.java and GradesStatCalculator.java files.**

#### Git Repository

I use [GitHub](#) as my Distributed Version Control System (DVCS), the following is a link to my GitHub, [Omegapy](#).

My GitHub repository that is used to store this assignment is named [My-Academics-Portfolio](#) and the link to this specific assignment is:

<https://github.com/Omegapy/My-Academics-Portfolio/tree/main/Programming-1-CSC320/Critical-Thinking-3>

## Pseudocode

Program: Grades Statistics Calculator

Author: Alejandro Ricciardi

Date: 05/12/2024

Description:

This program calculates statistical grades such as the minimum, maximum, and average grades from a list of student grades. It allows input until the user decides to stop.

**Begin Program**

-----  
File: GradesStatCalculator.java  
-----

**Class GradesStatCalculator**

**Method findMinimum(array of grades)**

Declare minimum variable

**Iterates grades for-loop**

if minimum > grade

minimum = grade

end if

**End loop**

Return minimum

**End Method**

**Method find maximum(array of grades)**

Declare maximum variable

**Iterates grades for-loop**

if maximum < grade

maximum = grade

end if

**End loop**

Return maximum

**End Method**

**Method findAverage(array of grades)**

Declare sum variable

**Iterates grades for-loop**

sum = sum + grade

**End loop**

Return sum / number of grades in the grades array

**End Method**

**End Class**

```
-----
File: Main.java
-----
```

# **Main Program**

## **Class Main**

```
    Declare a scanner object for input
    Declare a variable for user input
    Declare a banner "Grade Statistics Calculator"
    Declare a List object for grades
    Declare statical variables: max, min, and average
    Declare a variable to quit the program
```

## **Main Program while-loop**

```
    Declare variable
    Print banner
```

## **// Grade capture**

### **Grade input while loop**

```
    Prompt the user to enter a grade or 'done' to finish
    Validate the user input
        Loop until valid input is entered by user
    End loop
    Loop until the user enters 'done'
```

### **End loop**

## **// Calculations**

```
average = GradesStatCalculator.calculateAverage(grades convert to array)
minimum = GradesStatCalculator.findMinimum(grades convert to array)
maximum = GradesStatCalculator.findMaximum(grades convert to array)
```

## **// Display Results**

```
Print "---- Grade Statistics ----"
Print "Average Grade: " + average
Print "Maximum Grade: " + maximum
Print "Minimum Grade: " + minimum
```

## **// Exit program**

```
Prompt user to enter 'q' to exit program or to press enter to continue
if user exits
    Print "Thank you for using the Grade Statistics Calculator!"
    Break from Main Program while-loop
Else
    Loop Main Program
End if
```

## **End Class**

## **End Program**

## The GradesStatCalculator Class

The GradesStatCalculator class provides methods to compute grade statistics such as maximum, minimum, and average from an array of doubles. The class has 3 methods.

The method **findMaximum**(double[] array) finds the maximum value in an array of doubles.

It takes the parameter array, an array of double values.  
And returns the maximum value found in the array.

The method **findMinimum**(double[] array) finds the minimum value in an array of doubles.

It takes the parameter array, an array of double values.  
And returns the minimum value found in the array.

The method **findAverage**(double[] array) calculates the average value of an array of doubles.

It takes the parameter array, an array of double values.  
And returns the average value of the array.

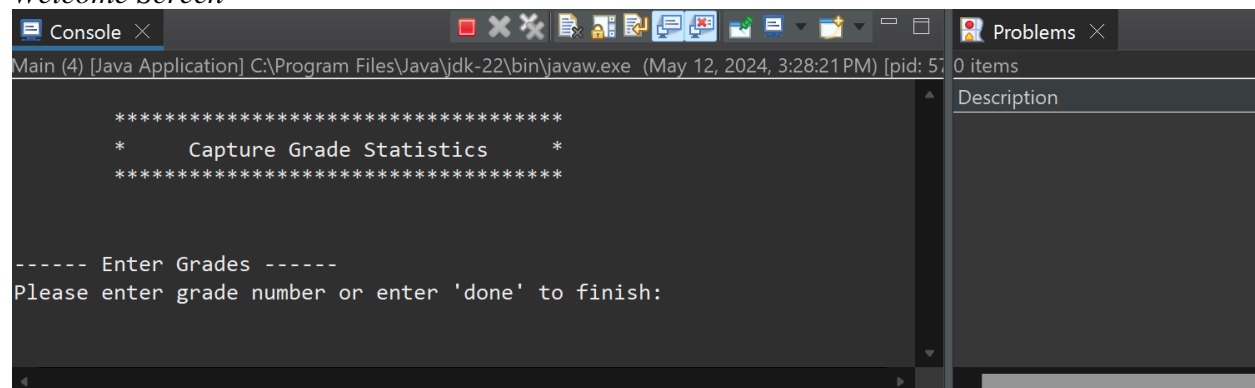
## The Main Class

The Main class runs the program and handles user interaction to capture and process grade statistics. It reads user input, validates it, and displays computed results.

## Screenshots: Program Functionality and Testing Scenarios

Figure 1

*Welcome Screen*



*Note:* Eclipse Console output from the program and Problem window showing no items.

Figure 2  
Validation Tests

```

Console X
<terminated> Main (4) [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe (May 12, 2024, 3:40:14 PM - 3

*****
*       Capture Grade Statistics       *
*****

----- Enter Grades -----
Please enter grade number or enter 'done' to finish: Not A Number
-- Invalid input. Please enter a non-negative number.
Please enter grade number or enter 'done' to finish: -12.123
-- Invalid input. Please enter a non-negative number.
Please enter grade number or enter 'done' to finish:
-- Invalid input. Please enter a non-negative number.
Please enter grade number or enter 'done' to finish: 123.23.23
-- Invalid input. Please enter a non-negative number.
Please enter grade number or enter 'done' to finish: 123.123
Please enter grade number or enter 'done' to finish: 123
Please enter grade number or enter 'done' to finish: done

----- Grade Statistics -----
Average value: 123.0615
Maximum value: 123.123
Minimum value: 123.0

-----
Enter 'Q' to exit program, or press enter to input another set of grades:
-----

----- Enter Grades -----
Please enter grade number or enter 'done' to finish: done
-- No grades were entered!

-----
Enter 'Q' to exit program, or press enter to input another set of grades:
-----

----- Enter Grades -----
Please enter grade number or enter 'done' to finish: 12.12
Please enter grade number or enter 'done' to finish: done

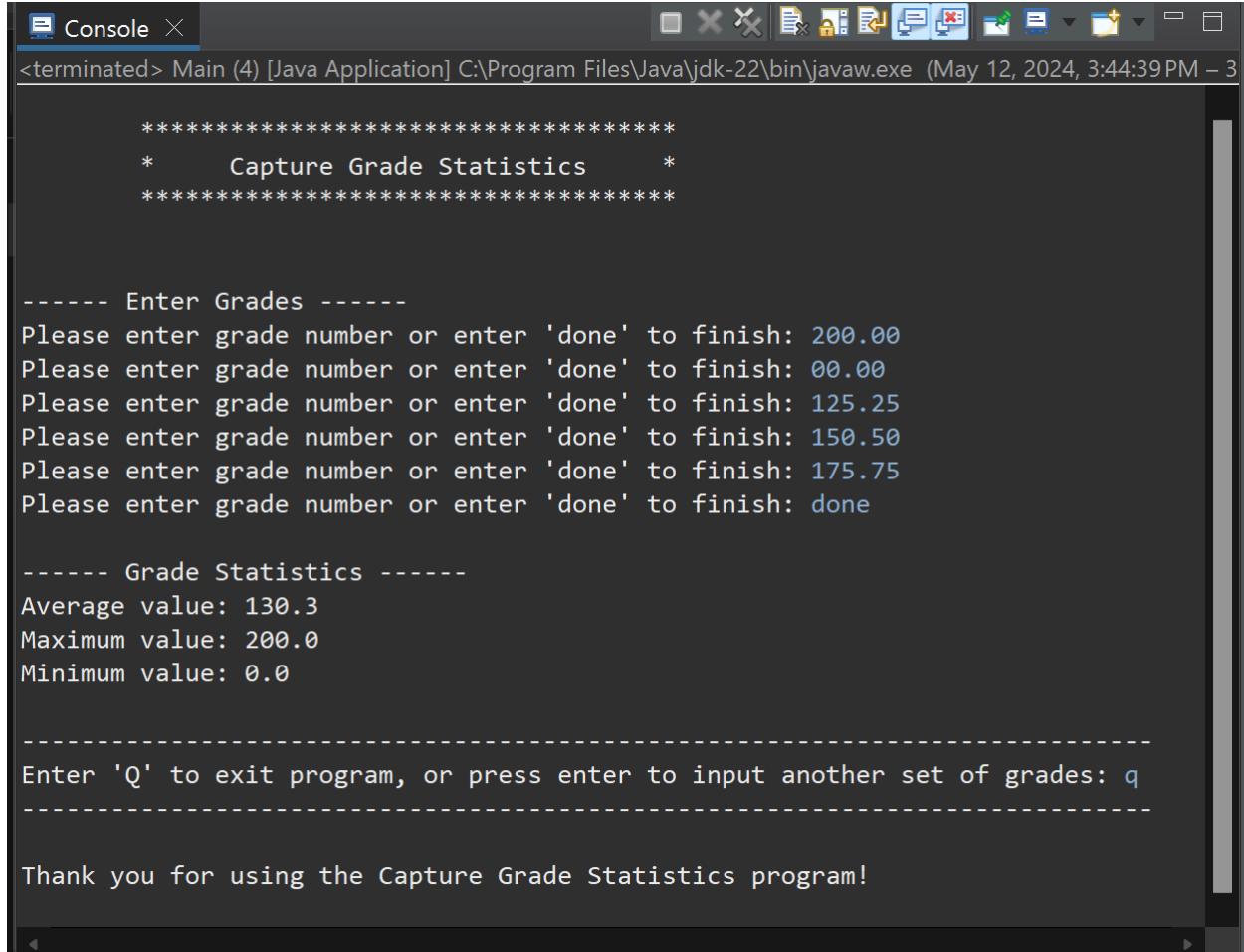
----- Grade Statistics -----
Average value: 12.12
Maximum value: 12.12
Minimum value: 12.12

-----
Enter 'Q' to exit program, or press enter to input another set of grades: q
-----

Thank you for using the Capture Grade Statistics program!

```

Figure 3  
*Calculation Tests*



```
<terminated> Main (4) [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe (May 12, 2024, 3:44:39 PM - 3)

*****
*   Capture Grade Statistics   *
*****

----- Enter Grades -----
Please enter grade number or enter 'done' to finish: 200.00
Please enter grade number or enter 'done' to finish: 00.00
Please enter grade number or enter 'done' to finish: 125.25
Please enter grade number or enter 'done' to finish: 150.50
Please enter grade number or enter 'done' to finish: 175.75
Please enter grade number or enter 'done' to finish: done

----- Grade Statistics -----
Average value: 130.3
Maximum value: 200.0
Minimum value: 0.0

-----
Enter 'Q' to exit program, or press enter to input another set of grades: q
-----

Thank you for using the Capture Grade Statistics program!
```

As shown in Figure 1, Figure 2, and Figure 3 the test runs without any issues, displaying the correct output as expected.