

Program #5 – Exception Handling in Java

Description:

- For this program we had to take a given Ada program and convert it into Java code. The program did grade distribution and frequency counting and what we had to modify was one of the input loops so that the frequency was updated only with the exception handler in Java.

```
/*  
 * CS 471 - Program 5: Exception Handling in Java  
 * Name: Tony Maldonado  
 *  
 * Date: October 05, 2020  
 *  
 * Input: A grade or list of grades, all integers between 0-100, entered by pressing enter  
 *       after each  
 *  
 * Output: A distribution of the grades within the limits  
 *  
 * Preconditions: The user must enter a grade(s) within the range 0-100. To stop  
 *               the input and print the distribution, the user should enter '-1'.  
 *  
 * Postcondition: none  
 */
```

```
import java.io.IOException;  
import java.util.ArrayList;  
import java.util.Scanner;  
import java.util.Collections;
```

```
public class grade_distribution {  
  
    // Creating the arrays for the grade limits and frequency counters  
    private ArrayList<Integer> limits = new ArrayList<>();  
    private ArrayList<Integer> frequencies = new ArrayList<>();  
  
    public static void main(String[] args) {  
  
        Scanner scan = new Scanner(System.in);  
  
        // Create an array to store the grades  
        ArrayList<Integer> grades = new ArrayList<Integer>();  
  
        // Create an object for the distribution
```

```
grade_distribution Distribution = new grade_distribution();

// Input the grades until -1 is entered
int input = 0;
System.out.println("Please enter the grade, type -1 when done. ");
do{
    try {

        input = Integer.parseInt(scan.nextLine());

        if(input != -1){

            // Throw ArithmeticException if input is out of bounds
            if(input < 0 || input > 100) {
                throw new ArithmeticException();
            }

            // Throw IOException to add to frequency array
            else {
                throw new IOException();
            }
        }

    } catch (ArithmeticException e) {
        System.out.println("Error -- enter new grade; " + input + " is out of range.");
    } catch (IOException i) {
        Distribution.updateFrequency(grades, input);
    } catch (NumberFormatException n) {
        System.out.println("Invalid, integers only please!");
    }
} while(input != -1);

// Print the final output
Distribution.printFrequency();
}

// This constructor creates the arraylists for the limits and sets the frequency
counters to 0
public grade_distribution(){
    Collections.addAll(limits, 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 101);
    Collections.addAll(frequencies, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0);
}

public void updateFrequency(ArrayList<Integer> gradeList, int userInput){
```

```
// Add the user input to the arraylist
gradeList.add(userInput);

// Match the grades in the list to the ranges
for(int i = 0; i < limits.size() - 1 ; i++){
    if(userInput >= limits.get(i) && userInput < limits.get(i + 1)){

        // Add to the frequency counter
        frequencies.set(i, frequencies.get(i) + 1);
    }
}

// Now print out the table
public void printFrequency(){
    System.out.println(String.format("%-2s %-20s %-20s", "", "Limits", "Frequency"));

    for(int i = 0; i < frequencies.size(); i++){
        System.out.print(String.format("%-10d %-15d", limits.get(i), limits.get(i+1) - 1));
        System.out.println(frequencies.get(i));
    }
}
```

Output:

```
Tonys-MacBook-Pro:Program 5 m21tony$ javac grade_distribution.java
Tonys-MacBook-Pro:Program 5 m21tony$ java grade_distribution.java
Please enter the grade, type -1 when done.
23
87
56
37
90
97
100
34
26
46
89
42
68
9
56
38
-5
Error -- enter new grade; -5 is out of range.
42
126
Error -- enter new grade; 126 is out of range.
65
tony
Invalid, integers only please!
34
-1
  Limits          Frequency
0         9          1
10        19          0
20        29          2
30        39          4
40        49          3
50        59          2
60        69          2
70        79          0
80        89          2
90       100          3
Tonys-MacBook-Pro:Program 5 m21tony$
```