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.

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\* CS 471 - Program 5: Exception Handling in Java

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\* Input: A grade or list of grades, all integers between 0-100, entered by pressing enter

\* after each

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\* 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'.

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\* 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);

}

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:**

A picture containing letter

Description automatically generated