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CSIT – 210

5 December 2014

Lab 10a

**Programming Project PP 10.1**

-----**SPEC**-----

Design and implement a program that reads a series of 10 integers from the user and prints their average. Read each input value as a string, and then attempt to convert it into an integer using the Interger.parseInt method. If this process throws a NumberFormatException (meaning that the input is not a valid number), print an appropriate error message and prompt for the number again. Continue reading values until 10 valid integers have been entered.

**SCRUM**

* Class Average
  + Method main()
* Class Numbers
  + Variable
    - int[] num size 10
  + Method constructor()
  + Method average()
  + Method collectTenNumbers()
  + Method toString()

**Class: Numbers**

1. This class will contain ten in numbers in an array
2. The class will have a method for collecting 10 ints from a user
3. The class will have a method to display the ten numbers and the average of the numbers
4. All methods are public and void unless otherwise noted
5. All variables are protected unless otherwise noted

**Import**

* Scanner

**Process**

* Variables
  + Int[] *num*
  + Double *avg = 0*
* Method constructor()
  + *Num* is a new array with ten indexes
* Method collectTenNumbers()
  + Int *count* = 0
  + Loop while the int *count* is less than 10
    - Ask the user to enter a integer
    - Read value with the scanner
    - Then try
      * Convert the string into a interger and set equal to the *num* array index location equal to *count*
      * *Count* increase by one
    - Use a catch statement for NumberFormatException to catch any invalid numbers of letters entered
      * Print “Error. Invalid entry. Only whole numbers are allowed.”
* Method average()
  + Calculacte the average of the ten numbers and then set *avg* equal to that number
  + Print “Here is a list of all the numbers entered and the Average of those numbers”
  + Print all the numbers and the average in a nicely formatted string
* Method setNum(int index, int value)
  + *Num*[*index*] = *value*
* Method int getNum(int index)
  + Return the value at the index location
* Method String toString()
  + Return all the values in the num array

**Class: Average**

1. This class contains the main method of the program
2. This class will supply the intro and ending statements
3. This class will call the collectTenNumbers() and the averae() methods

**Import**

**Process**

* Variables
  + none
* Method main()
  + Print some intro statements
  + Create a Numbers object
  + Call collectTenNumbers()
  + Call average()
  + Print some ending statements

**CODE**

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// Numbers.java Matt Matuk

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// 1. This class will contain ten in numbers in an array

// 2. The class will have a method for collecting 10 ints from a user

// 3. The class will have a method to display the ten numbers and the

// average of the numbers

// 4. All methods are public and void unless otherwise noted

// 5. All variables are protected unless otherwise noted

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**import** java.util.Scanner;

**public** **class** Numbers

{

**protected** **int**[] num;

**protected** **double** avg = 0;

// Constructor that sets up the int array to a size of ten

**public** Numbers()

{

num = **new** **int**[10];

}

// This method asks the user for ten ints and adds each number to

// the num array

**public** **void** collectTenNumbers()

{

**int** count = num.length;

Scanner scan = **new** Scanner(System.***in***);

// loop until all values are entered into the number array

**do**

{

// asks user for int

System.***out***.print("Please enter number "+ (count+1) +": ");

// trys to add value entered for user to the index location

// in the num array. If the value is not an int, then the

// exception will catch it and ask the user to re-enter the

// value

**try**

{

num[count] = Integer.*parseInt*(scan.next());

count++;

}

**catch** (NumberFormatException exception)

{

System.***out***.println("Error. Invalid Input. Please enter "

+"only whole numbers.");

}

}**while** (count < 10);

scan.close();

}

// Calculate the average of the num array and prints the result

**public** **void** average()

{

**int** sum = 0;

// adds all teh values in the array

**for** (**int** count = 0; count < num.length; count ++)

{

sum = sum + num[count];

}

// finds the average of all values in the array

avg = sum / num.length;

// print the sum, average and all values in the array

String temp = "\nHere is a list of all the numbers entered and \nthe "

+"average of the numbers:\n"

+"Sum: " + sum + "\t\t\tAverage: " + avg +"\n";

temp = temp + "\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

**for** (**int** count = 0; count < num.length; count++)

{

temp = temp + (count+1) +": "+ num[count] + "\t\t\t\t";

**if** ((count + 1) % 2 == 0)

{

temp = temp +"\n";

}

}

System.***out***.print(temp);

}

// These methods are setters and getters and a toString

**public** **void** setNum(**int** index, **int** value)

{

num[index] = value;

}

**public** **int** getNum(**int** index)

{

**return** num[index];

}

**public** **void** setAvg(**double** value)

{

avg = value;

}

**public** **double** getAvg()

{

**return** avg;

}

// returns the avg and all values in num array

**public** String toString()

{

String temp = "Average: " + avg +"\n";

**for** (**int** count = 0; count < num.length; count++)

{

temp = temp + (count+1) + ": " + num[count] + "\n";

}

**return** temp;

}

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// Average.java Matt Matuk

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// 1. This class contains the main method of the program

// 2. This class will supply the intro and ending statements

// 3. This class will call the collectTenNumbers() and the average()

// methods

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**public** **class** Average

{

**public** **static** **void** main(String[] args)

{

System.***out***.println("Welcome to my application today. I am going "

+"to ask you to enter ten whole \nnumbers and then I will "

+"display the average of those numbers.");

System.***out***.println();

Numbers avg = **new** Numbers();

avg.collectTenNumbers();

avg.average();

System.***out***.println("Thank you for using my application today.");

}

}

**OUTPUT SCREEN**

