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/* This is one of a pair of programs to allow you to compare Java and C programs
and how they correspond and differ. They are discussed in the lectures. This in
the Java version. It is not intended to be ideal Java code but to match the C code
for comparison. In particular, extensible array are better handled in Java using
vectors.
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import java.util.Scanner;
import java.io.File;

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/* This program analyses integer salaries entered by the user.
It outputs each salary together with its difference from the
mean of the salaries. There must be at least one salary.
*/

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public class SalaryAnalysis
{
    // Bubble-Sort a given array of int into ascending order.
    private static void sort(int[] anArray, int length)
    {
        // Each pass of the sort reduces unsortedLength by one.
        int unsortedLength = length;
        boolean changedOnThisPass;
        do
        {
            changedOnThisPass = false;
            for (int pairLeftIndex = 0;
                pairLeftIndex < unsortedLength - 1; pairLeftIndex++)
            { if (anArray[pairLeftIndex] > anArray[pairLeftIndex + 1])
                {
                    int thatWasAtPairLeftIndex = anArray[pairLeftIndex];
                    anArray[pairLeftIndex] = anArray[pairLeftIndex + 1];
                    anArray[pairLeftIndex + 1] = thatWasAtPairLeftIndex;
                    changedOnThisPass = true;
                } // if
            } // for
            unsortedLength--;
        } while (changedOnThisPass);
    } // sort

    public static void main(String[] args) throws Exception
    {
        String filename = args[0];

        // A Scanner for getting data from the user.
        Scanner salariesScanner = new Scanner(new File(filename));

        // The number of Salaries.
        int numberOfSalaries;
        // The salaries: only indices 0 to numberOfSalaries - 1 are used.
        int[] salaries;

        // Initial size of the array.
        int INITIAL_SIZE = 2;
        // When the array is full, we extend it by this factor.
        int RESIZE_FACTOR = 2;

        // Read salary data from the salariesScanner,
        // count them using numberOfSalaries,
        // and store in array, extending as required.

        salaries = new int[INITIAL_SIZE];
        numberOfSalaries = 0;
        while (salariesScanner.hasNextLine())
        {
            // Obtain the next salary
            String data = salariesScanner.nextLine();
            int currentSalary = Integer.parseInt(data);

            // Extend the array if it is too small.
            if (numberOfSalaries == salaries.length)
            {
                int[] biggerArray

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        = new int[salaries.length * RESIZE_FACTOR];
        for (int index = 0; index < salaries.length; index++)
        {
            biggerArray[index] = salaries[index];
        }
        salaries = biggerArray;
    } // if
    // Finally store the salary and update numberOfSalaries.
    salaries[numberOfSalaries] = currentSalary;
    numberOfSalaries++;
} // while

// Now compute the sum of the salaries.
int sumOfSalaries = 0;
for (int index = 0; index < numberOfSalaries; index++)
{
    sumOfSalaries += salaries[index];
}

// Compute the mean, which is a double, not an integer.
double meanSalary = sumOfSalaries / (double)numberOfSalaries;

// But we also want to round it to simplify the results.
int meanSalaryRounded = (int) Math.round(meanSalary);

// Sort the salaries into ascending order.
sort(salaries, numberOfSalaries);

// Produce the results.
System.out.println();
System.out.println("The mean salary is:\t" + meanSalary);
System.out.println("which rounds to:\t" + meanSalaryRounded);
System.out.println();
for (int index = 0; index < numberOfSalaries; index++)
{
    int differenceFromMean = salaries[index] - meanSalaryRounded;
    String comparisonToMean = differenceFromMean == 0.0
        ? "zero difference from"
        : (differenceFromMean < 0
            ? "less than" : "greater than");
    System.out.println (String.format //System.out.printf
        ("Person %2d earns %5d, which is %5d %s the mean",
         (index + 1), salaries[index],
         Math.abs(differenceFromMean), comparisonToMean));
} // for
} // main

} // class SalaryAnalysis

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