

HOMEWORK 1

You should comment on the results obtained (unusual patterns, how do the languages compare, speeds with and without debug options, with and without optimization, etc.)

Question 1 Based on the example programs from class, write a program that counts from 1 to n where $n = 1000, 10,000, 100,000$. The values 1 through n should be listed, one per line in an output file of your choice, in ascii format. Benchmark (put timers) the program. The number " n " should be input from the command line. The name of the output file is up to you. The program should output the line:

"Enter the value of n : "

Although we have not discussed I/O yet, use the Internet to find simple programs that demonstrate how to accomplish the task, or use (c++/Java/Fortran 90) tutorials.

Fortran

n	Time (ms)
1000
10000
100000

Java

n	Time (ms)
1000
10000
100000

C++

n	Time (ms)
1000
10000
100000

There is no need to read the data from the console if you do not know how. Simply recompile the program for each value of n . Do this in Fortran 90, Java and C++. Unless you know how to read data from the console, this requires running the program 3 times in each of the three languages.

Each case should be run 20 times. Print the average time (you can compute that in your code by creating a method to count:

```
float counter(int n)
```

putting this method inside a loop that executes it 20 times, and putting the counter outside this loop.

Question 2 Using the computer language of your choice, compute the integral from -3 to 10 of the function

$$y(x) = \frac{x}{2. + \sin(2 * x)}$$

using the Composite Simpson Integration formula. You can find the formulas using Wikipedia (<http://en.wikipedia.org/wiki/Simpson>) Run the program with 10,100,1000 intervals. Time the code. Only the actual loop that computes the integral should be timed. Print out the results in a table

Column 1: "n" \\
Column 2: "Time (ms)" \\

n	Integral Value	Time (ms)
10	xxx1
20	xxx2
30	xxx3
....		

Homework Format Create a directory structure:

```

homework1/
  |      \
  |      \
counter/  integration/
filex1    filey1
filex2    filey2
filex3    filey3

```

Tar the homework:

```
tar cvfz homework1.tgz homework1
```

or

```
tar cvf homework1.tar homework1
```

```
gzip homework1.tar
```

Upload either `homework.tgz` or `homework.tar.gz` to the class web site. If you have problems, please let me know immediately.

Remove binary and object files before creating the tar file, to reduce the size of the output files.

Make sure you include files called `README` (a brief description of the directory contents), and a `NOTES` files (notes you take as you work describing what you do as you do them). Include a file called `INSTALL` with brief instructions on what to do to generate your results.