

Lab Report

ECPE 170 – Computer Systems and Networks – Spring 2016

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Lab Topic: Performance Optimization (Lab #: 6)

Question #1:

What is the total physical RAM installed in the system? (In MB)

Answer:

4000

Question #2:

With no applications running (beyond the web browser with this page), how much RAM is used by the native operating system? (e.g. Windows)

Answer:

1392.9 MB in use

Question #3:

With no applications running (beyond the web browser with this page), how much RAM is available?

Answer:

2500 available

Question #4:

Check the virtual machine configuration. How much RAM is currently allocated to Linux in your virtual machine?

Note: Your answer to question 4 must be less than your answer to question 3! Otherwise, your system will use slow virtual memory (i.e. swapping data to the hard disk) when running this lab.

Answer:

my virtual Machine has 2048 MB allocated

Question #5:

Try to increase your virtual machine memory allocation, if possible, to the maximum allowed based on your free RAM. Leave ~256MB free for the virtual machine program itself. Now how much RAM is allocated to Linux in your virtual machine?

Answer:

My Virtual Machine now has 2944 MB allocated

Question #6:

Boot Linux. With no applications running in Linux, how much RAM is available *inside* the virtual machine? The "System Monitor" program should report that information. This is the space that is actually available for our test application.

Answer:

My Virtual Machine has about 1800MB of RAM with no applications running

Question #7:

What is the code doing? (Describe the algorithm in a paragraph, focusing on the `combine1()` function.)

Answer:

This code combines all of the floats in a given vector into one number

Question #8:

What is the largest number of elements that the vector can hold WITHOUT using swap storage (virtual memory), and how much memory does it take? Be sure to leave enough memory for **Firefox** and

LibreOffice, since you'll need those when running this lab as well.

Answer:

The most elements I can have is 200000000

Question #9:

What vector size are you using for all experiments in this lab?

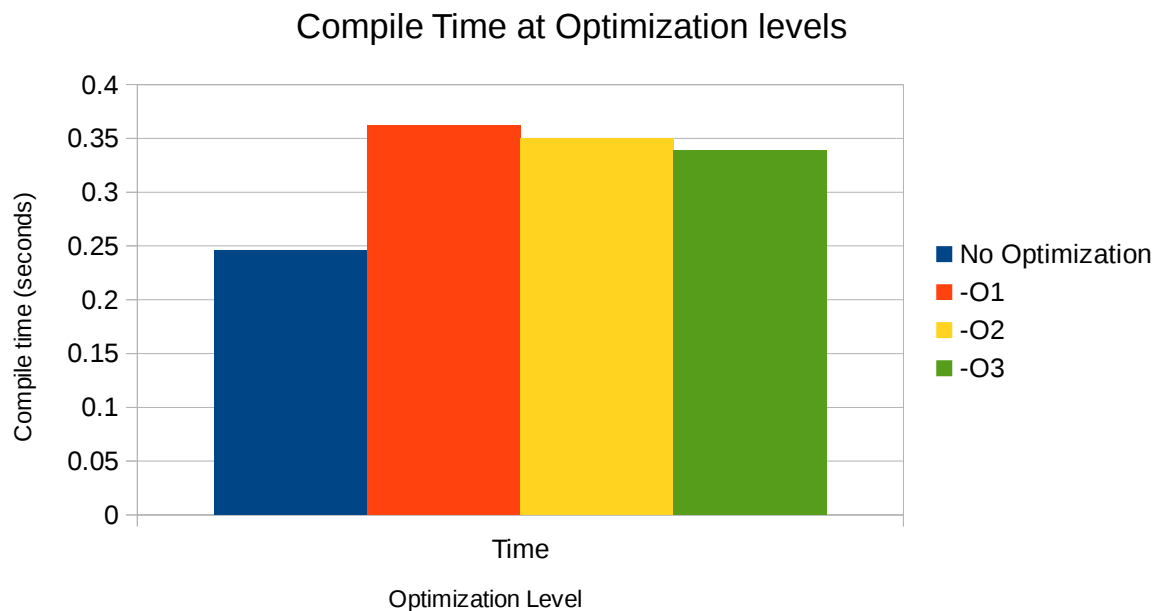
Answer:

The vector size I am using is 200000000

Question #10:

How much time does the **compiler** take to finish with (a) no optimization, (b) with -O1 optimization, (c) with -O2 optimization, and (d) with -O3 optimization? Report the Real time, which is the "wall clock" time. Create both a table and a graph in LibreOffice Calc.

Answer:



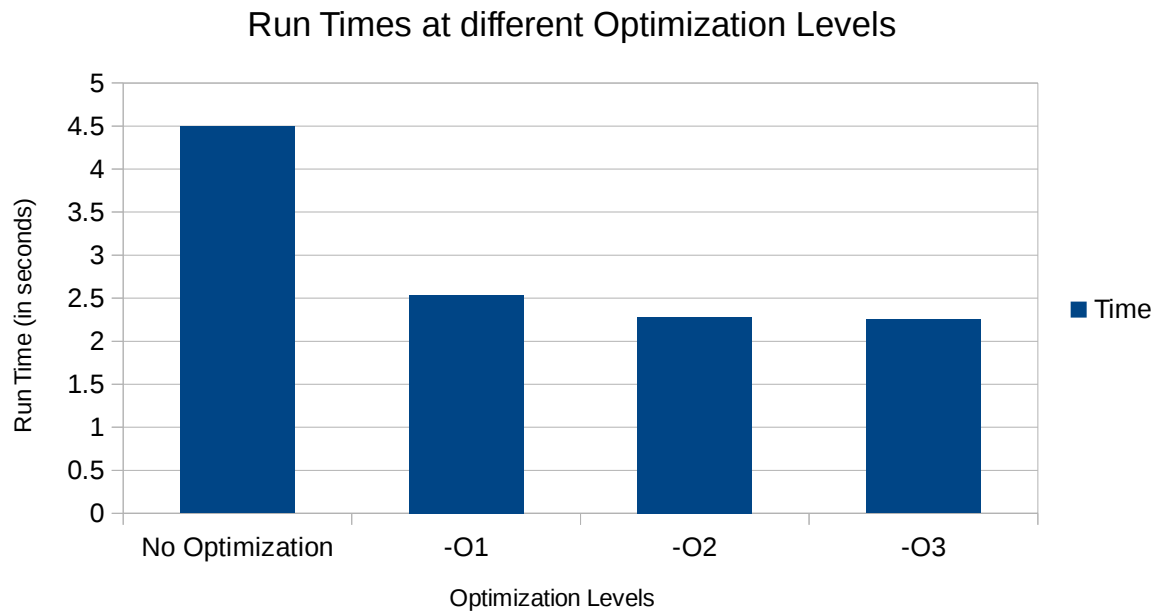
Optimization Level	Time
No Optimization	.246
-O1	.362
-O2	.35
-O3	.339

Question #11:

How much time does the **program** take to finish with (a) no optimization, (b) with -O1 optimization, (c) with -O2 optimization, and (d) with -O3 optimization? Report the Real time, which is the "wall

clock" time. Create both a table and a graph in LibreOffice Calc.gh memory for **Firefox** and **LibreOffice**, since you'll need those when running this lab as well.

Answer:



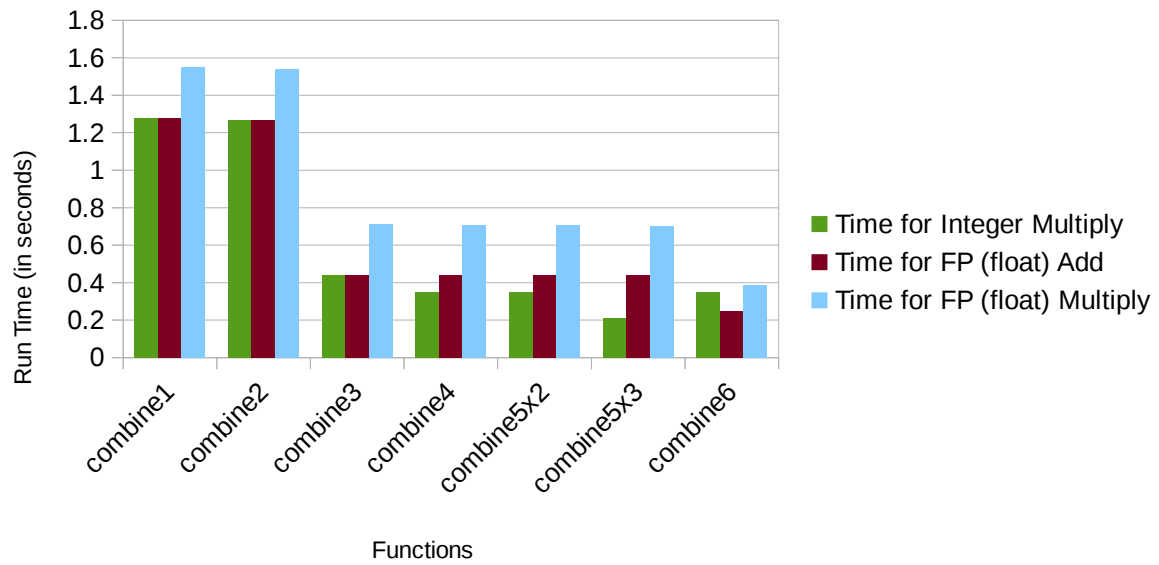
Optimization Level	Time
No Optimization	4.496
-O1	2.535
-O2	2.281
-O3	2.253

Question #12-13:

After implementing each function, benchmark it for a variety of data types and mathematical operations. Fill in the table below as you write each function.

Answer:

Run Times of Functions that Combine a Vector



Configuration	Vector Size (elements)	Vector Size (MB)	Time for Integer Add	Time for Integer Multiply	Time for FP (float) Add	Time for FP (float) Multiply
combine1	200000000	762.94	1.148	1.281	1.277	1.551
combine2	200000000	762.94	1.042	1.269	1.265	1.540
combine3	200000000	762.94	.260	.439	.439	.710
combine4	200000000	762.94	.140	.350	.443	.707
combine5x2	200000000	762.94	.145	.347	.442	.706
combine5x3	200000000	762.94	.134	.209	.440	.703
combine6	200000000	762.94	.138	.352	.246	.386