Lab 6 Report

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6. 602Mb
7. The code gets the sum or product of the elements in a randomly created vector of a length given in the command line arguments. The elements' type and the operation are defined in config.h. It will call a different combine function based on the command line arguments. The combine functions will differ because they are optimized in different ways. The program stores the sum/product in the variable result. It also records the amount of time it took to combine the vector.
8. 12080 MiB free = 12666800000 bytes, 12666800000 / 4 bytes/int = 3166700000.0 ints
9. 3000000000 elements
10.

	compile time (s)
no optimization	0.41
-O1	0.39
-O2	0.47
-O3	0.58

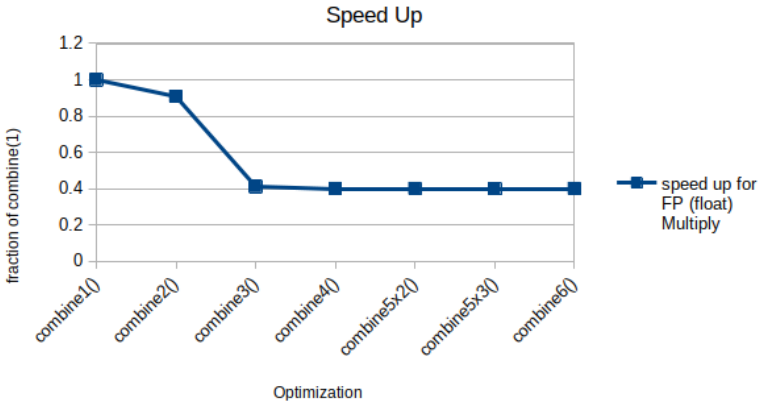
11.

	runtime
no optimization	37.3
-O1	22.028
-O2	19.63
-O3	12.72

12.

Configuration	Vector size (elements)	vector size (MB)	time for integer add	time for integ
combine1	3000000000	11444	12.595	
combine2	3000000000	11444	7.856	
combine3	3000000000	11444	2.234	
combine4	3000000000	11444	1.589	
combine5x2	3000000000	11444	1.016	
combine5x3	3000000000	11444	1.043	
combine6	3000000000	11444	0.972	

13.


Speed Up
1.2
1
0.8
0.6
0.4
0.2
0
fraction of combine(1)
combine1()
combine2()
combine3()
combine4()
combine5x2()
combine5x3()
combine6()
Optimization
speed up for FP (float) Multiply