

Name: ____Tailang CAO____

Q1	The main file is executing file01 and file02, which are each 4kb big, and too small. The runtime is thus too short to be recorded with two decimal numbers.																																																																																																		
Q2	<p>Flat profile:</p> <p>Each sample counts as 0.01 seconds.</p> <table><tr><th>% time</th><th>cumulative seconds</th><th>self seconds</th><th>calls</th><th>self s/call</th><th>total s/call</th><th>name</th></tr><tr><td>32.35</td><td>1.11</td><td>1.11</td><td>647482750</td><td>0.00</td><td>0.00</td><td>__gnu_cxx::__en</td></tr><tr><td>15.74</td><td>1.65</td><td>0.54</td><td>2</td><td>0.27</td><td>0.51</td><td>sort1(std::__cxx</td></tr><tr><td>15.44</td><td>2.19</td><td>0.53</td><td>38948</td><td>0.00</td><td>0.00</td><td>search1(std::__c</td></tr><tr><td>13.99</td><td>2.67</td><td>0.48</td><td>379465206</td><td>0.00</td><td>0.00</td><td>bool std::opera</td></tr><tr><td>11.36</td><td>3.06</td><td>0.39</td><td>647482750</td><td>0.00</td><td>0.00</td><td>bool std::opera</td></tr><tr><td>10.64</td><td>3.42</td><td>0.37</td><td>108224639</td><td>0.00</td><td>0.00</td><td>std::char_trait</td></tr><tr><td>0.73</td><td>3.45</td><td>0.03</td><td>1</td><td>0.03</td><td>0.03</td><td>_GLOBAL__sub_I__</td></tr><tr><td>0.00</td><td>3.45</td><td>0.00</td><td>38931</td><td>0.00</td><td>0.00</td><td>void std::swap<c</td></tr><tr><td>0.00</td><td>3.45</td><td>0.00</td><td>2</td><td>0.00</td><td>1.20</td><td>find_print_add_r</td></tr><tr><td>0.00</td><td>3.45</td><td>0.00</td><td>2</td><td>0.00</td><td>0.00</td><td>readFile(std::__</td></tr><tr><td>0.00</td><td>3.45</td><td>0.00</td><td>1</td><td>0.00</td><td>0.00</td><td>_GLOBAL__sub_I__</td></tr><tr><td>0.00</td><td>3.45</td><td>0.00</td><td>1</td><td>0.00</td><td>0.00</td><td>__static_initial</td></tr><tr><td>0.00</td><td>3.45</td><td>0.00</td><td>1</td><td>0.00</td><td>0.00</td><td>__static_initial</td></tr></table>	% time	cumulative seconds	self seconds	calls	self s/call	total s/call	name	32.35	1.11	1.11	647482750	0.00	0.00	__gnu_cxx::__en	15.74	1.65	0.54	2	0.27	0.51	sort1(std::__cxx	15.44	2.19	0.53	38948	0.00	0.00	search1(std::__c	13.99	2.67	0.48	379465206	0.00	0.00	bool std::opera	11.36	3.06	0.39	647482750	0.00	0.00	bool std::opera	10.64	3.42	0.37	108224639	0.00	0.00	std::char_trait	0.73	3.45	0.03	1	0.03	0.03	_GLOBAL__sub_I__	0.00	3.45	0.00	38931	0.00	0.00	void std::swap<c	0.00	3.45	0.00	2	0.00	1.20	find_print_add_r	0.00	3.45	0.00	2	0.00	0.00	readFile(std::__	0.00	3.45	0.00	1	0.00	0.00	_GLOBAL__sub_I__	0.00	3.45	0.00	1	0.00	0.00	__static_initial	0.00	3.45	0.00	1	0.00	0.00	__static_initial
% time	cumulative seconds	self seconds	calls	self s/call	total s/call	name																																																																																													
32.35	1.11	1.11	647482750	0.00	0.00	__gnu_cxx::__en																																																																																													
15.74	1.65	0.54	2	0.27	0.51	sort1(std::__cxx																																																																																													
15.44	2.19	0.53	38948	0.00	0.00	search1(std::__c																																																																																													
13.99	2.67	0.48	379465206	0.00	0.00	bool std::opera																																																																																													
11.36	3.06	0.39	647482750	0.00	0.00	bool std::opera																																																																																													
10.64	3.42	0.37	108224639	0.00	0.00	std::char_trait																																																																																													
0.73	3.45	0.03	1	0.03	0.03	_GLOBAL__sub_I__																																																																																													
0.00	3.45	0.00	38931	0.00	0.00	void std::swap<c																																																																																													
0.00	3.45	0.00	2	0.00	1.20	find_print_add_r																																																																																													
0.00	3.45	0.00	2	0.00	0.00	readFile(std::__																																																																																													
0.00	3.45	0.00	1	0.00	0.00	_GLOBAL__sub_I__																																																																																													
0.00	3.45	0.00	1	0.00	0.00	__static_initial																																																																																													
0.00	3.45	0.00	1	0.00	0.00	__static_initial																																																																																													

	^L					
	Call graph (explanation follows)					
	granularity: each sample hit covers 2 byte(s) for 0.29% of 3.45 seconds					
	index % time	self	children	called	name	
	[1]	99.3	0.00	3.42	<spontaneous> main [1]	
			0.00	2.40	2/2 find_print_add_records(std	
			0.54	0.48	2/2 sort1(std::__cxx11::basic_	
			0.00	0.00	2/2 readFile(std::__cxx11::bas	
	[2]	69.6	0.53	1.87	38948/38948 find_print_add_records(std	
			0.53	1.87	38948 search1(std::__cxx11::basic_st	
			0.39	1.48	647482750/647482750 bool std::operator!<=<cl	
	[3]	69.6	0.00	2.40	2/2 main [1]	
			0.00	2.40	2 find_print_add_records(std::__	
			0.53	1.87	38948/38948 search1(std::__cxx11::bas	
	[4]	54.2	0.39	1.48	647482750/647482750 search1(std::__cxx11::	
			0.39	1.48	647482750 bool std::operator!<=<char, s	
			1.11	0.37	647482750/647482750 __gnu_cxx::__enable_if	
	[5]	42.9	1.11	0.37	647482750/647482750 bool std::operator!<=<cl	
			1.11	0.37	647482750 __gnu_cxx::__enable_if<std::	
			0.37	0.00	108224639/108224639 std::char_traits<char>	
	[6]	29.7	0.54	0.48	2/2 main [1]	
			0.54	0.48	2 sort1(std::__cxx11::basic_stri	
			0.48	0.00	379465206/379465206 bool std::operator< <cl	
			0.00	0.00	38931/38931 void std::swap<char, std::	
	[7]	14.0	0.48	0.00	379465206/379465206 sort1(std::__cxx11::ba	
			0.48	0.00	379465206 bool std::operator< <char, s	
	[8]	10.6	0.37	0.00	108224639/108224639 __gnu_cxx::__enable_if	
			0.37	0.00	108224639 std::char_traits<char>::comp	
	[9]	0.7	0.03	0.00	1/1 __libc_csu_init [10]	
			0.03	0.00	1 _GLOBAL__sub_I__Z7search1PNSt7	
			0.00	0.00	1/1 __static_initialization_and	
	[10]	0.7	0.00	0.03	<spontaneous> __libc_csu_init [10]	
			0.03	0.00	1/1 _GLOBAL__sub_I__Z7search1P	
			0.00	0.00	1/1 _GLOBAL__sub_I__Z8readFile	
	[17]	0.0	0.00	0.00	38931/38931 sort1(std::__cxx11::basic_	
			0.00	0.00	38931 void std::swap<char, std::char	
	[18]	0.0	0.00	0.00	2/2 main [1]	
			0.00	0.00	2 readFile(std::__cxx11::basic_s	
	[19]	0.0	0.00	0.00	1/1 __libc_csu_init [10]	
			0.00	0.00	1 _GLOBAL__sub_I__Z8readFileNSt7	
			0.00	0.00	1/1 __static_initialization_and	
	[20]	0.0	0.00	0.00	1/1 _GLOBAL__sub_I__Z8readFile	
			0.00	0.00	1 __static_initialization_and_de	
	[21]	0.0	0.00	0.00	1/1 _GLOBAL__sub_I__Z7search1P	
			0.00	0.00	1 __static_initialization_and_de	
Q3	__gnu_cxx::__enable_if<std::__is_char<char>::__value, bool>::__type std::operator==<char>(std::__cxx11::basic_string<char,\$ Consuming 32.35% of time					
Q4	The same one as the one consuming the most time.					

	<code>__gnu_cxx::__enable_if<std::__is_char<char>::__value, bool>::__type std::operator==(char>(std::__cxx11::basic_string<char,\$</code>
Q5	Search1 uses 0.53 seconds per call, total call time is 0 second. This might be because search1 itself consumes a significant runtime, but the functions search1 calls do not contribute significantly to the overall execution time.
Q6	Self seconds per call: 0.00 seconds Total seconds per call: 0.60 seconds This implies that the majority of the time spent in find_print_add_records is due to the functions it calls rather than its own code.
Q7	The total time was 2.40 seconds contributing from the find_print_add_records child function.
Q10	

Q8:

Optimization Level	Total execution time
O0 (default)	3.28 sec
O1	2.87 sec
O2	1.93 sec
O3	1.62 sec

Q9:

Optimization level	Search1	Sort1
O1	69.7%	27.4%
O2	57.2%	45.32%
O3	49.1%	49.3%

Q11:

Sort function	Search function	Total execution time
Sort1	Search1	3.42 sec
Sort2	Search1	4.58 sec
Sort3	Search1	2.47 sec
Sort1	Search2	0.83 sec
Sort2	Search2	2.76 sec
Sort3	Search2	0.01 sec

Q12:

Sort3 Search2 has the best performance fin terms of execution time

Q13:

$(3.42 - 0.01)/3.42 = 99\%$ program enhancement percentage.