The time for generating an AVL tree should be (n * log(n)), but my data shows that the complexity is actually much higher. Adding relatively few reports to a tree seems to greatly increase the time. I've gone over my algorithms, and it seems like it should be (n * log(n)), but the time for generating says otherwise. I tried generating trees from all the 2.5 million reports, but it took too long, well over 10 minutes and I was only a fraction of the way through, and it kept getting slower. Testing with a small sample showed my algorithm for finding accidents after a given date in a state appeared to work as intended.

As far as searching the AVL appears to be more efficient, as expected. It took only 33 microseconds to find 5260 reports after searching 25000 reports, but it to the treemap structure 310 microseconds to find 107 reports after searching 25000 reports. The more important number is the size of the tree searched, so 33/25000 is roughly 10 times faster than 310/25000.

Unless I made some serious mistake I could not recognize in my algorithm, the treemap data structure is much faster for generating trees. This makes sense, because the AVL structure requires constant manipulation when adding nodes, which gets more and more complex as the number increases.

Overall, the AVL is faster for searching than the treemap, but much, MUCH slower for generating the trees for the data. Assignment 7 data is on top, assignment 6 data is on the bottom.

reports place										
150			30047	110600						
140 130			28099	112600						
120			26036 24114	99700 107700						
110			22146	94700						
100			20258	81100						
	000 5729		18181	88000						
80	000 3777		16222	74500						
25	000 542		5260	33900						
millisecond	ds to generate	vs. report	ts placed		nanoseco	onds to find vs	s. reports found	d		
150000					125000 —					
					-			•		
					100000 —		•			
9						•	•			
100000						•				
8					ō 12000					
ds t					20000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 2500000 - 250000 - 250000 - 250000 - 250000 - 250000 - 250000 - 25000000 - 2500000 - 25000000 - 250000000 - 2500000 - 2500000 - 25000000000 - 25000000 - 250000000000					
100000 — 500000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50000 — 500000 — 50000 — 50000 — 50000 — 50000 — 500000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50000 — 50					99 50000					
= 33000				•						
-				•	25000 —					
0 ^ 2500	0 50000	75000	100000	125000 15	0000	17500 20000	22500 2500	0 27500	30000	32500
2300	0 30000			123000 13	5000	17300 20000			30000	32300
		repo	orts placed				reports	found		
ert					find					
	entries					entries searched	entries found			
	entries 2500000					entries searched	entries found 105463			
roseconds					microseconds					
roseconds 8200660	2500000				microseconds 563	2500000	105463			
7675216	2500000 2250000				microseconds 563 614	2500000 2250000	105463 105463			
7675216 7605555 6273333	2500000 2250000 2000000 1750000				microseconds 563 614 647 553	2500000 2250000 2000000 1750000	105463 105463 105463			
7675216 7675256 6273333 5226805	2500000 2250000 2000000 1750000 1500000				microseconds 563 614 647 553 731	2500000 2250000 2000000 1750000 1500000	105463 105463 105463 104385 82824			
7675216 7675216 7605555 6273333 5226805 4365022	2500000 2250000 2000000 1750000 1500000 1250000				microseconds 563 614 647 553 731 566	2500000 2250000 2000000 1750000 1500000	105463 105463 105463 104385 82824 61534			
709econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747	2500000 2250000 2000000 1750000 1500000 1250000 1000000				microseconds 563 614 647 553 731 566	2500000 2250000 2000000 1750000 1500000 1250000 1000000	105463 105463 105463 104385 82824 61534 40266			
705econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164	2500000 2250000 2000000 1750000 1500000 1250000 1000000 750000				microseconds 563 614 647 553 731 566 543 582	2500000 2250000 2000000 1750000 1500000 1250000 1000000 750000	105463 105463 105463 104385 82824 61534 40266 18891			
769econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000				microseconds 563 614 647 553 731 566 543 582	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000	105463 105463 105463 104385 82824 61534 40266 18891			
70seconds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000				microseconds 563 614 647 553 731 566 543 582 561	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000	105463 105463 105463 104385 82824 61534 40266 18891 107			
70seconds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000				microseconds 563 614 647 553 731 566 543 582 561 459	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000	105463 105463 105463 104385 82824 61534 40266 18891 107 107			
705econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 250000				microseconds 563 614 647 553 731 566 543 582 561 459 317	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 250000	105463 105463 105463 104385 82824 61534 40266 18891 107 107			
70seconds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 250000 25000				microseconds 563 614 647 553 731 566 543 582 561 459	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 25000 25000	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107			
705econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 250000				microseconds 563 614 647 553 731 566 543 582 561 459 317	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 250000	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107			
705econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294 13506	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 250000 25000				microseconds 563 614 647 553 731 566 543 582 561 459 317 310	2500000 2250000 2000000 1750000 1500000 1250000 750000 500000 250000 25000 25000	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 207			
705econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294 13506 8422	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 25000 2500				microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298	2500000 2250000 2000000 1750000 1500000 1250000 7500000 500000 250000 250000 25000 2500	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 207			
708econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294 13506 8422 6776	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (ins	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 25000 2500	105463 105463 105463 104385 82824 61534 40266 18891 107 107 7 107 2 0	ch)		
roseconds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294 13506 8422 6776	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 25000 2500	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
708econds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294 13506 8422 6776	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 7 107 2 0	,		
roseconds 8200660 7675216 7605555 6273333 5226805 4365022 3477747 2515164 1677752 801623 108673 30294 13506 8422 6776	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
750E+66	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
750E+66	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
750E+66	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
750E+66	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
750E+66	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
750E+66	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		
7.50E+6	2500000 2250000 2000000 1750000 1500000 1250000 7500000 2500000 250000 250000 25000 25000 25000 25000 25000 25000 25000 25000	nds (inse	ertion)		microseconds 563 614 647 553 731 566 543 582 561 459 317 310 309 298 344 entries	2500000 2250000 2000000 1750000 1500000 1250000 7500000 250000 250000 25000 2500 25	105463 105463 105463 104385 82824 61534 40266 18891 107 107 107 20 0	,		

entries

entries