Short Project 8 Report

CS 6301.011

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We implemented Cuckoo hashing algorithm and compared it's performance against Java's HashSet. Below is a table that shows run time and memory for Hash Set and Cuckoo Hashing.

We ran our program on test cases provided for LP-3.

No of Operations	HashSet	Cuckoo Hashing	Load Factor
201 (sk-t01)	Time: 28 msec. Memory: 3 MB / 256 MB.	Time: 35 msec. Memory: 3 MB / 256 MB.	0.5
50001 (sk-t02)	Time: 181 msec. Memory: 36 MB / 256 MB.	Time: 388 msec. Memory: 51 MB / 256 MB.	0.5
1000000 (sk-t03)	Time: 2254 msec. Memory: 228 MB / 562 MB.	Time: 3847 msec. Memory: 240 MB / 1024 MB.	0.5
1001 (sk-t11)	Time: 44 msec. Memory: 4 MB / 256 MB.	Time: 47 msec. Memory: 4 MB / 256 MB.	0.5
50000 (sk-t12)	Time: 194 msec. Memory: 30 MB / 256 MB.	Time: 321 msec. Memory: 44 MB / 256 MB.	0.5
1000000 (sk-t13)	Time: 1877 msec. Memory: 121 MB / 671 MB.	Time: 3675 msec. Memory: 219 MB / 1024 MB.	0.5
201 (sk-t01)	Time: 29 msec. Memory: 3 MB / 256 MB.	Time: 30 msec. Memory: 3 MB / 256 MB.	0.75
50001 (sk-t02)	Time: 214 msec. Memory: 37 MB / 256 MB.	Time: 496 msec. Memory: 48 MB / 256 MB.	0.75
1000000 (sk-t03)	Time: 2047 msec. Memory: 139 MB / 702 MB.	Time: 4430 msec. Memory: 294 MB / 1526 MB.	0.75
1001 (sk-t11)	Time: 70 msec. Memory: 4 MB / 256 MB.	Time: 53 msec. Memory: 4 MB / 256 MB.	0.75
50000 (sk-t12)	Time: 173 msec. Memory: 31 MB / 256 MB.	Time: 332 msec. Memory: 38 MB / 256 MB.	0.75
1000000 (sk-t13)	Time: 1913 msec. Memory: 206 MB / 696 MB.	Time: 3585 msec. Memory: 155 MB / 857 MB.	0.75

Below table shows performance of Cuckoo hashing with 0.9 load factor.

No of Operations	Time
201 (sk-t01)	Time: 20 msec. Memory: 3 MB / 256 MB.
50001 (sk-t02)	Time: 220 msec. Memory: 46 MB / 256 MB.
1000000 (sk-t03)	Time: 2668 msec. Memory: 249 MB / 1012 MB.
1001 (sk-t11)	Time: 57 msec. Memory: 4 MB / 256 MB.
50000 (sk-t12)	Time: 532 msec. Memory: 41 MB / 256 MB.
1000000 (sk-t13)	Time: 6990 msec. Memory: 272 MB / 1024 MB.

Based on above data, it turns out that Java's HashSet is more efficient than Cuckoo hashing.