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CptS 223

PA6 Report

- 1) **Section A:** The focus of the assignment was to look at and analyze different hash functions and different collision resolutions to get familiar with there execution time and overall efficiency. By doing so we will be able to see when we should apply the different hash functions and collision resolutions to be the most efficient as possible.

- 2) **Section B:**

Computer Architecture:

- CPU: 1.4 GHz i7
- RAM: 16GB
- MacOS operating system

We ran the program 3 times each time we were asked to find the average. We then averaged it and added it into the table. If the time changed by a significant from one of the other tests, then we would test it 5 or more times until we got more accurate data.

- 3) **Section C:**

The following tables:

Collision Strategy	Insert Function			Search Function	
	Total Time	Average Time	# of Collisions	Total Time	Average Time
Chaining	3.47e-6	3.52e-6	123	9.27e-7	9.31e-7
Linear Probing	2.08e-6	2.10e-6	67	8.71e-7	8.72e-7
Quadratic Probing	1.74e-6	1.72e-6	24	9.03e-7	9.04e-7

Hash Function	Insert Function			Search Function	
	Total Time	Average Time	# of Collisions	Total Time	Average Time
Simple	0.0088e-6	0.00891e-6	118	9.6e-7	9.58e-7
Prefix	0.0076e-6	0.00773e-6	74	9.96e-7	9.972e-7
Full Length	1.576e-6	1.48e-6	24	9.03e-7	9.04e-7

Explanation: For the Collision Strategy report, we can determine that it takes less time to execute Quadratic Probing than the others. Linear Probing comes in second when it comes to execution time, and Chaining is the slowest of the three. And the collision numbers decrease as you get to Quadratic Probing the most efficient. For the Hash Function report, you can see that the full length was the slowest being it had more to do. Then as we work our way up the Simple Function and the Prefix have a considerably fast execution time when compared to the Full Length. The Collisions once again goes down by a lot as we get to the Full Length words. These

are to my expectation and looks about like how my group partner and I thought it would go. We knew Quadratic Probing would perform the best after learning how fast it can spread across data.