CIS*3090 Assignment 2 Report

Number of Unique Characters in Decryption Dictionary versus Time in Seconds

Number of unique characters in decryption dictionary	Time (seconds)	ciphertext.txt String
3	1.1092	dog
4	1.2948	fits
5	3.1506	great ate
6	7.6850	frozen
7	50.2396	jumpers
8	1056.6796	clap frog

During the tests for the a2decrypt.c program, one run was executed for each number of unique characters in the decryption dictionary. The number of unique characters in the decryption dictionary became too large at 8 letters. This execution took 1056.6796 seconds (17.6113 minutes) to complete. The combination of the longer decryption dictionary as well as requiring 8 processes, causes this execution to take a longer amount of time in comparison to alphabets containing 7 unique letters and lower. Moreover, the greater number of processes requires a greater number of permutations the program must compute. Creating permutations requires the factorial formula which exponentially increases. This is displayed in the t-chart, as it is observed that the times are exponentially increasing as the number of unique characters in the decryption dictionaries increase. Lastly, the greatest difference in time is between 7 and 8 unique characters in the decryption dictionary, of approximately 1000 seconds (16.6667 minutes). Overall, the implemented brute-force decryption method becomes exponentially time consuming as the number of unique characters in the decryption dictionary increases.