Comp3260 Assignment 1

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April 5, 2018

1 c1

First the frequency graph was observed, which expressed that the cipher war produced by substitution. Next the IC was calculated giving an approximate period, d = 3. Then a kasiski of 17 characters shown that the string 'agxyvyzmffhjkefie' occurs in the text 3 times with the gaps 392 and 2024.

$$GCD(2024, 392) : 2024 = 5 \times 392 + 64$$

$$GCD(392, 64) : 392 = 6 \times 64 + 8$$

$$GCD(64, 8) : 64 = 8^2 + 0$$

$$\Rightarrow GCD(2024, 392) = 8$$

Hence the cipher definitely has 8 alphabets. Looking at the frequency graph with 8 alphabets shows that the cipher is Viginere as the letter frequency match the normal graph left to right, they only shift. The key is the letter a is shifted to in each alphabet, which means the key is 'remember'.

2 c2

The frequency graphs shows that a substitution cipher was used, the IC give an approximate period, d = 10. A Kasiski at 10 gives the gaps of 287, 91.

$$GCD(287, 91) = 7$$

Hence there are definitely 7 alphabets in the cipher. Solving for the key to this cipher is very similar to the previous one, only the frequency graph is backwards meaning it is a Beauford cipher. Matching each letter to the letter in place of a in each alphabet, gives the key 'triumph'.

3 c3

c3 was found to be a General substitution cipher

4 c4

c4 was found to be a Transposition cipher