Lab 03 - Vigenere Cipher

1) **List the five most common trigrams**
   (10 total points. 2 points each)

   - “BKM”
   - “GHM”
   - “THB”
   - “YEB”
   - “WPR”

2) **Show the difference between the starting indexes of the five most common trigrams.**
   (10 total points, 2 points each)
   - “BKM” positions = [205, 50, 15, 125, 150, 80, 70, 275]
   - “GHM” positions = [90, 290, 385, 35, 105]
   - “THB” positions = [105, 35, 253, 72, 220]
   - “YEB” positions = [85, 35, 65, 230, 30]
   - “WPR” positions = [95, 185, 350, 10]

3) **Based on your findings, what do you suspect the key length is? Justify your answer.**
   (10 total points, 5 points length value, 5 points justification)

   - 5, because it is the most common factor out of the differences included from each index.

4) **Separate the ciphertext into X shift-by-N ciphers where X is the length of the key and perform monoalphabetic frequency analysis on each. What are the three most common ciphertext characters in each of the shift-by-N ciphers?**
   (20 total points, 10 points for separating into X shift-by-N ciphers, 10 points for the common ciphertext characters in each shift-by-N cipher.)
   - “BKM” = [b, w, m]
   - “GHM” = [h, w, q]
   - “THB” = [m, b, i]
   - “YEB” = [r, v, a]
   - “WPR” = [t, e, o]

5) **Decrypt the ciphertext using the potential key values you found in question 5. Show all iterations, the final keyword, and the final plaintext.**
   (25 total points, 15 points for all iterations, 5 points for correct keyword, 5 points for correct plaintext)

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Enter character 0 (likely to be in the keyword): l
/////////  Cipher 4 Potential Key Values   /////////

Most frequently occurring ciphertext characters from left to right:
['i', 't', 'd', 'c', 'h', 'p', 'w', 'x', 'g', 'a', 's', 'r', 'b', 'z', 'v', 'j
', 'l', 'n', 'e', 'k', 'u', 'o', 'f', 'm', 'q', 'y']

Most likely 5 character(s) in the keyword: ['i']
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Enter character 1 (likely to be in the keyword): q
/////////  Cipher 4 Potential Key Values   /////////

Most frequently occurring ciphertext characters from left to right:
['d', 'o', 'y', 'x', 'c', 'k', 'r', 's', 'b', 'n', 'v', 'm', 'u', 'w', 'q', 'e
', 'g', 'i', 'f', 'p', 'z', 'j', 'a', 'h', 'l', 't']

Most likely 5 character(s) in the keyword: ['d']
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Enter character 2 (likely to be in the keyword): l
/////////  Cipher 4 Potential Key Values   /////////

Most frequently occurring ciphertext characters from left to right:
['i', 't', 'd', 'c', 'h', 'p', 'w', 'x', 'g', 'a', 's', 'r', 'b', 'z', 'v', 'j
', 'l', 'n', 'e', 'k', 'u', 'o', 'f', 'm', 'q', 'y']

Most likely 5 character(s) in the keyword: ['i']
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Enter character 3 (likely to be in the keyword): g
/////////  Cipher 4 Potential Key Values   /////////

Most frequently occurring ciphertext characters from left to right:
['n', 'y', 'i', 'h', 'b', 'c', 'm', 'u', 'l', 'f', 'x', 'w', 'e', 'g', 'a', 'o
', 'q', 's', 'j', 'p', 'z', 't', 'd', 'k', 'r', 'v']

Most likely 5 character(s) in the keyword: ['n']
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Enter character 4 (likely to be in the keyword): t
/////////  Cipher 4 Potential Key Values   /////////

Most frequently occurring ciphertext characters from left to right:
['a', 'l', 'v', 'u', 'h', 'o', 'p', 'z', 'y', 'k', 's', 'j', 'r', 't', 'n', 'b
', 'd', 'f', 'c', 'm', 'w', 'g', 'e', 'i', 'q', 'x']

Most likely 5 character(s) in the keyword: ['a']
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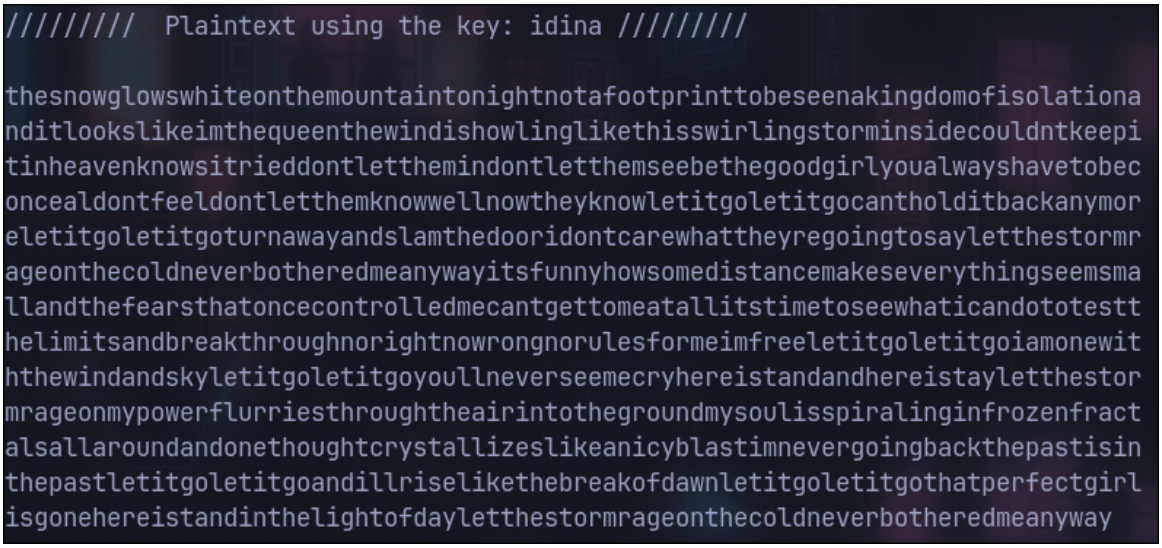
- 

6) **Submit your documented python code on canvas.**
(25 total points, 10 points for documentation, 15 points for working code. No points awarded if the code is copy/pasted from someone else.)