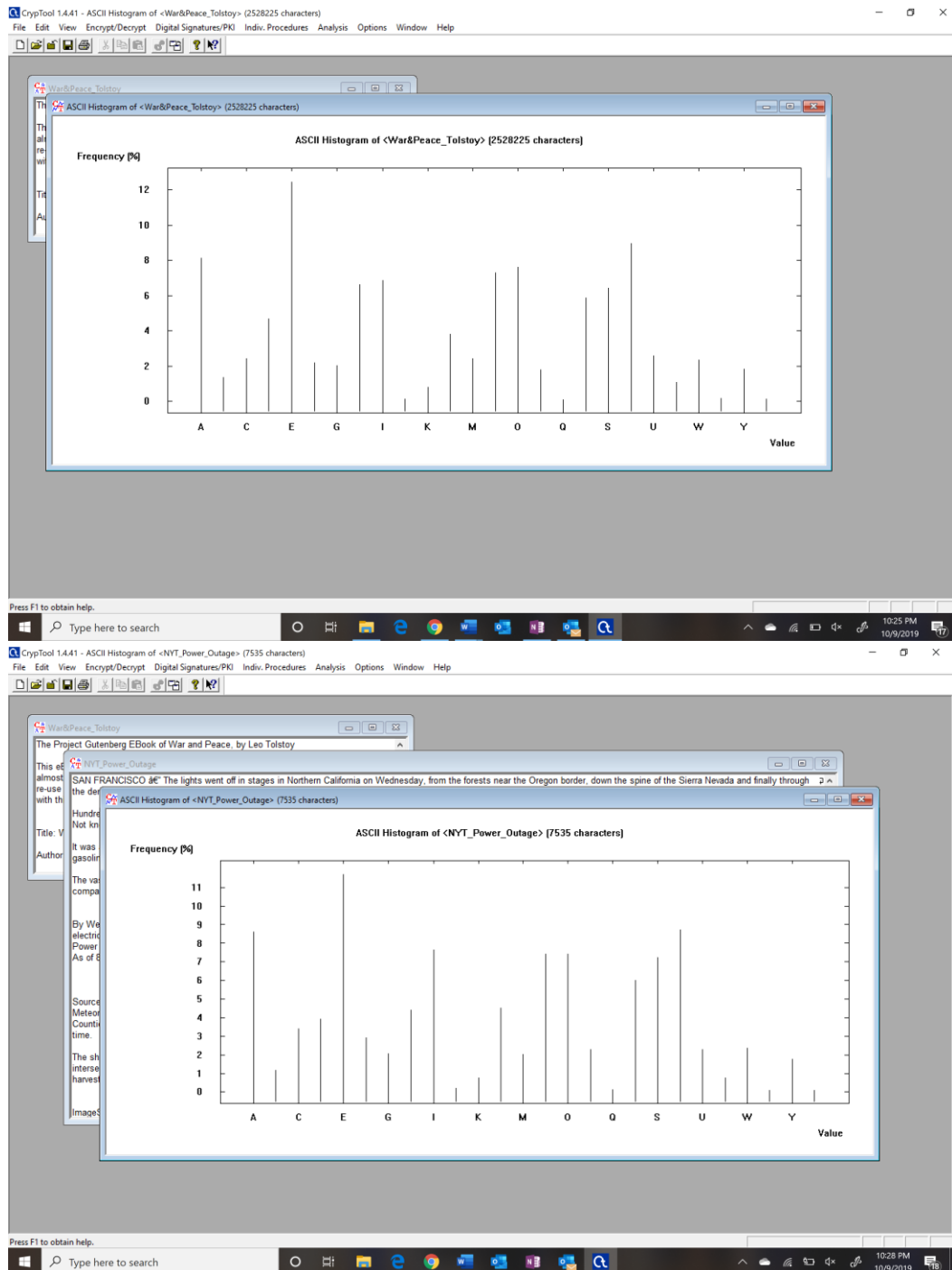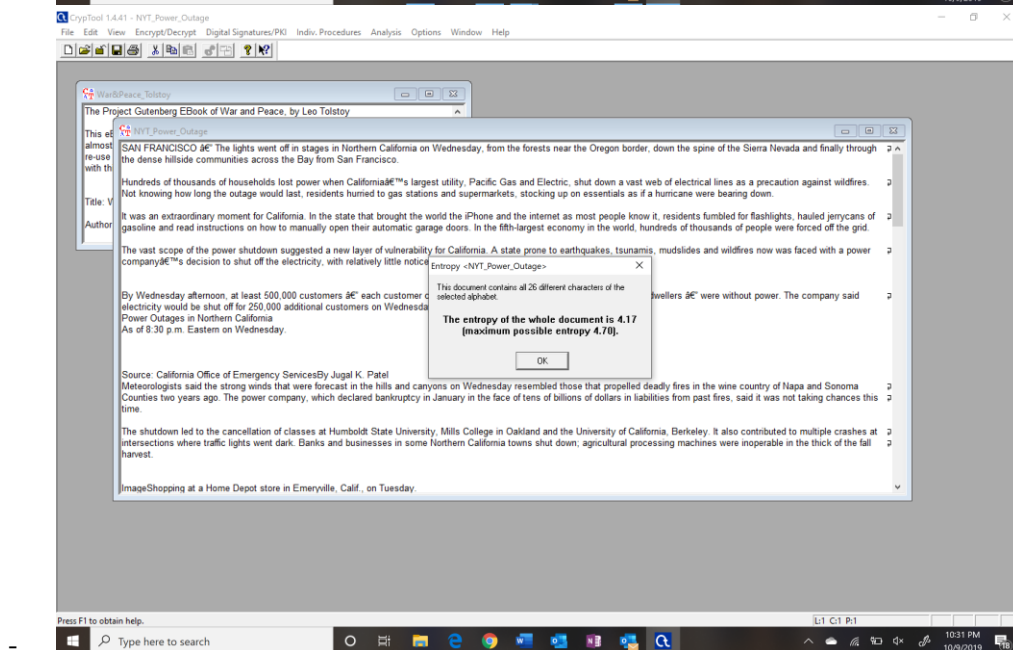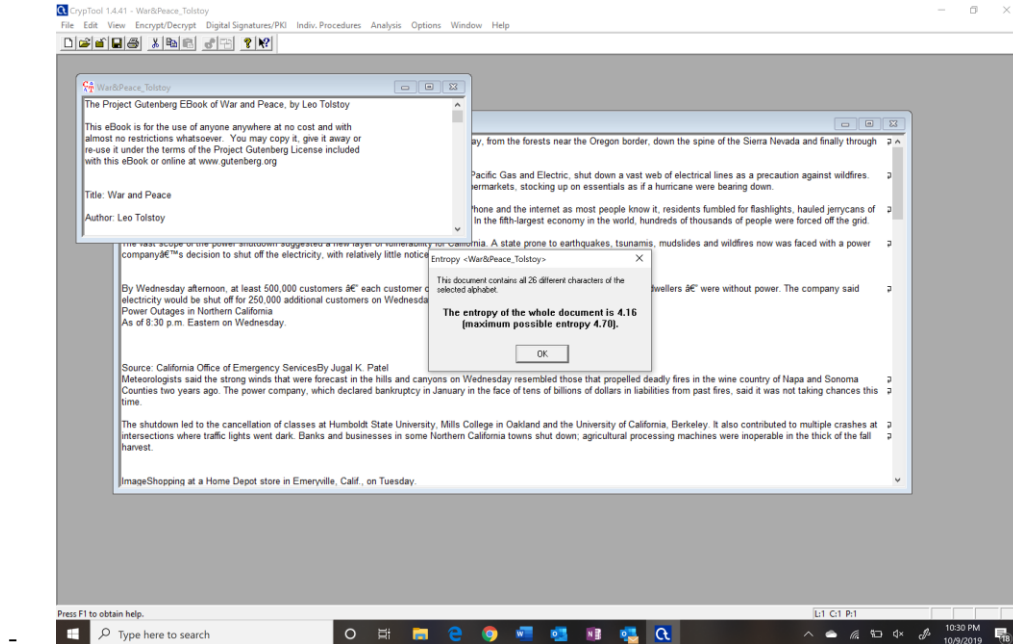# Crypto Assignment

Task 1 (4 points)

- (1.5 points) Create a histogram for each text that display the relative frequency of letters in a graphical form. For this, go to Analysis > Tools for Analysis. Provide the two histograms in screenshots.
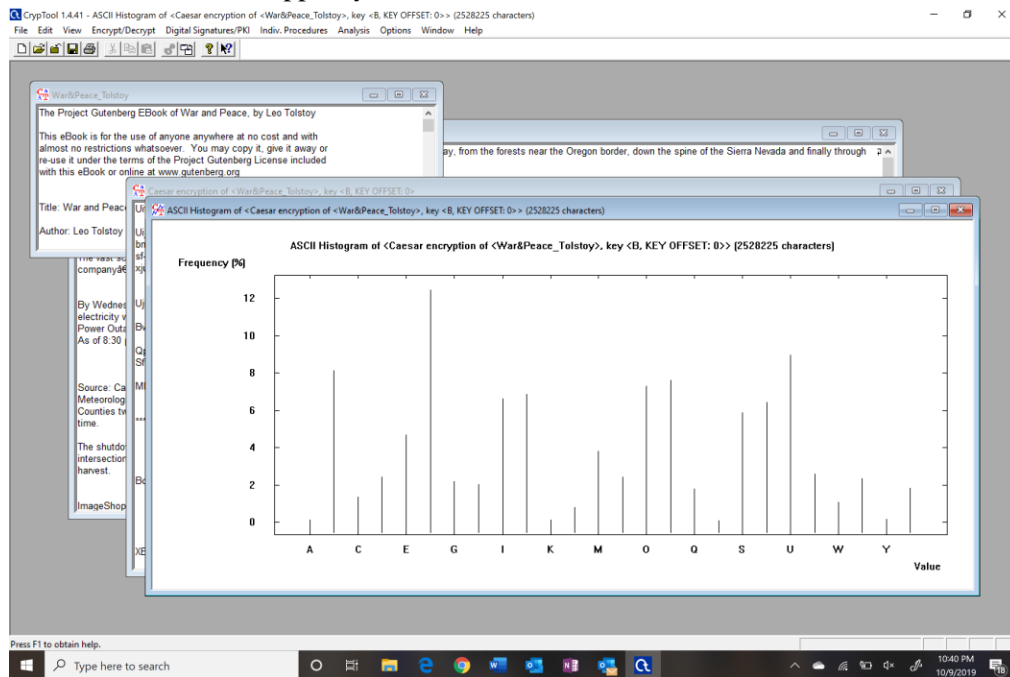
- (1.5 points) Do the two histograms depend significantly on the texts you have provided?
  - The two histograms, from different text, are very similar. There are small deviations within letters like F, H, and N. However, for the most part, it is almost identical.
- (1 point) Calculate the entropy of each text. For this, Analysis > Tools for Analysis > Entropy. What would you conclude from the comparison of the entropies?
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  - The entropy numbers are off by .01. This means that they are very random and not able to be easily predicted, considering the max Entropy is 4.70.
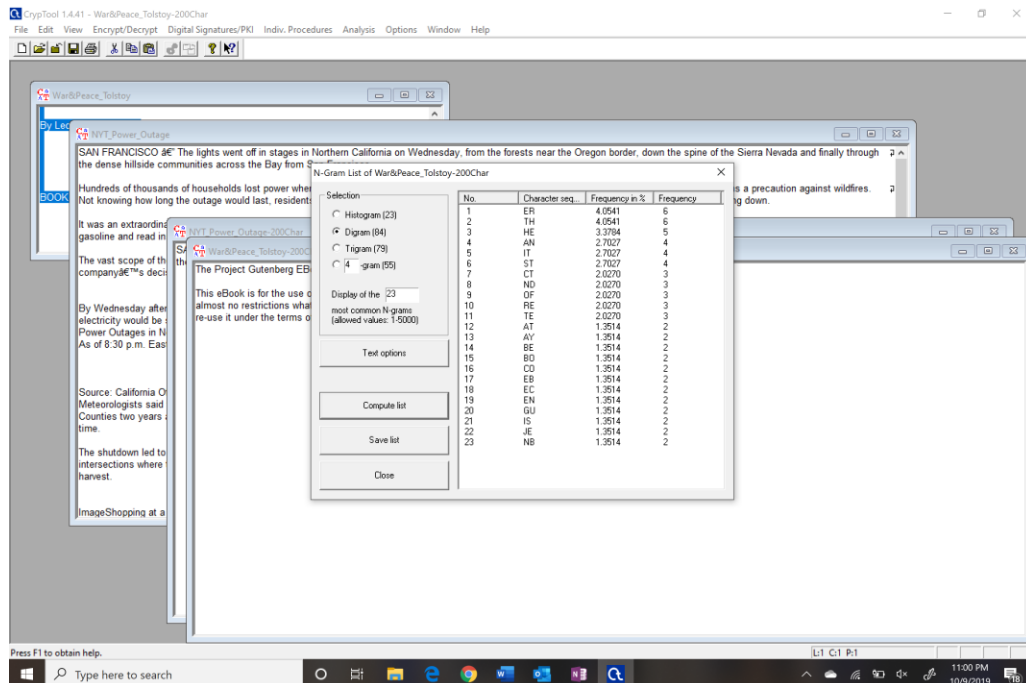
Task 2 (4 points)

- (2 points) What are the characteristic features of the obtained distribution compared with the original text? Provide a screenshot to support your answer.
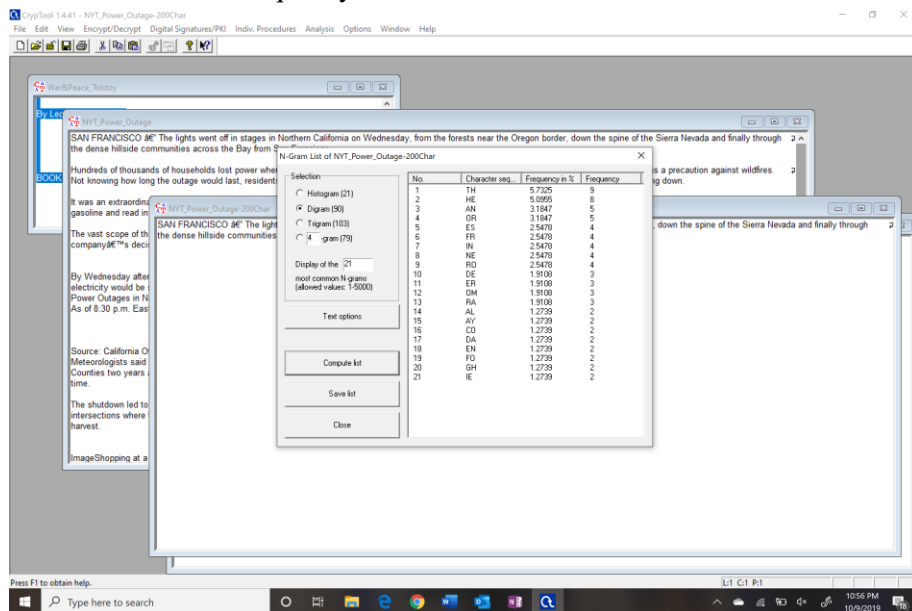 -
  - The characteristics distribution of the original text compared to the encrypted text is that the histogram has basically been shifted over 1 character. This can be seen in the spike in the F, which is usually the E.
- (2 points) How would you apply the features you have discovered in cracking the key?
  - To crack the key you would reverse the code by shifting the letters back one, in this instance an B would be an A.

Task 3 (4 points)

- (1.5 points for War&Peace_Tolstoy.txt) Summarize your observation of the frequency distribution. Also, provide a screenshot of the frequency distribution.
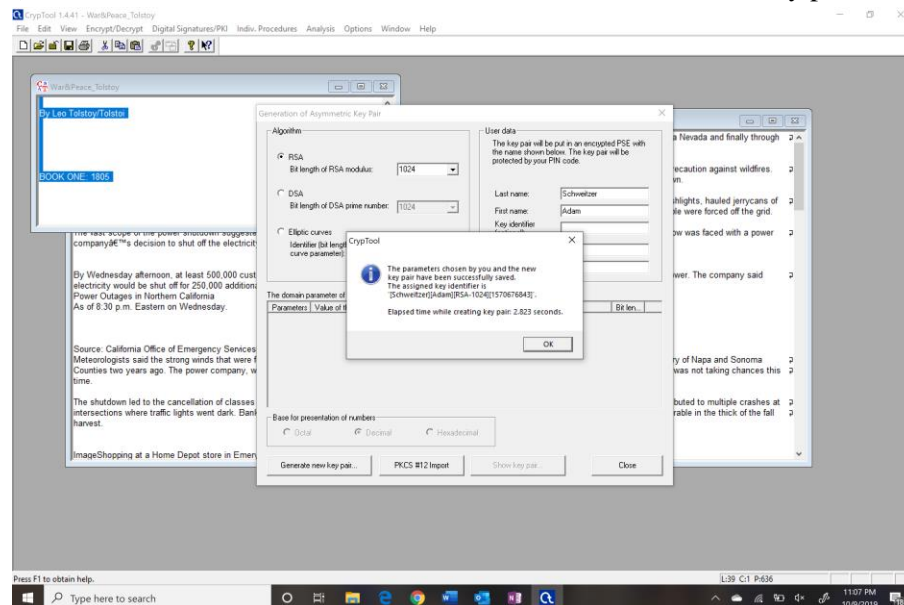
- - This frequency diagram showed the most frequent character sequences. In the abbreviated text with 200 characters, ER and TH were the most frequent with a frequency of 6 times each. HE, AN, and IT, were the next top character sequences.
- (1.5 points for a NYT article) Summarize your observation of the frequency distribution. Also, provide a screenshot of the frequency distribution.
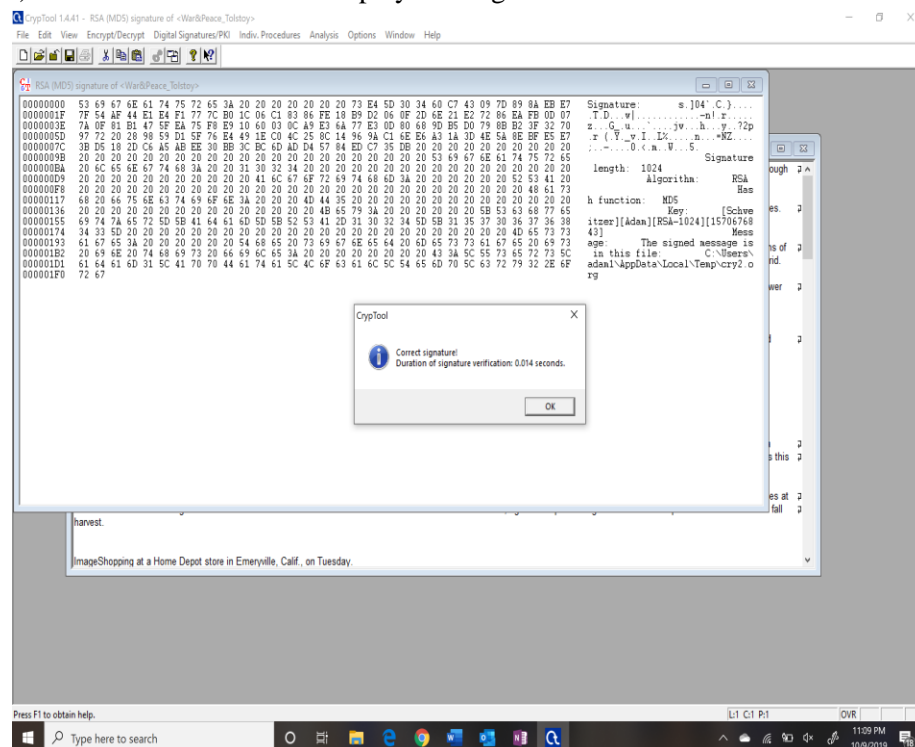

- - This frequency diagram showed the most frequent character sequences. In the abbreviated text with 200 characters, TH was the most frequent with a frequency of 9 times. This was followed by HE, AN, and OR.
- (1 point) Compare and contrast the two frequency distributions.
  - IN the above two distributions, TH, HE, and AN were both top 5 contenders in both text. This could be useful in determining text, in addition to other factors.

Task 4 (4 points)

- (2 points) Attach a screen shot that shows the successful creation of the key pair.
  -
- (2 points) Attach a screenshot that displays the signature verification.
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Task 5 (4 points)

- (1 points) List the cipher and the key for Ciphertext 1.
  - Vigenere and RRRRRR
- (1 points) List the cipher and the key for Ciphertext 2.
  -
- (2 points) List the cipher and the key for Ciphertext 3.
  - ADFGVX