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Introduction to Cryptography  
File Input/Output and File Encryption/Decryption

- (1) Write a function in Python that
  - (a) accepts a text file as an argument;
  - (b) opens and reads the text file;
  - (c) returns a list whose entries are the number of times each corresponding letter appears in the message (ordered according to the usual alphabet).
- (2) Use the function from the previous question along with your work from the “Frequency Analysis” assignment to generate a list whose entries are the frequency (as a decimal) each letter appears in the text file “WarAndPeace.txt”.
- (3) Write a function in Python that
  - (a) accepts a text file and a substitution key as arguments;
  - (b) opens and reads the text file;
  - (c) turns all letters to upper case, applies a substitution cipher to the text, and outputs the result to a file named “SuperSecret.txt”.
- (4) Use the function from the previous problem to encrypt the text file “WarAndPeace.txt” using a valid substitution cipher of your choice.
- (5) Suppose we wanted to encrypt the text file “WarAndPeace.txt” using a one-time pad. How long would the key need to be?
- (6) Write a function in Python that
  - (a) accepts a text file as an argument;
  - (b) opens and reads the text file;
  - (c) converts the text into five-letter numerical blocks;
  - (d) multiplies each five-letter block by 37 modulo 2798989898, and outputs the result to a file named “MysteryText.txt”.
- (7) Use the function from the previous problem to encrypt the text file “WarAndPeace.txt”.