Name:_____

Introduction to Cryptography
Frequency Analysis

(1) Write a function in Python that
   (a) takes in a message as a string (this can be pre-stored in Python, you do not need to prompt the user);
   (b) returns a list whose entries are the number of times each corresponding letter appears in the message (ordered according to the usual alphabet).
(2) Write a function in Python that uses the list from the previous problem to generate a new list whose entries are the **frequency** (as a decimal) each letter appears in the input message.
(3) Use your frequency analysis function to analyze the following text, which we saw on the first day of class. Does it allow you to guess any substitutions?

FZW GBYW FA VSDUAJWB DWUBWFD SD VWWTEO SMYBQSMWV SM ZGNQM MQFGBW; WJWM FZW EWQDF UGBSAGD NSMV SD BAGDWV RO FZW TBANSDW AX DZQBSMY IMAKEWVYW KSFZZWEV XBAN AFZWBD. DANW QBW XABFGMQFW WMAGYZ FA XSMV Q CAR KZSUZ UAMDSDFD SM FZW DAEGFSAM AX NODFWBSWD, KZWFZWB SF RW FZW TZODSUSDF KZA FBQUID VAKM Q ZSFZWBFA GMIMAKM MGUEWQB TQBFSUEW AB FZW TAESUWNQM KZA VWFWUFD Q UBSNSMQE. RGF NADF AX GD QBW VBSJWM FA DGRESNQFW FZSD GBYW RO FZW DAEJSMY AX QBFSXSUSQE TGPPEWD VWJSDWV XAB AGB WMFWBFQSMNWMF. VWFWUFSJW DFABSWD AB UBADDKABV TGPPEWD UQFWB XAB FZW NQCABSFO; FZW DAEGFSAM AX DWUBWF UAVWD NQO RW FZW ZARRO AX FZW XWK.

-CAZM UZQVKSUI

(4) What are the limitations of using frequency analysis when decrypting a ciphertext message obtained using a substitution cipher?