(3) For plaintext, the frequency of bytes was somewhat concentrated between 90 and 120, except for 32, which had by far the highest count. I think this is due to the ascii characters being around these values, the high count of 32 is probably due to the white space count because the txt file I used is a short story. For CBC Mode the frequencies were significantly more uniform throughout the byte values, they all had similar counts. For ECB mode, the counts were also relatively uniform but the differences between the counts was higher. I conclude that CBC mode had closer counts because every block relies on the previous block’s cipher.

(4) After changing the word THIS to QHIS, I noticed a change in some counts of the ECB mode but a lot of change in the CBC mode. This is because CBC mode relies on the previous block’s cipher, and therefore, a change in the beginning of the text file results in a change in the rest of the counts, as it affects the entire cipher afterwards.

(5)

ECB Mode:

Number of same bytes: 20736 Number of different bytes: 32

CBC Mode:

Number of same bytes: 116 Number of different bytes: 41272

As expected, the number of same bytes in ECB mode are almost the same, however, CBC mode had significantly more different bytes. In ECB mode, blocks are ciphered block by block, and therefore when we change a character, it will not affect the rest of the text’s cipher much. In CBC mode, each block is XOR’d against the last enciphered block.