Question 1: Write a short summary of the performance you observed using the two search algorithms.

Using both version search “sensation” in lenna.txt

Case1: search ---- 616d

Case2:search ---- 6f2e 6772 3977 7d79 0000 1800 4574 74

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Brute force search:

Case1:Time spent: 0.005465763 seconds

Case2:Time:0.006099676 seconds

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KMP search:

Case1: Time spent: 0.00746547 seconds

Case2: Time:0.010305107 seconds

* Question 2: Report the binary tree of codes your algorithm generates, and the final size of War and Peace after Huffman coding.

BinaryTree.txt

war\_and\_peace.txt

input length: 3258246 bytes

output length: 1848598 bytes

Question 3: Consider the Huffman coding of war\_and\_peace.txt, taisho.txt, and pi.txt. Which of these achieves the best encoding, i.e. the best reduction in size? What makes some of the encodings better than others?

war\_and\_peace.txt

input length: 3258246 bytes

output length: 1848598 bytes

taisho.txt

input length: 3649944 bytes

output length: 1542656 bytes

pi.txt

input length: 1010003 bytes

output length: 443632 bytes

So pi.txt achieve best encoding.

Because, N different messages, log2N bits per message

Pi.txt has the least kinds of messages in the three txt files.

So it the smallest bits per message after encoding

* Question 4: The Lempel-Ziv algorithm has a parameter: the size of the sliding window. On a text of your choice, how does changing the window size affect the quality of the compression?

Compress pi.txt by using Lempel-Ziv

100- size of sliding window

* input length: 1010003 characters
* output length: 2618745 characters

1000 –size of sliding window

* input length: 1010003 characters
* output length: 2232349 characters
* original and decoded texts match!

6000 –size of sliding window

* input length: 1010003 characters
* output length: 2022019 characters
* original and decoded texts match!

Size of windows bigger, then quality of the compression better.

Question 5: What happens if you Huffman encode War and Peace before applying Lempel- Ziv compression to it? Do you get a smaller file size (in characters) overall?

After using Lempel-ziv compress, then using Huffman encode.

input length: 3258227 characters

output length: 6271053 characters

output length: 3153040 bytes

if you Huffman encode War and Peace before applying Lempel- Ziv compression

input length: 3258246 bytes

output length: 1848598 bytes

So direct using Huffman encoding without Lempel-ziv compression works better for war and peace. Txt

Yes, I get a smaller size file