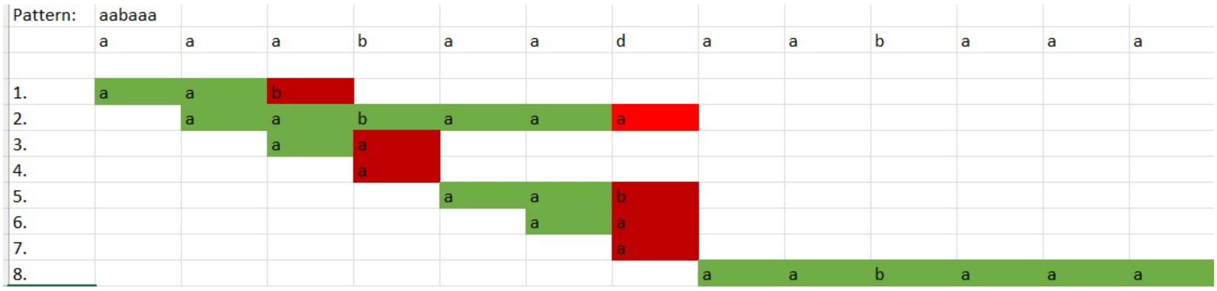
Problem 1:

Brute force

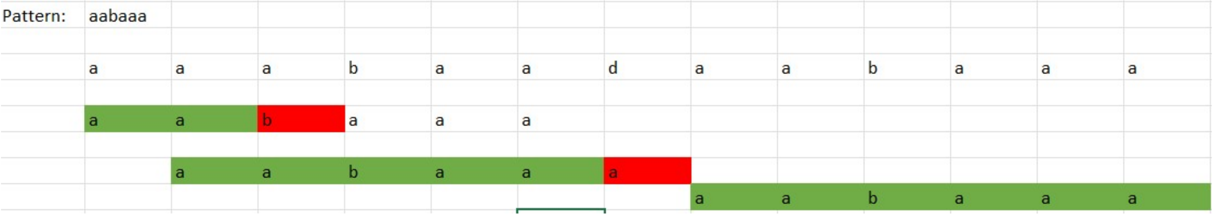


Pattern:	aabaaa												
	a	a	a	b	a	a	d	a	a	b	a	a	a
1.	a	a	b										
2.		a	a	b	a	a	a						
3.			a	a									
4.				a									
5.					a	a	b						
6.						a	a						
7.							a						
8.								a	a	b	a	a	a

Problem 2:

Boyer-Moore matching algorithm

a)



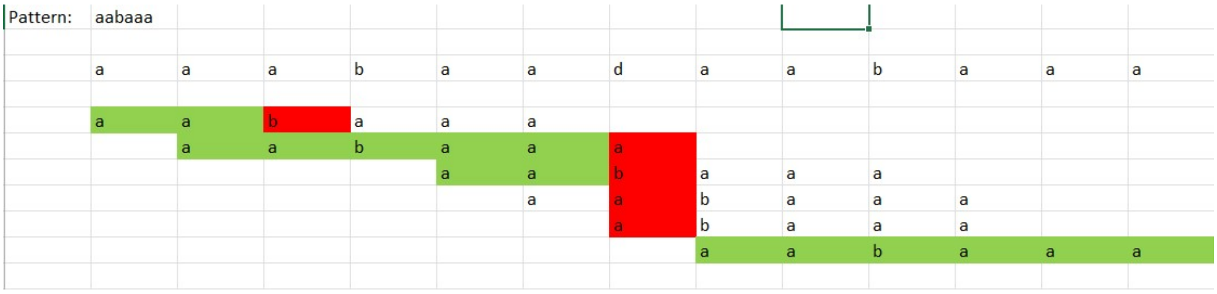
Pattern:	aabaaa												
	a	a	a	b	a	a	d	a	a	b	a	a	a
	a	a	b	a	a	a							
		a	a	b	a	a	a						
								a	a	b	a	a	a

b)

See BoyM.py

Problem 3:

KMP



Pattern:	aabaaa												
	a	a	a	b	a	a	d	a	a	b	a	a	a
	a	a	b	a	a	a							
		a	a	b	a	a	a						
					a	a	b	a	a	a			
						a	a	b	a	a	a		
							a	b	a	a	a		
								a	a	b	a	a	a

Problem 4:

How many non-empty prefixes of string P (aaabbaaa) are also suffixes of P?

Prefix starts from left, suffix starts from right.

1. Prefix: a Suffix: a **Match**

2. Prefix: aa Suffix: aa **Match**

3. Prefix: aaa Suffix: aaa **Match**

4. Prefix: aaab Suffix: baaa

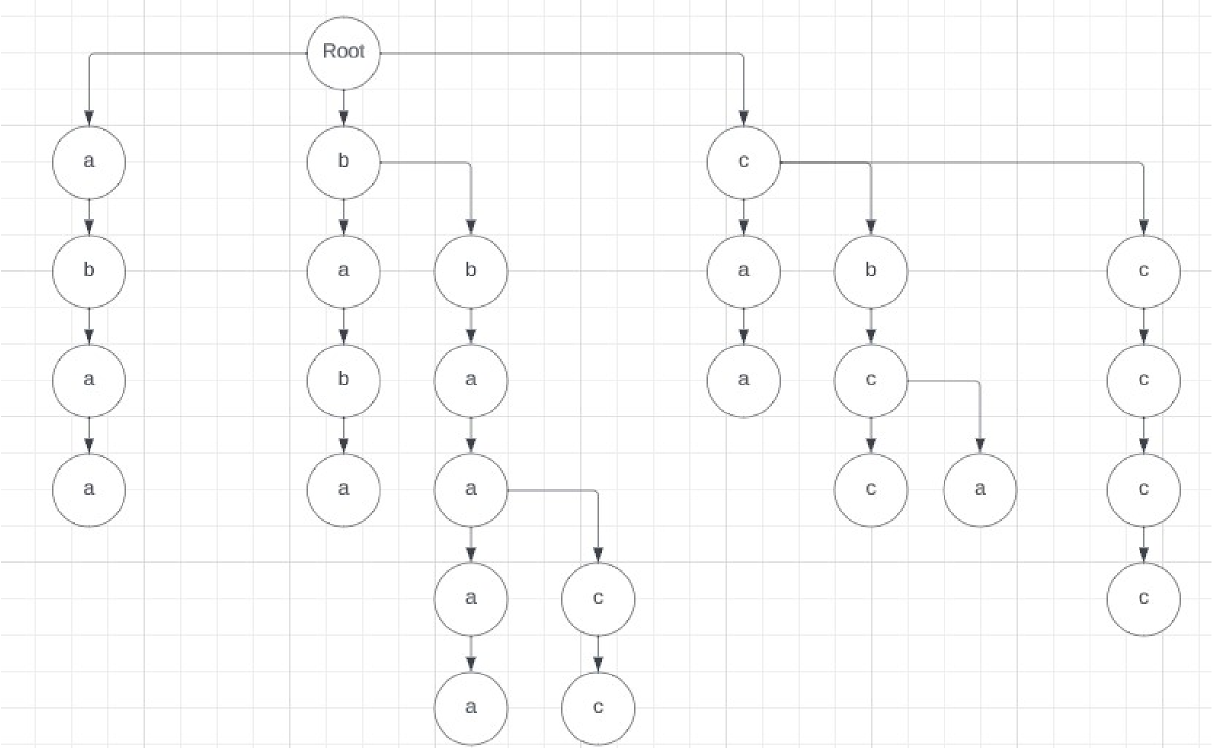
5. Prefix: aaabb Suffix: bbaaa

6. Prefix: aaabba Suffix: abbaaa

7. Prefix: aaabbaa Suffix: aabbaaa

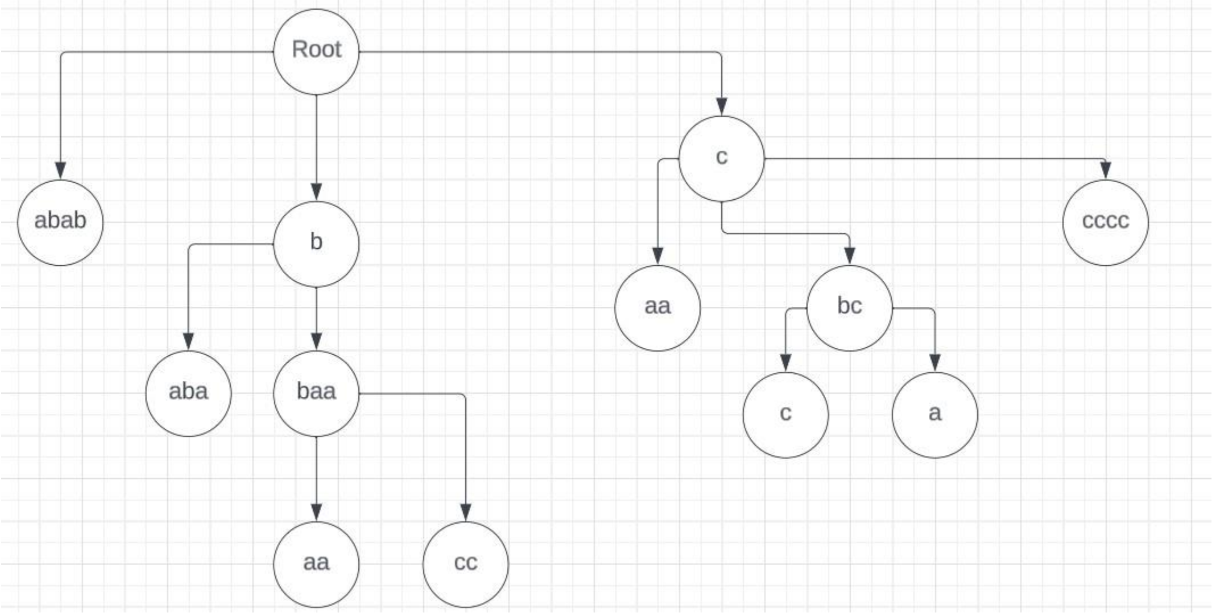
Problem 5:

Standard trie



Problem 6:

Compressed trie



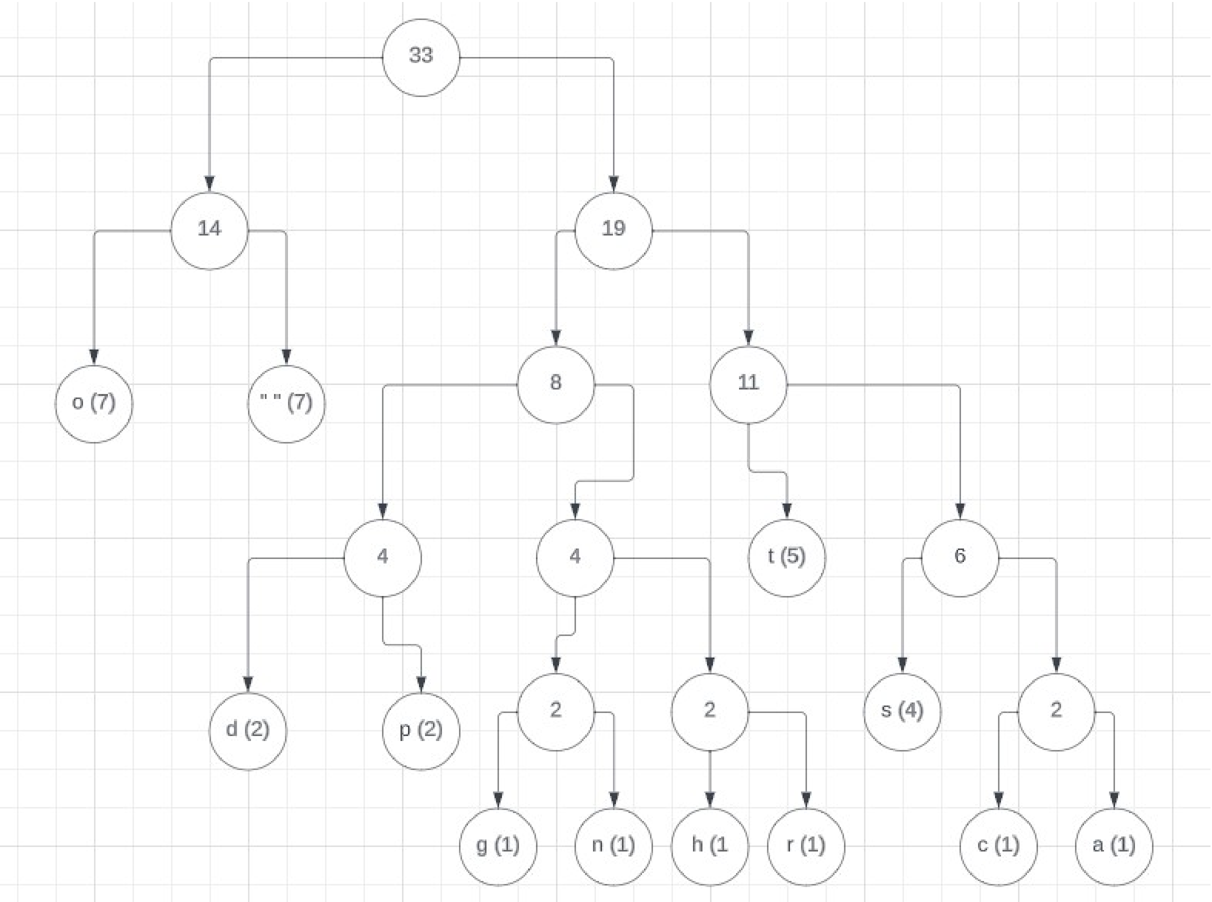
Problem 7:

Draw the frequency table and Huffman tree for the following string:

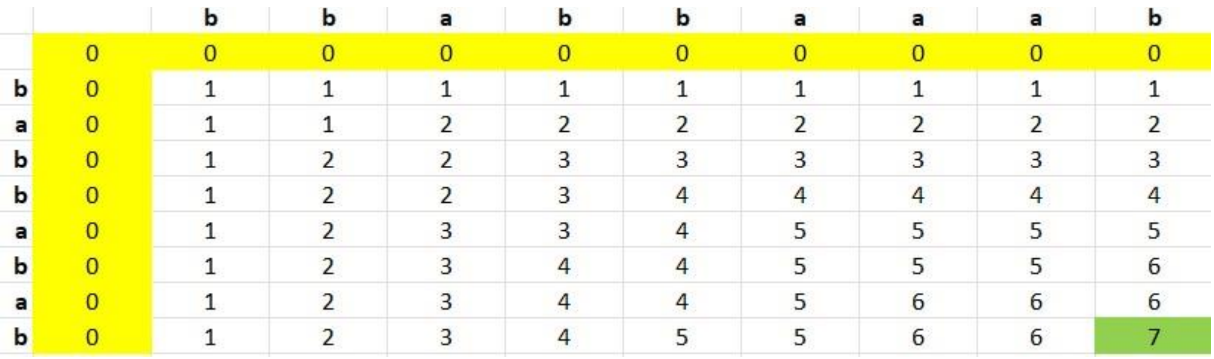
“dogs do not spot hot pots or cats”

d: 2, o: 7, g: 1, s: 4, “ ”: 7, n: 1, t: 4, p: 2, h: 1, r: 1, c: 1, a: 1

Huffman tree:



Problem 8:

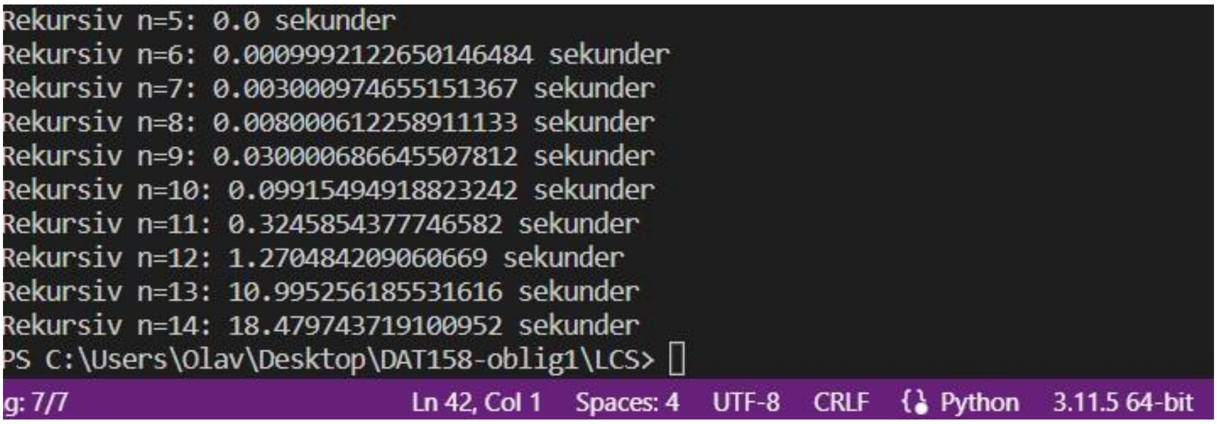


		b	b	a	b	b	a	a	a	b
	0	0	0	0	0	0	0	0	0	0
b	0	1	1	1	1	1	1	1	1	1
a	0	1	1	2	2	2	2	2	2	2
b	0	1	2	2	3	3	3	3	3	3
b	0	1	2	2	3	4	4	4	4	4
a	0	1	2	3	3	4	5	5	5	5
b	0	1	2	3	4	4	5	5	5	6
a	0	1	2	3	4	4	5	6	6	6
b	0	1	2	3	4	5	5	6	6	7

Problem 9:

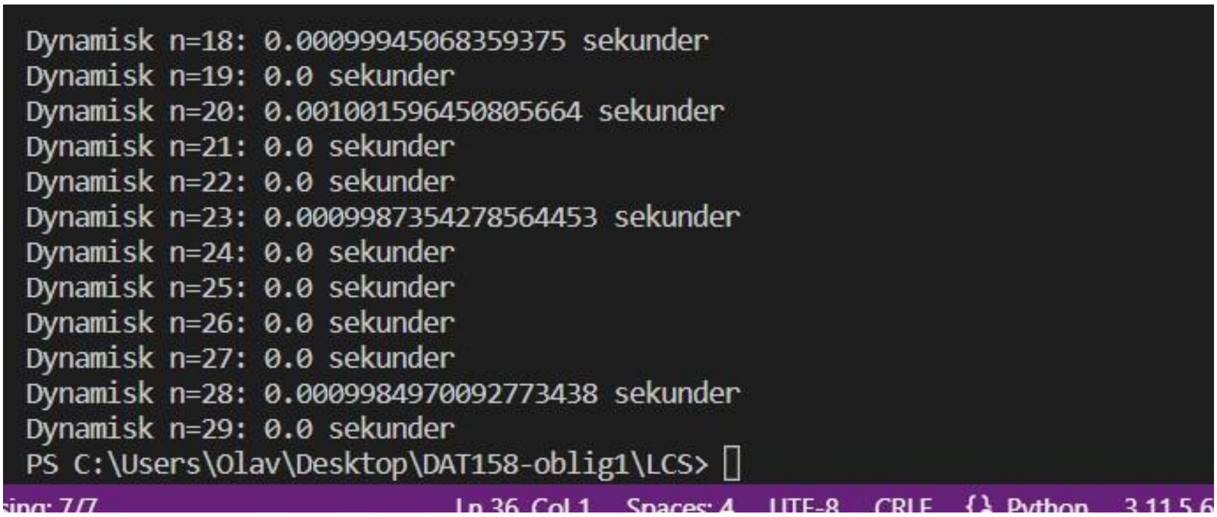
A/B) See LCS_dp.py

C) The code takes exponentially longer to finish starting at n=9 String length:



```
Rekursiv n=5: 0.0 sekunder
Rekursiv n=6: 0.0009992122650146484 sekunder
Rekursiv n=7: 0.003000974655151367 sekunder
Rekursiv n=8: 0.008000612258911133 sekunder
Rekursiv n=9: 0.030000686645507812 sekunder
Rekursiv n=10: 0.09915494918823242 sekunder
Rekursiv n=11: 0.3245854377746582 sekunder
Rekursiv n=12: 1.270484209060669 sekunder
Rekursiv n=13: 10.995256185531616 sekunder
Rekursiv n=14: 18.479743719100952 sekunder
PS C:\Users\Olav\Desktop\DAT158-oblig1\LCS>
```

While the dynamic version will have insignificant processing time on the same task even as n increases.



```
Dynamisk n=18: 0.000999450683359375 sekunder
Dynamisk n=19: 0.0 sekunder
Dynamisk n=20: 0.001001596450805664 sekunder
Dynamisk n=21: 0.0 sekunder
Dynamisk n=22: 0.0 sekunder
Dynamisk n=23: 0.0009987354278564453 sekunder
Dynamisk n=24: 0.0 sekunder
Dynamisk n=25: 0.0 sekunder
Dynamisk n=26: 0.0 sekunder
Dynamisk n=27: 0.0 sekunder
Dynamisk n=28: 0.0009984970092773438 sekunder
Dynamisk n=29: 0.0 sekunder
PS C:\Users\Olav\Desktop\DAT158-oblig1\LCS>
```