

COS226 Week 11 Activity

1. Understanding immutability and concatenation in the `String` type. Consider the following Java code fragment for forming the circular suffixes of a `String s` of length `N`. How much space proportional to `N` is used? Is the running time linear, quadratic, something else?

```
String[] circularSuffixes = new String[N];
for (int i = 0; i < N; i++)
    circularSuffixes[i] = s.substring(i, N) + s.substring(0, i);
```

Algorithms 4th edition, Section 5.4

2. Using the textbook construction, create the NFA for the regular expression:

$((B | M) (A (N A)^*)^*)$

3. Write the states that are reachable in the above NFA before and after matching each character of the word BANANA.

Algorithms 4th edition, Section 5.5

4. Give the LZW encoding for the following string using the `compress()` method of Algorithm 5.11.

b a n d a n a b a n a n a

see	write	put
---	-----	---
b	62	ba, 81
a	61	
n	6e	
d	64	

end 80 (EOF) -

5. Using the same input as in the previous question, build the Huffman trie, list the codewords and frequencies for each of the 4 letters, and state the length in bits of the encoded message.