COS226 Week 11 Activity

Algorithms 4th edition, Section 5.2 and 5.3

1. Quadratic time, quadratic space.

2. 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              an, 82
    n          6e              nd, 83
    d          64              da, 84
    a          82 [an]         ana, 85
    n
    a          61              ab, 86
    b          81 [ba]         ban, 87
    a
    n          6e              na, 88
    a          85 [ana]
    n
    a
   end         80 (EOF)
   ```

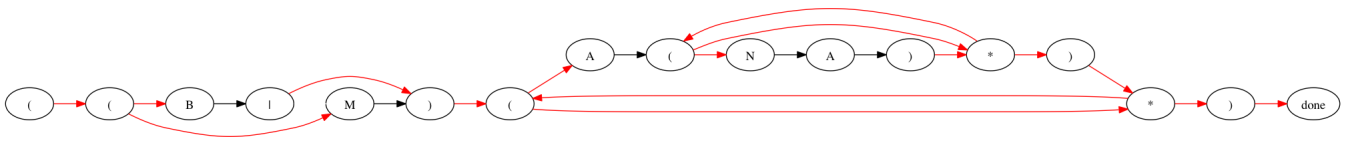
3. Using the same input as in the previous question, build the Huffman trie, list the codewords and frequencies for each of the 4 letters, and state the length in bits of the encoded message.

   One possible code:

code	letter	frequency
000	b	2
001	d	1
01	n	4
1	a	6

   Message: 000101001101100010110 11, number of bits: 23

4. NFA built for ((B—M)(A(NA)*)*))



5. NFA Simulation for Banana

   - Starting states: {0, 1, 2, 4}
   - B: {3, 5, 6, 7, 14, 15, 16}
   - A: {6, 7, 8, 9, 12, 13, 14, 15, 16}

- N: {10}
- A: {6, 7, 8, 11, 12, 13, 14, 15, 16}
- N: {10}
- A: {6, 7, 8, 11, 12, 13, 14, 15, 16}