Tutorial 8 Exercises

COMP526: Efficient Algorithms

25–26 November, 2024

Exercise 1. What is the result of applying the Lempel-Ziv-Welch (LZW) compression scheme to the text S = `ABABABACABABA` with alphabet $\Sigma = \{\texttt{A}, \texttt{B}, \texttt{C}\}$ using codewords 4 bits? Write both the encoded text and the dictionary when the procedure terminates.

Exercise 2. Use the LZW decoding algorithm to decode the encoded text
`000101000100001000110000 1001`
(or as a decimal list $1,4,4,2,3,0,9$) where the alphabet is $\Sigma = \{\texttt{!}, \texttt{A}, \texttt{G}, \texttt{H}\}$ and the codeword length is 4 bits. Also record the dictionary after decoding the text.

Exercise 3. Use the inverse move-to-front transform to decode the encoded text $1,2,3,1,4,4,2,2,2$ using the alphabet $\Sigma = \{\texttt{A}, \texttt{C}, \texttt{H}, \texttt{I}, \texttt{U}\}$. Write the state of the alphabet after each decoded letter

Exercise 4. Use the inverse Burrows-Wheeler transform to decode the text
`dnenb$aaraab`