Tutorial 9 for
COMP 526 – Efficient Algorithmics, Fall 2022

Problem 1 (Move-to-front transform)

Let $T = T[0..9) = $ ABBACBAAA be an input text over alphabet $\Sigma = \{\texttt{A}, \texttt{B}, \texttt{C}\}$. Apply the move-to-front transform to this input with initial queue content $Q = [\texttt{A}, \texttt{B}, \texttt{C}]$ and trace the content of Q throughout the execution.

Problem 2 (Lempel-Ziv-Welch compression)

Given word $w = $ ASNXASNASNA over the ASCII character set (relevant parts of ASCII are provided on the right).
Construct, step by step, the Lempel-Ziv-Welch (LZW) factorization of w (i.e., the phrases encoded by one codeword) and provide the compressed representation of w; it suffices to show the encoded text C using integer numbers (no need for binary encodings).

Code	Character
65	A
...	...
78	N
...	...
83	S
...	...
88	X
...	...

Problem 3 (Hamming code)

We consider the $(7, 4)$ Hamming code from class.

1. Given the message 0101, determine the parity bits and the final transmitted block.

2. Is 1111111 a valid block, i.e., have (detectable) errors occurred?