Topic 08: Data compression 2

You are asked to study the **Lempel–Ziv–Welch (LZW) algorithm** for data compression.

How to prepare your source code

- Implement the LZW algorithm for compression and decompression.
- For the compression phase, the program receives a text file and produces a binary file containing the compressed content. For the decompression phase, the program reversely converts the compressed content in the binary file to the original text content.
- *There is no restriction on how to organize the code. In the main function, provide several simple examples to demonstrate how to use your code.*

How to prepare your report

- Introduce its background: history and applications
- Trace the algorithm, step by step, for both compression and decompression phases, using simple examples.
- Analyze the algorithm's time complexity in the best case and worst case.
- Present a comprehensive overview of LZW-related algorithms, such as LZ77 and LZ78. For each algorithm, just give the overall idea while ignoring the details.

Reference to start your research

- Lempel–Ziv–Welch (LZW) https://en.wikipedia.org/wiki/Lempel%E2%80%93Ziv%E2%80%93Welch