Synopsis

1. Project Title:

Efficient LZW Compression/Decompression Using Trie Dictionary

2. Problem Statement:

Uncompressed data wastes storage/bandwidth. Existing tools lack transparent, educational implementations of dictionary-based compression.

3. Objective:

Building a high-performance LZW compressor in C++ using a trie for fast string searches, achieving lossless compression with competitive ratios.

4. Proposed Solution:

- Trie Dictionary: O(k) string lookups
- LZW: Replace repeats with codes
- Binary I/O: Fixed-width (12/16-bit) encoding

5. Expected Outcome:

- Working compressor/decompressor (~50% size reduction for text)
- 3x faster than brute-force dictionary searches
- Modular C++ code for education/extensions

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Team Leader's Signature Supervisor's Signature