

asgn6 Writeup

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Lessons Learned

After doing assignment 6 which implements the LZ79 compression algorithm, I would say that this assignment taught me the most about bit-wise operations and working with bit sizes. In `trie.c`, I learned about interacting with variables in a structure. For example, having to set the every children in Trie roots to null.

In `word.c`, I learned how to allocate memory for structs and how to loop previously made functions like `word delete` in others.

`io.c` taught me the most about bit-wise operations like setting pair buffer bits in the `write pair` function and counting the number of bits in order to know when to write or flush them.

Other miscellaneous files like `endian.h` and `code.h` taught me how to swap endianness and how to use a `code.h` which is a header file full of defines in my code.

As for `encode` and `decode.c`, I learned how to implement the LZ79 compression algorithm for both compressing and decompressing files. Specifically, I improved on my coding logic from following the file specifics, learned how to set headers to the correct magic number and masking bits, and how to use `open()` and `close()` file functions.

Overall, I learned a ton from assignment 6. Even though I felt like this was the hardest assignment so far, it taught me a lot about files, bits, and how the LZ79 algorithm operates.

The lessons I learned from assignment 6 can be really helpful in the future when I work on projects similar to assignment 6.

LZ78 Compression Functionality

After finishing assignment 6, I can explain the LZ78 compression algorithm which is essentially a lossless compression algorithm that can compress most files. The algorithm works by taking in a file and reading it. It uses a dictionary to reference phrases using a pair of code and symbol. The bytes are decompressed and outputted into a file.

The efficiency of the LZ78 compression changes with entropy when files with higher entropy increase the difficulty of compressing it while lower entropy files decrease the difficulty of compression. This difficulty is represented by the compression ratio printed by verbose which compares the original file size versus the compressed file.