

Programming Project: LZW Compression

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Programming Project: LZW Compression

Project Implementation details -

Programming language: Java 13.0.2

Operating System: Windows

Source files of Project: Encoder.java, Decoder.java

Input file of Project: input.txt

Output files of Project: input.lzw, input_decoded.txt

Project Source file details -

Encoding : In Encoder.java program, we compress the input file content by using LZW compression algorithm. The LZW algorithm stores characters as keys and its corresponding ASCII values in a dictionary. The data is compressed in a 16 bit format and encoded in UTF-16BE (16-bit Unicode Transformation Format) in lzw file.

Decoding: In Decoder.java program, the encoded lzw file is passed as input, which is decoded and saved in input_decoded.txt. The dictionary is used to perform decoding of data similar to that of Encoding. So, In the end the file contents of both input.txt and input_decoded.txt are the same.

Compiling/Execution of Programs -

1. Open Command Prompt and navigate to the directory containing Encoder.java and Decoder.java programs.

2. To compile the Encoder.java program, use the command
`javac Encoder.java`

3. Now run the Encoder.java program with arguments using the command
`java Encoder input.txt 12`

Here input.txt is the input file which contains the content to be encoded. The bitlength used here is 12. Output file (output.lzw) with encoded content is generated and available in the same directory.

4. Similarly compile the Decoder.java program using the command
`javac Decoder.java`

5. Now run the Decoder.java program with arguments using the command
`java Decoder input.lzw 1`

Here input.lzw is the input file which contains the content to be decoded. The bitlength is same as 12. Output file (output_decoded.txt) with decoded content is generated and available in the same directory.

6. The files input.txt and input_decoded.txt will have the same content after executing Decoder program on input.lzw file..

Goal/Working of LZW Algorithm:

The Lempel–Ziv–Welch (LZW) algorithm is used for compression/decompression of data. Here the data is encoded in 16 bit format (UTF-16BE) and the decoder decompress the encoded data into original data. This Algorithm is used in compress Unix file compression utility and reduces the large filesizes into smaller filesizes.