Run-Length Encoding:

Run-Length Encoding (RLE) is a simple form of lossless data compression that operates on sequences with multiple consecutive occurrences of the same value. It encodes the sequence to store only a single value and its count.

This type of compression is best for simple images and animations with lots of redundant pixels. It works especially well with black and white images. For complex images and animations, RLE can make the file size larger instead of smaller if there are not many redundant parts. Therefore, it is important to understand the content and whether the algorithm helps or hinders.

Working:

RLE is probably the simplest compression algorithm. It replaces sequences of identical data values ​​in a file with counts and single values. Suppose the following data strings (17 bytes) must be compressed:

ABBBBBBBBBCDEEEEF

Using RLE compression, the compressed file occupies 10 bytes as follows:

A \*8B C D \*4E F

As you can see, the repeated data string is replaced with a control character (\*) followed by the number of repeated characters and the repeated character itself. Control characters are not fixed and may vary from implementation to implementation.

If the control character itself appears in the file, an extra character is encoded.

As you can see, RLE encoding only works if there are sequences of 4 or more repeating characters, since three characters are used for RLE, encoding two repeating characters can even result in increased file size.

Lempel-Ziv-**Welch**:

LZW is a commonly used compression technique, which for GIF and TIFF and PDF. LZW is important techniques for data compression flexibility and simplicity. It helps to increase twice the capacity of the hard drive. The algorithm is easy to implement and has the potential for very high throughput in hardware implementations. It is the algorithm of the widely used UNIX file compression utility compress for the GIF image format.

Idea relies on recurring patterns to save data space. LZW is the most important general-purpose data compression technique because of its simplicity and versatility.

Working:

LZW compression works by reading a sequence of symbols, grouping the symbols into a string, and converting the string to code. Because the codes take up less space than the strings they replace, we get compression. Features of LZW include:

* LZW compression uses a code table, 4096 as a common choice for the number of table entries. Codes 0-255 in the code table are always assigned to represent a single byte from the input file.
* When encoding begins, the code table contains only the first 256 entries, and the rest of the table is blank. Compression is achieved by using codes 256 to 4095 to represent sequences of bytes.
* As encoding continues, LZW identifies repeating sequences in the data and adds them to the code table.
* Decoding is accomplished by taking each code from the compressed file and translating it through a code table to find the character or characters it represents.

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