

Huffman Decoding and Encoding

Huffman coding is a lossless data compression technique that assigns shorter binary codes to characters that appear more frequently in the input data, and longer codes to those that appear less often. This method reduces the overall size of the data without losing any information and is commonly used in file compression formats like ZIP and JPEG.

In the encoding process, the program first calculates the frequency of each character in the input, then constructs a binary Huffman tree based on these frequencies. By traversing this tree, unique binary codes are assigned to each character, and the input text is converted into a compressed binary stream using these codes.

While in the decoding process, the same Huffman tree is used to interpret the binary stream and recover the original text. In c language, this task is implemented using structures for tree nodes, dynamic memory for the tree, and bitwise operations to manage the encoded data efficiently.