

PROJECT SPECIFICATIONS:

In this project you are going to implement a compression program and an uncompression program to build a useful compression utility. These are separate programs, but they share many functions, which should be built as shared library. The program that reads a regular file and produces a compressed file is called the *compression* or *huffing* program. The program that does the reverse, producing a regular file from a compressed file is called the *uncompression* or *unhuffing* program.

Here are some information for completing this project:

A. The huffing program should be able to perform the following operations:

1. Read the characters in a text file and count the frequency of each character and store the character and its frequency in a data structure.
2. Use Huffman coding algorithm to create a binary tree for Huffman coding. Your binary tree for Huffman coding should provide the following functionalities:
 - a. Traverse the tree and record every root-to-leaf path. The edges taken for each root-to-leaf path determine the coding of the character stored in the leaf node.
 - b. Perform a pre-order traversal to write the tree, and read it back. This is needed if the tree is stored in the header of a compressed file.
 - c. Perform a post-order traversal to delete all tree nodes when the tree is no longer needed.
3. Read the text file and produce a compressed file of the original text file. You also need to include the coding tree information at the beginning of the output file.

B. The unhuffing program should be able to perform the following operations:

1. Read the compressed text and the binary Huffman coding in the binary tree from the compressed file.
2. Reconstruct the binary Huffman coding tree from the information read from the file.
3. Use Huffman coding binary tree to create the original text file from the compressed original file.

OTHER REQUIREMENTS

- Make sure to start work on your project early and make steady progress.
- Make sure to test your program thoroughly before you hand in your program.
- Make sure that you give proper names to your variables.

WHAT TO TURN IN

Upload your source code, testing plan and all the output generated from your testing to myClass.