Data Structures And Algorithms

BSAI – III – A

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Huffman Encoding

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1. Executive Summary

Huffman coding algorithm uses a text file for input, checks the frequency of the individual letters, then encodes the letters into a binary code which can be transmitted and decoded to get the original data back.

2. Project Background:

The main purpose of this project is to take some text as input and convert the textual data into some code which has a significantly reduced size compared to the original text.
Since data can be very large we need some kind of data compression algorithm to reduce its size. Huffman coding helps us achieve this.

3. Execution Process

1)First, take input from txt file.

2)Secondly, extract the frequencies of the 26 letters.

3)Then, use the frequencies to construct a minheap.

4)Extract the two smallest nodes from minheap.

5)Then, create a new node with those two nodes as left and right.

6)Add the new node back into the heap.

7)Repeat steps 4) to 6) until only one node remains in the heap.

8)Iterate through the tree, left edges are assigned 0 and right edges are assigned 1.

9)At leaf node, we print the code.

10) The code is decoded according the the tree traversal in the same way.

4. Class Diagram

5. Self-Learning

Some new concepts that we learned and old concepts which we could revise during this project:

1) Minheap
2) Encoding and Decoding
3) Visual Studio form builder
4) File handling in C++
5) Use of some optional Parameters

Sometimes optional parameters are given in the function for specific situations. They enhance the reusability and the flexibility of code.

6. Future Plans

In this project we learned about textual data compression. Inshallah in the future we will expand on the knowledge that we have gained and also learn about image and video compression.