Assignment 15

Generate a Huffman Code for the letters in some alphabet, one must start with a set of letters from the alphabet along with their frequencies.

Method:
First, build a list which holds references to (binary) nodes containing the letters in the alphabet, their frequencies of occurrences, and left and right subtree references (initially null). This could be viewed as a forest of single node trees. There will be exactly one node in the list for each letter.

Second, systematically transform the list into a list with only one element in it where the element points to the root of the Huffman Code Tree for that alphabet (a single binary tree). This transformation takes place as follows: repeatedly take two elements in the list which have the lowest frequencies and make them the left and right subtrees of the new element in the list (lowest frequency goes in the left - for ease of grading). The frequency of the new element is the sum of the frequencies of the two that it embodies. This new element will replace the two elements just used in the list.

If you use a priority queue for your list of nodes, they will always be kept in order for you.

a. Print out the frequency table and the Huffman Code for each letter of the Gettysburg address.
b. Encode the Gettysburg address.
c. Print the encoded Gettysburg address.
d. Decode your compressed file and print out the Gettysburg address.
e. Print out the compression ratio that was achieved.

Assignment 15

Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field, as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But, in a larger sense, we cannot dedicate -- we cannot consecrate -- we cannot hallow -- this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note, nor long remember what we say here, but it can never forget what they did here. It is for us the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us -- that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion -- that we here highly resolve that these dead shall not have died in vain -- that this nation, under God, shall have a new birth of freedom -- and that government of the people, by the people, for the people, shall not perish from the earth.

Due May 13th