Huffman Coding Tree

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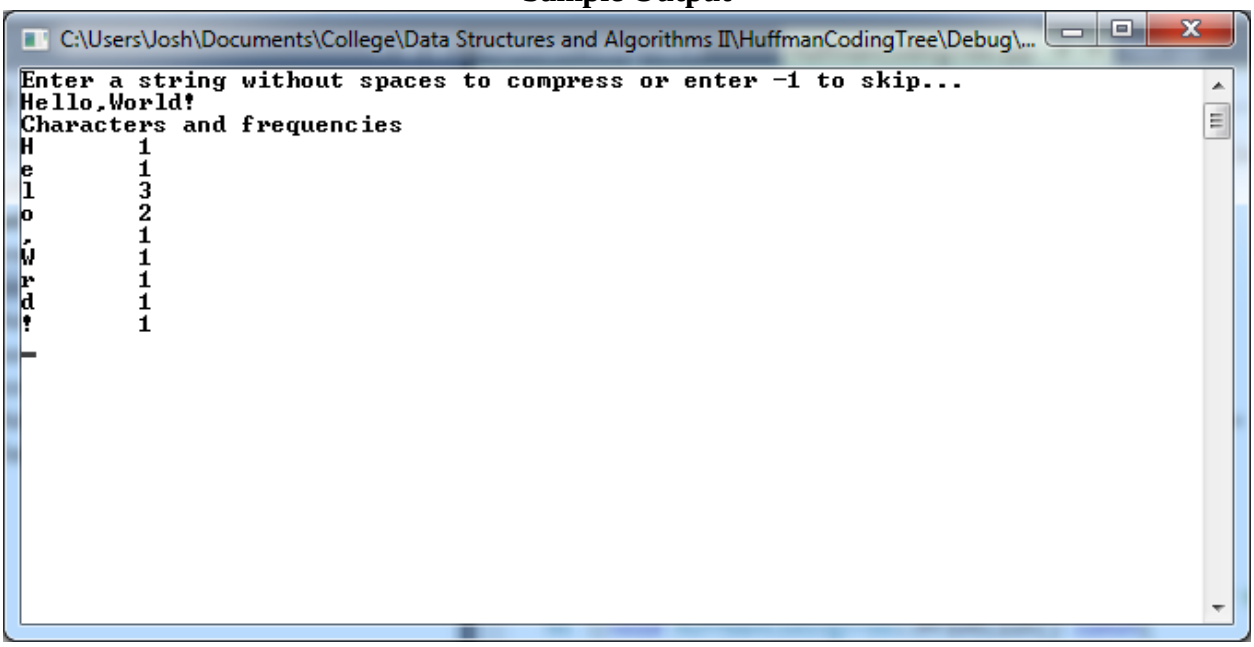
CS218

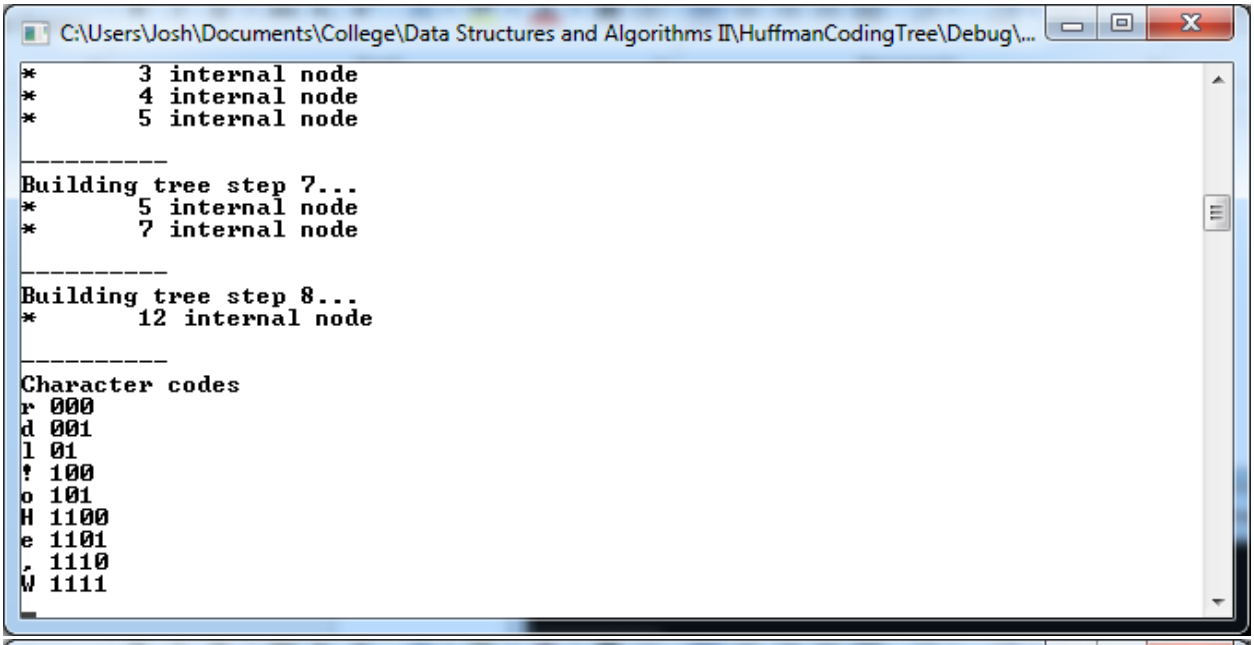
Project Description

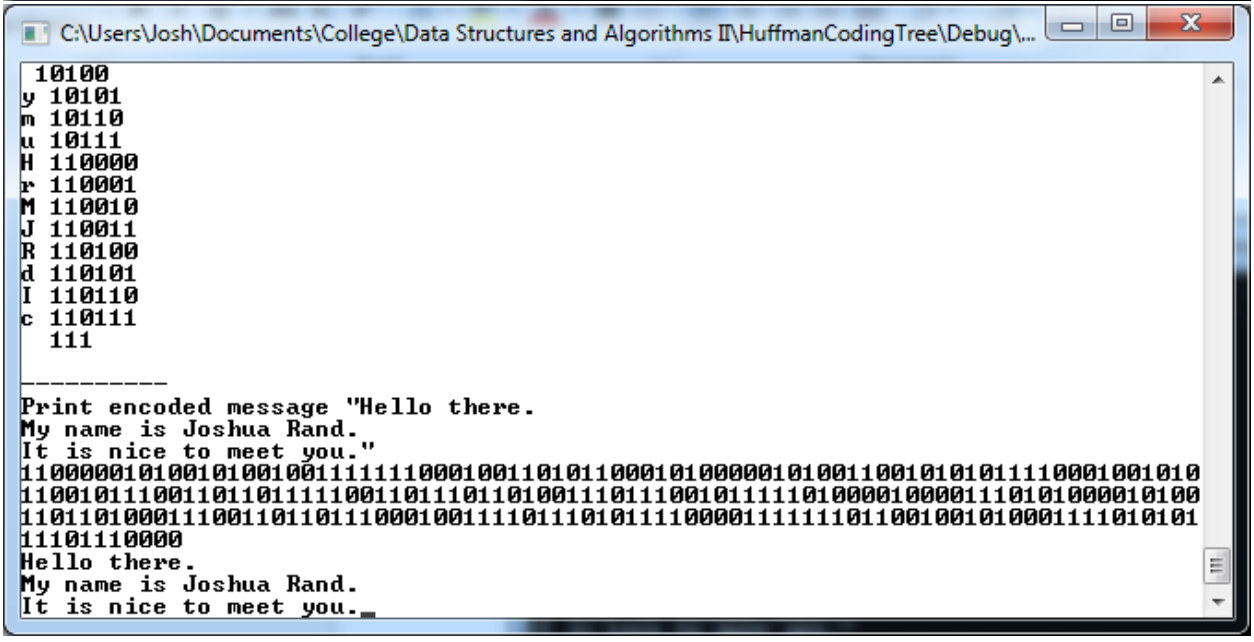
This project demonstrates a Huffman Coding Tree compression algorithm. The program allows the user to enter a string (without spaces) and the program determines the different characters and how frequently each character occurs in the string. The program then finds the two least occurring characters and inserts them into a tree. This algorithm repeats until there is only one top-level character left in the list. Using the tree, the program then assigns a unique binary code to each character and prints the string in the new encoded form. The program repeats the process for a .txt file and then decodes it back to the original file.

Test Plan		
Reason for Testing	Input	Expected Output
Scan string and determine characters and frequency	Hello,World! (Press enter)	h 1 e 1 l 3 o 2 , 1 w 1 r 1 d 1 ! 1
Assign binary codes to characters	Hello,World! (Repeatedly press enter until you see “Character codes”)	r 000 d 001 l 01 ! 100 o 101 h 1100 e 1101 , 1110 w 1111
Be able to print the encoded message	(Repeat above step, press enter once more)	Print encoded message “Hello,World!” 110011010101101111011111 0100001001100
Encode file	-1 *From Text.txt…* Hello there. My name is Joshua Rand. It is nice to meet you.	*CodedMessage.txt* 110000010100101001001111 1100010011010110001010000 0101001100101010111100010 0101011001011100110110111 1100110111011010011101110 0101111101000010000111010 1000010100110110100011100 1101101110001001111011101 0111100001111111011001001 0100011110101011110111000 0
Decode file	*CodedMessage.txt* 110000010100101001001111111100 010011010110001010000010100 110010101011110001001010110 010111001101101111100110111010 101001110111001011111010000100 000011101010000101001101101000 111001101101110001001111011 110101111000011111110110010010 10100011110101011110111000	*DecodedMessage.txt* Hello there. My name is Joshua Rand. It is nice to meet you.

Sample Output







In Text.txt…
Hello there.
My name is Joshua Rand.
It is nice to meet you.

In CodedMessage.txt…
11000001010010100100111111110001001101011000101000001010011001010101111000100101011100100111011011111100110111011101001111011100101111101000010000111010100001010011101000111001101101110001001111011101011110000011111111011001001010001111101010111101110000

In DecodedMessage.txt…
Hello there.
My name is Joshua Rand.
It is nice to meet you.