VishwaCTF

VISHWAKARMA INSTITUTES

Description is as follows:

There was this secret message sent by somebody that I want to recover. So, I hacked somebody's P.C. and found the source but I am too lazy to work on it anymore. So, I came up with a clever idea that you all can help me in it. Here you go:

Message-001101111000010110010110001111100110101001110110

Pre-Order-IIILQLHIILALBILULGIILKLEIILPLNLF

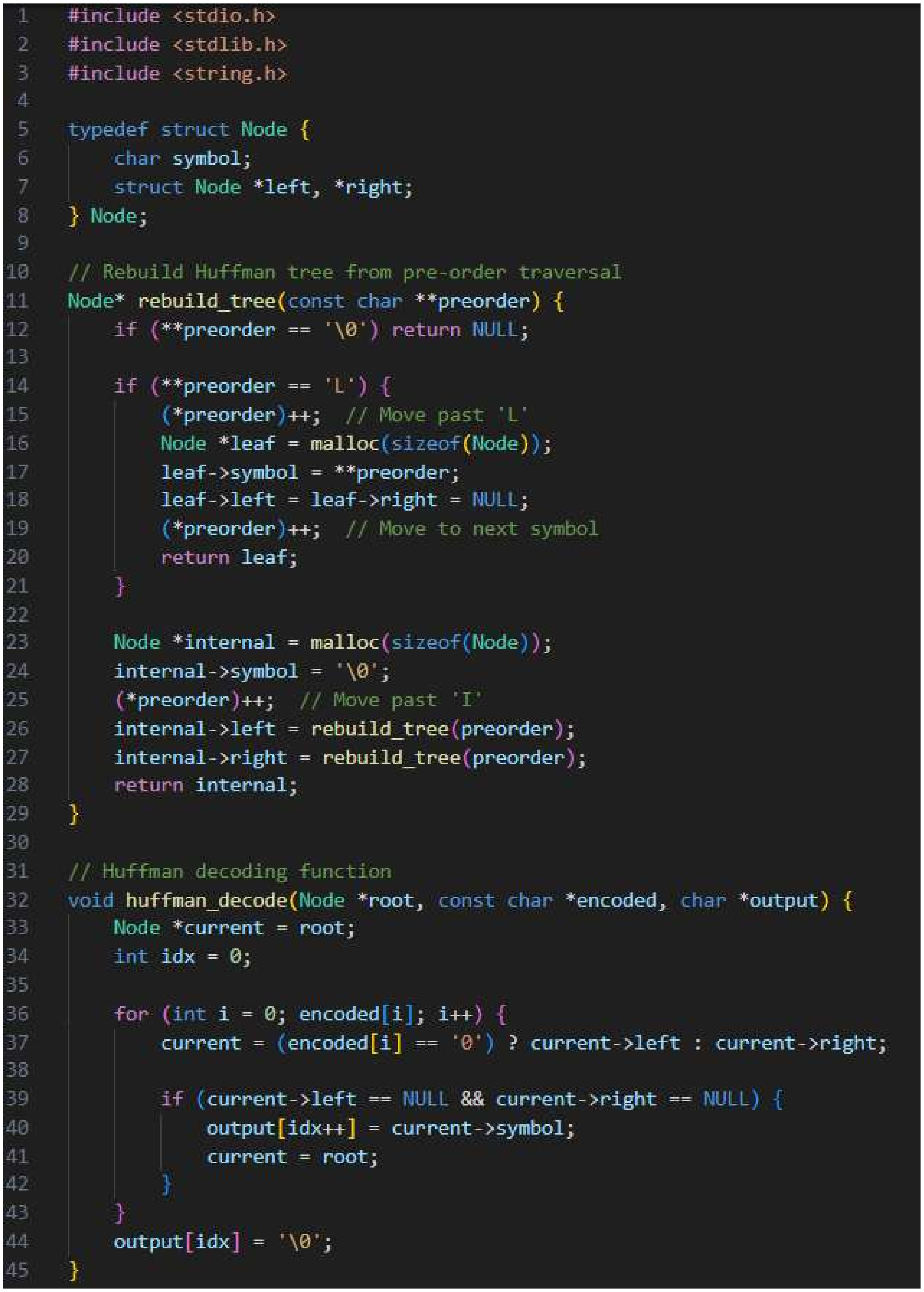
Flag format- VishwaCTF{message-decoded}

Solution:

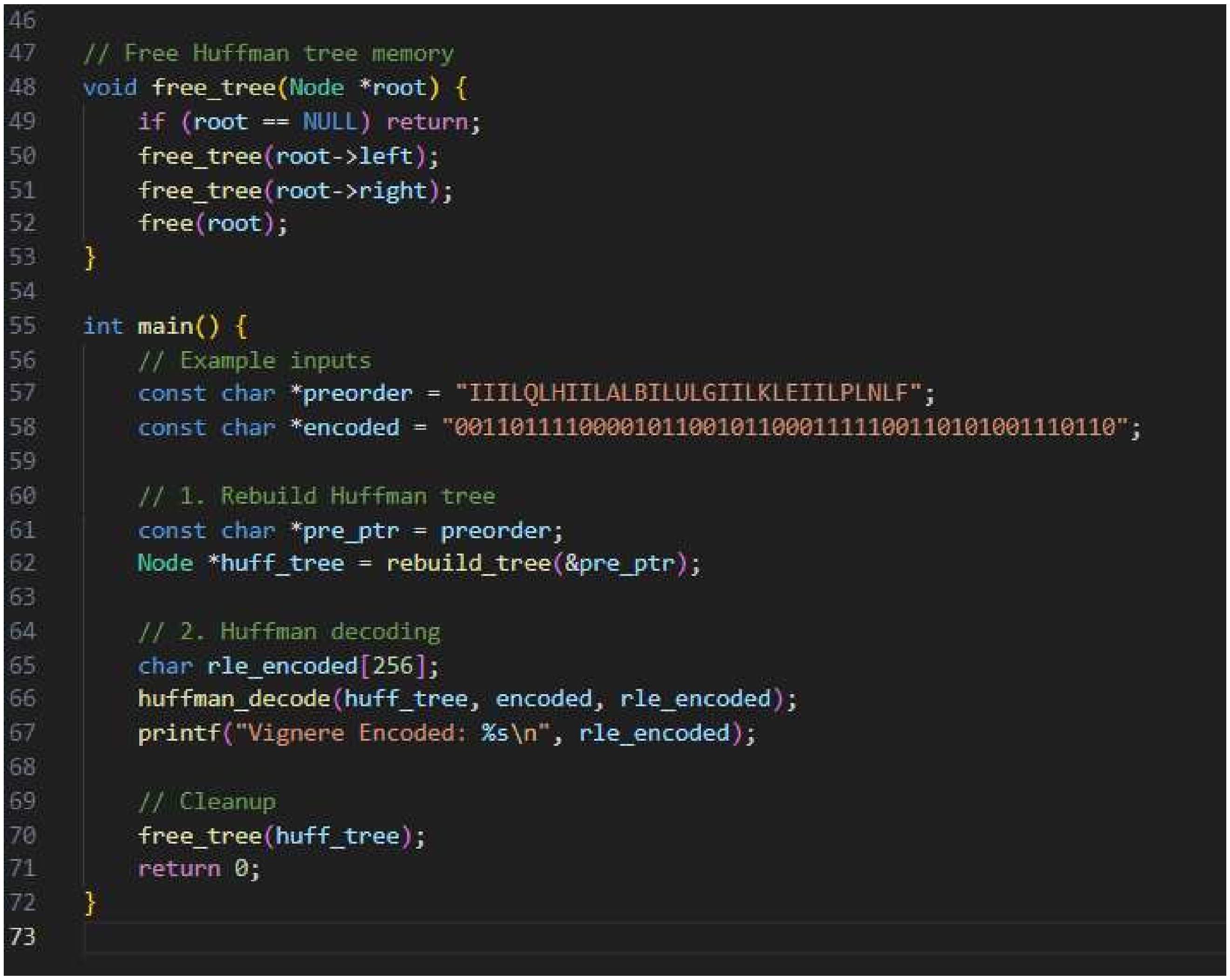
The logic for encrypting the message is a simple one - first vignere cipher and then Huffman encoding you can figure it out easily by reversing the chall.exe file.

Just look in the main function, you don't have to go through the entire code. The key used for vignere encoding is found in the code. You have to reverse the two- using online tools or writing your own code.

The message is the encoded form of a Huffman tree, the pre-order traversal of which is given, so you can write your own code(OR refer to the one given below) to construct a tree using pre-order traversal (which for Huffman tree is different from ordinary pre-order traversal)l



```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

typedef struct Node {
    char symbol;
    struct Node *left, *right;
} Node;

// Rebuild Huffman tree from pre-order traversal
Node* rebuild_tree(const char **preorder) {
    if (**preorder == '\0') return NULL;

    if (**preorder == 'L') {
        (*preorder)++;  // Move past 'L'
        Node *leaf = malloc(sizeof(Node));
        leaf->symbol = **preorder;
        leaf->left = leaf->right = NULL;
        (*preorder)++;  // Move to next symbol
        return leaf;
    }

    Node *internal = malloc(sizeof(Node));
    internal->symbol = '\0';
    (*preorder)++;  // Move past 'I'
    internal->left = rebuild_tree(preorder);
    internal->right = rebuild_tree(preorder);
    return internal;
}

// Huffman decoding function
void huffman_decode(Node *root, const char *encoded, char *output) {
    Node *current = root;
    int idx = 0;

    for (int i = 0; encoded[i]; i++) {
        current = (encoded[i] == '0') ? current->left : current->right;

        if (current->left == NULL && current->right == NULL) {
            output[idx++] = current->symbol;
            current = root;
        }
    }
    output[idx] = '\0';
}
```



```c

// Free Huffman tree memory
void free_tree(Node *root) {
    if (root == NULL) return;
    free_tree(root->left);
    free_tree(root->right);
    free(root);
}

int main() {
    // Example inputs
    const char *preorder = "IIILQLHIILALBILULGIILKLEIILPLNLF";
    const char *encoded = "0011011111000010110010110001111100110101001110110";

    // 1. Rebuild Huffman tree
    const char *pre_ptr = preorder;
    Node *huff_tree = rebuild_tree(&pre_ptr);

    // 2. Huffman decoding
    char rle_encoded[256];
    huffman_decode(huff_tree, encoded, rle_encoded);
    printf("Vignere Encoded: %s\n", rle_encoded);

    // Cleanup
    free_tree(huff_tree);
    return 0;
}

```

File: chall.exe

Flag - VishwaCTF{FLAUNTTHEWIERD }

Happy Hacking!