Complexity

Encode method()

For the encode method, each time when searching the character in the tree, the worst case is O(h), where h is the depth of the tree. And there are n characters for a string s. Therefore, the time complexity is O(nh).

For the decode method, to get the whole string, we need to go through all the code like 01010101…. Therefore the time complexity is the length of the code, theta(l). the length of code won’t exceed O(nh).

Therefore, the time complexity of the encode method is O(nh)

The space complexity theta(h)+theta(l)=theta(l).

Decode method()

For the decode method, when go through the code to build the string, the time complexity is the length of the code, which is theta(l).

Therefore, the time complexity of the decode method is theta(l)

The space complexity is theta(l)

In conclusion, the time complexity of the class is O(nh), and the space complexity is theta(l). where h is the depth of the heap, and l is the length of the code.