CSCE 221
Problem Set 19

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I.

,	00
<space>	110
0	100
5	1011
1	1010
9	0111
8	0110
7	0101
4	0100
2	11111
6	11110
:	111011
\n	11100
3	111010

Fig. 1. Huffman Code of the given table.

II.

If the frequencies are sorted then they are already in heap order within their storage container, which is best implemented as a priority queue. Dequeue the first two nodes, add them together and construct a new tree, inserting the compound node with the dequeued nodes as its children. Check both trees for minimum value to construct new parent in a similar manner to how the second tree was constructed. Repeat until first two trees are empty, thee third tree is the final result. This requires $\frac{3N}{2}$ operations (full pass through first tree, at most $\frac{N}{2}$ operaitons in second tree.) which is $\boxed{O(N)}$.