
Algorithm 10: Huffman Algorithm

Input: $n \geq 1, q \geq 2, p_1, \dots, p_n \geq 0$

assume $q - 1 \mid n - 1$ (otherwise add nodes of weight 0)

Output: decision tree T minimizing $\bar{L}(T)$

1 **foreach** $i = 1, \dots, n$ **do**

2 | create a leaf node T_i for p_i with weight $w(T_i) = p_i$

3 $F \leftarrow \{T_1, \dots, T_n\}$ // priority queue

4 **while** $|F| > 1$ **do**

5 | $T_1, \dots, T_q \leftarrow q$ trees from F of minimal weight

6 | remove T_1, \dots, T_q from F

7 | $T \leftarrow$ new tree obtained by attaching T_1, \dots, T_q to a common root

8 | add T to F with $w(T) = \sum_{i=1}^q w(T_i)$
