35 + 27 + 8 + 12 + 15 + 5 + 10 = 112
21 + 15 + 4 + 16 + 12 + 28 + 4 + 12 = 112

35 + 21 + 14 + 11 + 10 + 3 + 7 = 101

Is this optimal?
$35 + 21 + 14 + 17 + 10 = 91$

$35 + 21 + 14 + 9 + 12 = 91$

Is this correct?
Is it optimal?

5 + 7 + 12 → 24

Seems likely!!

How about:

12 + 4 + 8 → 24

Is it optimal?

4 ↔ 5

12 + 7 + 4 → 23
4 + 3 + 2 = 9  Is it optimal?

NO!  Interchange

4 + 2 + 2 = 8
Algorithm
for every alphabet symbol $i$ create a single node tree and assign it the weight $w_i$
Create heap $H$ whose elements are all of these single node trees ordered by their weight values
for $i = 1$ to $n$ do
    $x \leftarrow H$.delete_min
    $y \leftarrow H$.delete_min
    create a new node $z$ whose left child is $x$, right child is $y$, and its weight is $x$.weight + y.weight
    $H$.insert($z$)
end for

Example

Huffman tree constructed

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