*F. Using the Huffman-related slides from lecture 18 as a guide, construct a Huffman Tree for the following weighted symbol set.  Show the Huffman Tree and the corresponding table of codes for each symbol.  (Before constructing the tree, sort the symbols by weight.)  (5 points)*

A picture containing diagram

Description automatically generated Shape

Description automatically generated with low confidence

*G.*

*. Using the slide titled “Two Simple Run Length Encoding Algorithms” as a model, RLE encode each of the following symbol streams using both Variants 1 and 2.  Show the resulting data stream and the compression ratio in each case.  Express the data stream in characters and decimal integer count values (not in bits).  Assume that the <esc> and the integer counts require one byte each.  Aside from the question of compression ratios, what advantage does Variant 1 have over Variant 2?  (5 points)a)*

*a) AAAAAABBBBBBCCCCCCDDDDDD*   
  
 *b) AAAABBBBBCCCDDDD*  
  
*c) AAABBBCCCDDD*

a) AAAAAABBBBBBCCCCCCDDDDDD -24

Variant 1:

        Encoded stream: [6]A[6]B[6]C[6]D

        Compression ratio: 3:1 or 3

Variant 2:

        Encoded stream: <esc>[6]A<esc>[6]B<esc>[6]C<esc>[6]D

        Compression ratio: 2:1 or 2.0

a) *AAAABBBBBCCCDDDD - 16*

Variant 1:

        Encoded stream: [4]A[5]B[3]C[4]D

        Compression ratio: 2:1 or 2

Variant 2:

        Encoded stream: <esc>[4]A<esc>[5]B<esc>[3]C<esc>[4]D

        Compression ratio: 16:12 more then 1

a) *AAABBBCCCDDD - 12*

Variant 1:

        Encoded stream: [3]A[3]B[3]C[3]D

        Compression ratio: 12:8 more then 1

Variant 2:

        Encoded stream: <esc>[4]A<esc>[5]B<esc>[3]C<esc>[4]D

        Compression ratio: 12:12 OR 1