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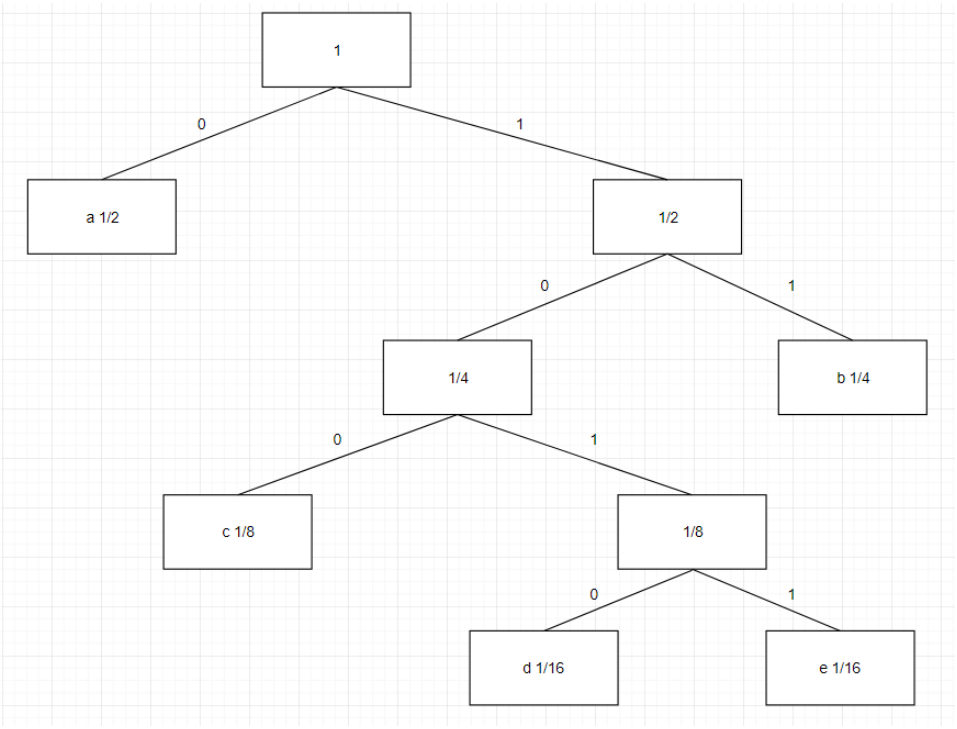
Huffman Encoding (HW #11)

1. Encoding:

Letter	Encoding
T	0
A	11
G	100
C	101

2. (a) Encoding:

Letter	Encoding
A	0
B	11
C	100
D	1010
E	1011



(b)

Letter	Length
A	1000000 * 1 / 2 = 500000
B	1000000 * 2 / 4 = 500000
C	1000000 * 3 / 8 = 375000
D	1000000 * 4 / 16 = 250000
E	1000000 * 4 / 16 = 250000
Total	**1875000**

3. (a) (20, 35, 45)
(b) Impossible: A Huffman tree cannot be created with the given frequencies because '0' is a prefix of '00'.
(c) Impossible: The encoding produced by Huffman's algorithm will always contain a single bit code. In this case, '10' should be '1,' because '1' is shorter and is not a prefix of any other code.
(Following the algorithm, at every step there will be at least one leaf that is one away from the root of the Huffman tree and will therefore have a one-bit encoding.)