CSE 417: Homework 4
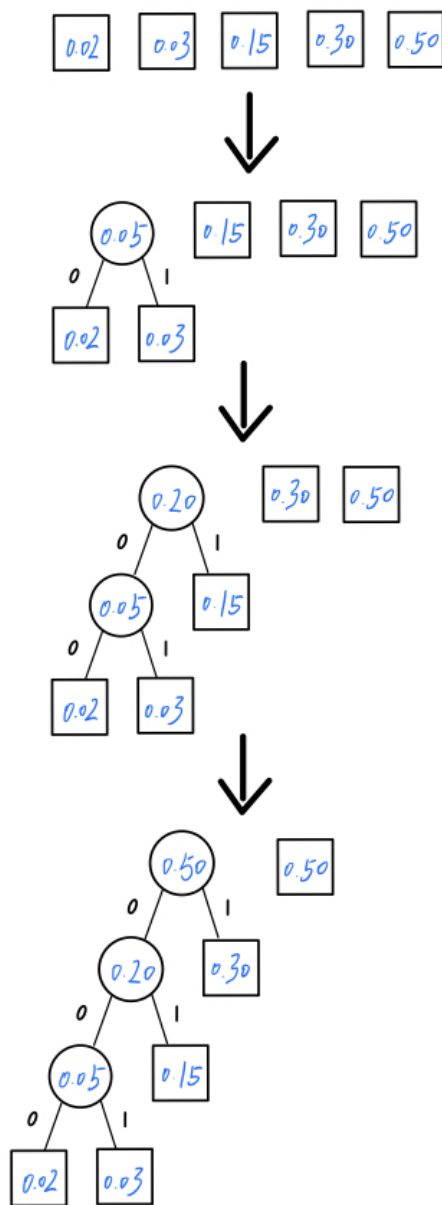
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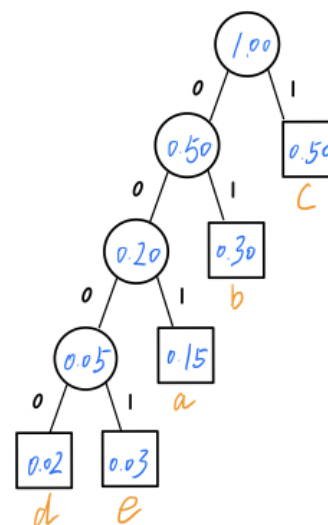
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Problem 5:

(a)

Final tree:

Huffman Code:

a: 001

b: 01

c: 1

d: 0000

e: 0001

(b)

Total leng in bits $= (0.02 \times 4 + 0.03 \times 4 + 0.15 \times 3 + 0.30 \times 2 + 0.50 \times 1) \times 100 = 175$

(c)

The length of the Huffman code of a lower frequency element will always be longer or equal to the length of the Huffman code of a higher frequency element. In the Huffman trees, the depth of nodes with lower frequency will always be deeper or equal to the nodes with higher frequency.

The frequency of a is 0.15, which is lower than the frequency of b 0.30, so in the Hoffman tree, the depth of a should deeper or equal to the depth of b. But in the figure, a is in the 2nd level and b is in the 4th level, which a is upper than b.