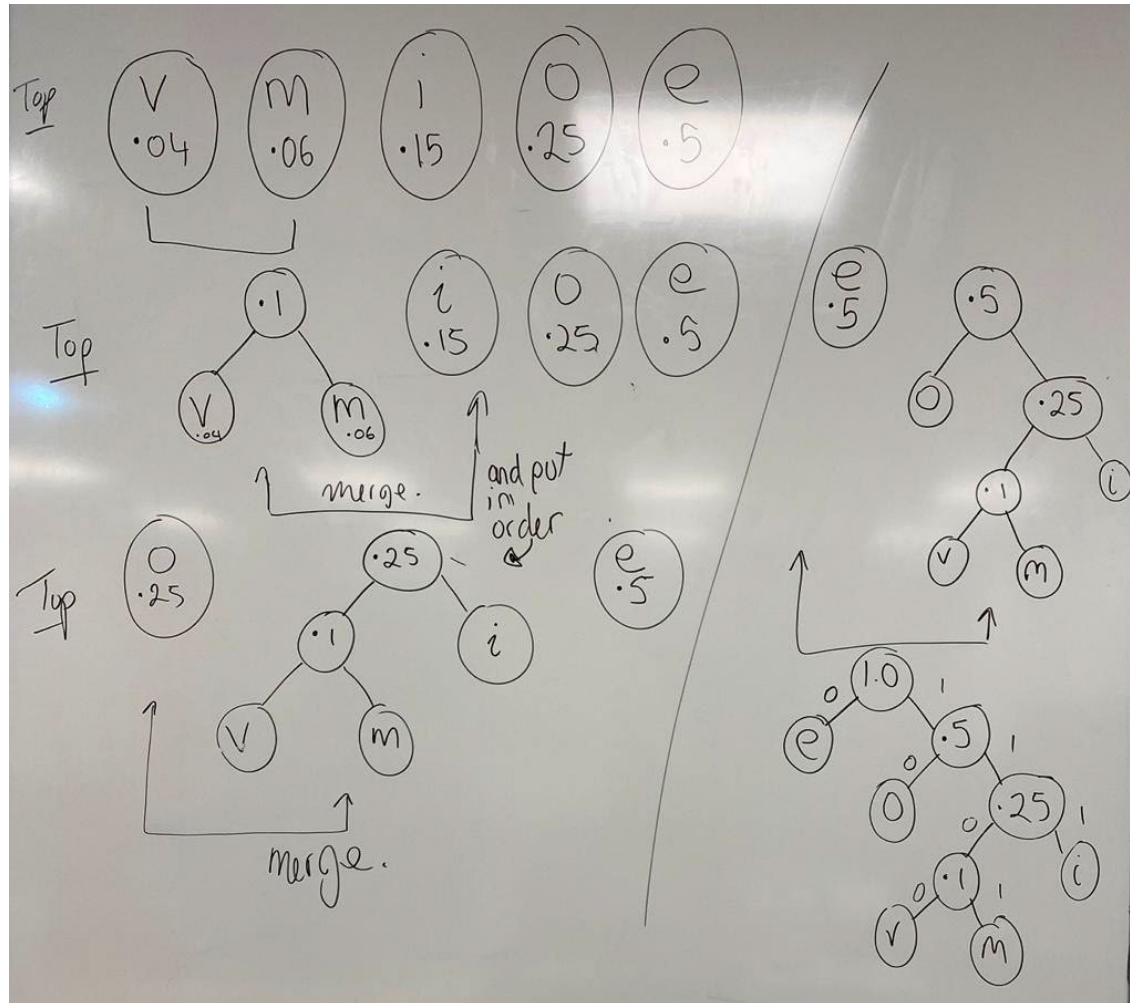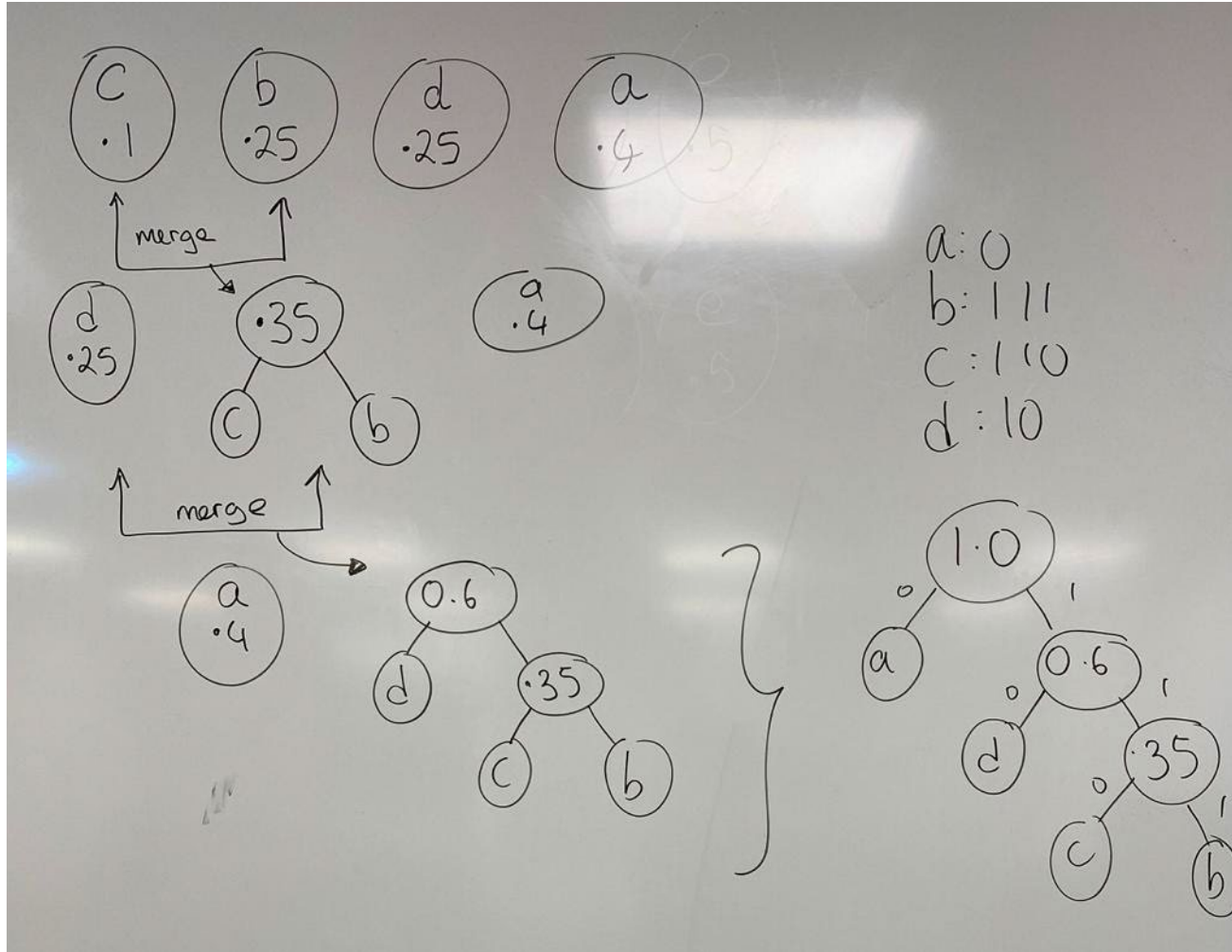# CT102 Tutorial

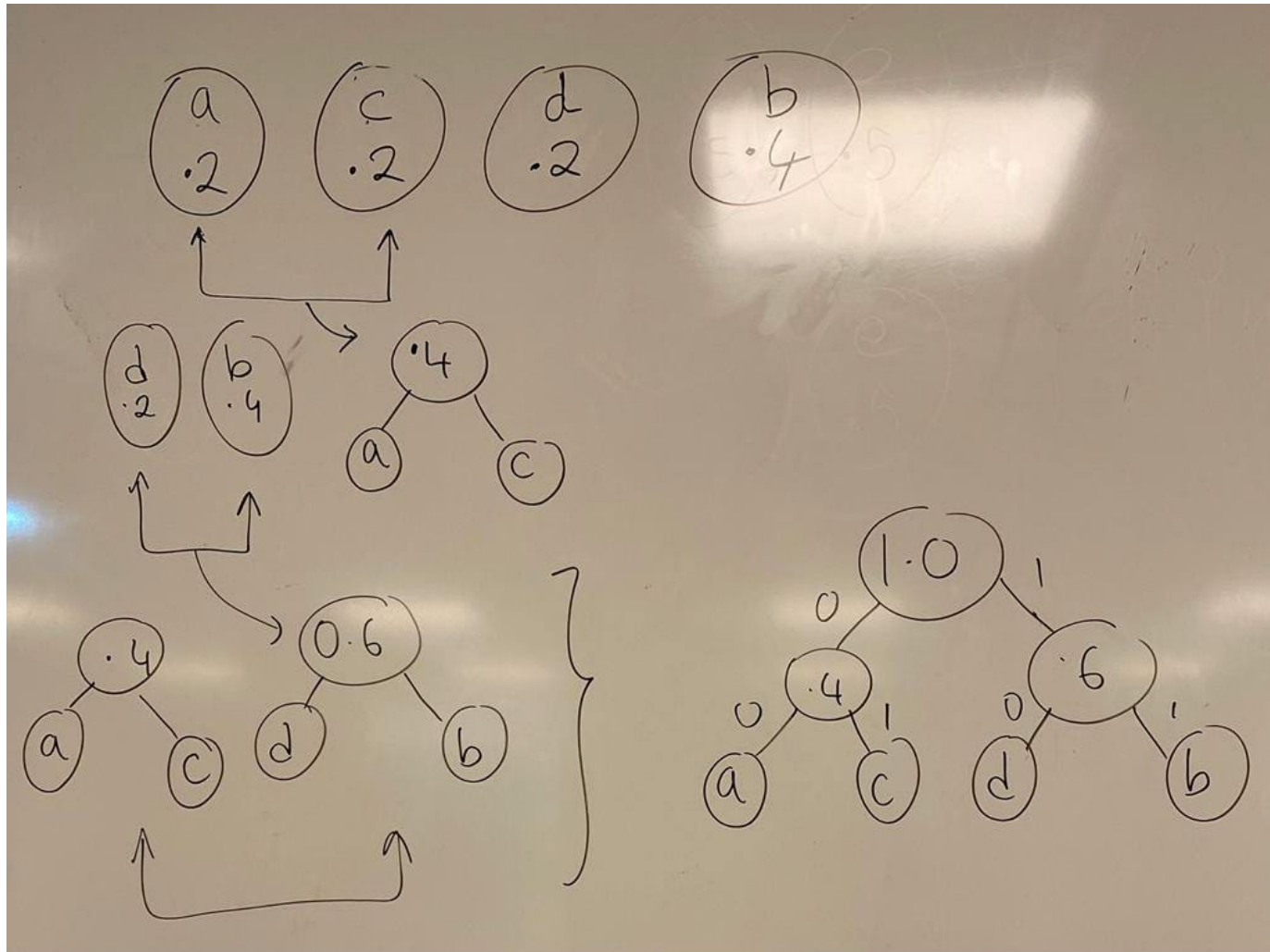## MCQ 3 Compression Questions

08/11/2023

Given the following 5 characters (m, o, v, i, e) and their frequencies:
(m, 0.06), (o, 0.25), (v, 0.04), (i, 0.15) and (e, 0.5)

Given the following 4 characters (a, b, c, d) and their frequencies:

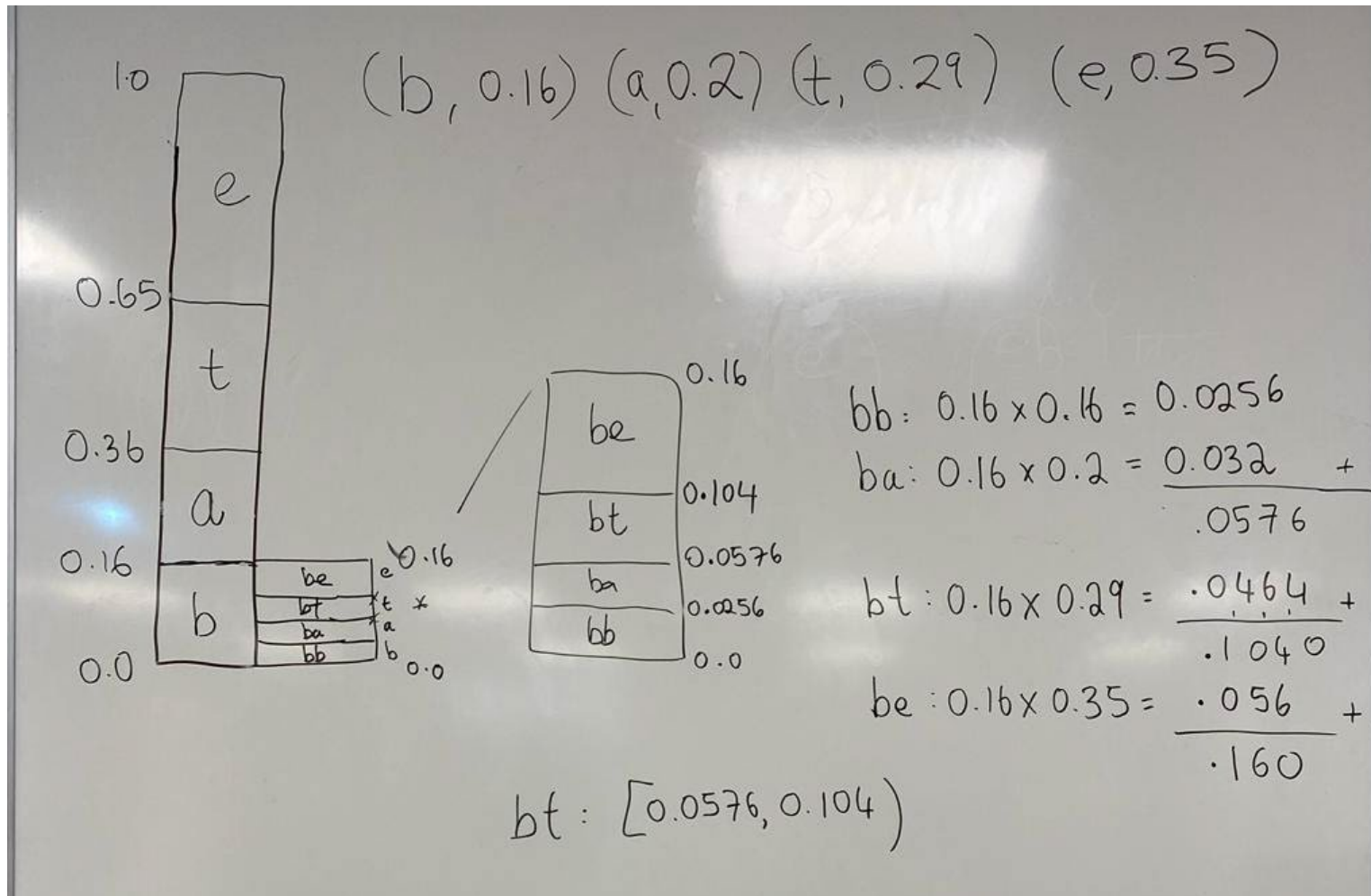(a, 0.4), (b, 0.25), (c, 0.1), (d, 0.25).

Given the following 4 characters and their frequencies:

(a, 0.2), (b, 0.4), (c, 0.2), (d, 0.2).

Given the following 4 characters and their frequencies:

(a, 0.2), (b, 0.16), (e, 0.35), (t, 0.29)

For arithmetic coding the interval corresponding to the message 'bt' is:

$(b, 0.16)$ $(a, 0.2)$ $(t, 0.29)$ $(e, 0.35)$

$bb: 0.16 \times 0.16 = 0.0256$

$ba: 0.16 \times 0.2 = 0.032$ +
$\qquad\qquad\qquad\qquad .0576$

$bt: 0.16 \times 0.29 = .0464$ +
$\qquad\qquad\qquad\qquad .1040$

$be: 0.16 \times 0.35 = .056$ +
$\qquad\qquad\qquad\qquad .160$

$bt: [0.0576, 0.104]$

Given the following 3 characters and their frequencies:

(a, 0.4), (c, 0.4), (r, 0.2)

For arithmetic coding the interval corresponding to the messages 'ar',
'aa' and 'ra':

ar: [0.2, 0.28)

aa: [0.28, 0.44)

ra: [0.04, 0.12)

$(r, 2) \quad (a, .4) \quad (c, .4)$

$ar: 0.4 \times 0.2 = 0.08 \qquad : 0.28$

$aa: 0.4 \times 0.4 = 0.16 \qquad \underline{0.16 \; +}$

$ac: 0.4 \times 0.4 = 0.16 \qquad \begin{array}{r} .44 \\ .16 \;\# \\ \hline 0.60 \end{array}$

$rr: 0.2 \times 0.2 = 0.04$

$ra: 0.2 \times 0.4 = 0.08 \quad +$

$rc: 0.2 \times 0.4 = \underline{0.08} \quad + \\ \hspace{3.5cm} .20$