#4

UBs

$$t_2 \to \overbrace{1, \boxed{7}, 9}^{0.25}, \overbrace{13, 15, 16} \qquad 0.3$$

$$t_3 \to \overbrace{2, 6, \boxed{7}}^{0.15}, \overbrace{8, 11, 16}, 18 \qquad 0.2$$

$$t_1 \to \overbrace{5, \boxed{7}, 12}^{0.2} \; \overbrace{13, 15, 17} \qquad 0.2$$

$$t_4 \to \overbrace{\boxed{7}, 8, 9}^{0.18}, \overbrace{11, 13, 15} \qquad 0.2$$

SUM TO $0.9 > \theta$ SO PIVOT IS 7

LOCAL UBs OF BLOCKS CONTAINING 7 SUM TO $0.78 > \theta$ SO WE FULLY SCORE DOC 7

#1

First of all, we expand the binary sequence of copy blocks:

$$0 \; 1111 \; 0 \; 11 \; 0 \; 11 \; \underbrace{00}_{\text{because the 15's list has length 13}}$$

Then we apply this copy-list to 15's list

5, 6, 7, 8, 16, 17, 22, 24

Then you can add, in sorted order, the extra nodes and get:

$$16 \to 5, 6, 7, 8, \underbrace{9}_{\text{extra}}, 16, 17, \underbrace{20, 21}_{\text{extra}}, 22, 24, \underbrace{29, 30}_{\text{extra}}$$

#2

A → 1, 3 | IDF $\log 4/2 = 1$

AFTER → 2, 3 | $\log 4/2 = 1$

BEAUTIFUL → 1, 4 | $\log 4/2 = 1$

DOG → 1, 2 | $\log 4/2 = 1$

GIRL → 3, 4 | $\log 4/2 = 1$

	T_1	T_2	T_3	T_4	q
A	1	0	1	0	0
AFTER	0	2	1	0	0
BEAUTIFUL	1	0	0	1	1
DOG	1	1	0	0	0
GIRL	0	0	1	2	1

$SIM(q, T_1) = 1 \times 1 = 1$

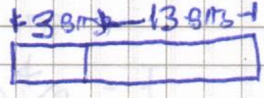
$SIM(q, T_2) = 0$

$SIM(q, T_3) = 1 \times 1 = 1$

$SIM(q, T_4) = 1 \times 1 + 2 \times 1 = 3$

T_4 IS THE MOST SIMILAR DOC TO q

#3



a) A SINGLE 2-BYTE WORD CAN HOLD (i) A SINGLE INTEGER OF 16 − (LAYOUT BITS) = 16 − 3 = 13 BITS, OR (ii) 13 INTEGERS OF LENGTH 1 BIT EACH UNDER THIS CODE. THEREFORE TWO 2-BYTE WORDS CAN ENCODE A MINIMUM OF TWO INTEGERS (~~LENGTHS~~ OF LENGTH 13 BITS) AND A MAXIMUM OF TWENTY-SIX INTEGERS (OF LENGTH 1 BIT).

b) CONFIGURATIONS

000: ONE 13-BITS NUMBER

001: TWO 6-BITS NUMBERS (1 BIT IS WASTED)

010: THREE 4-BITS NUMBERS (1 BIT IS WASTED)

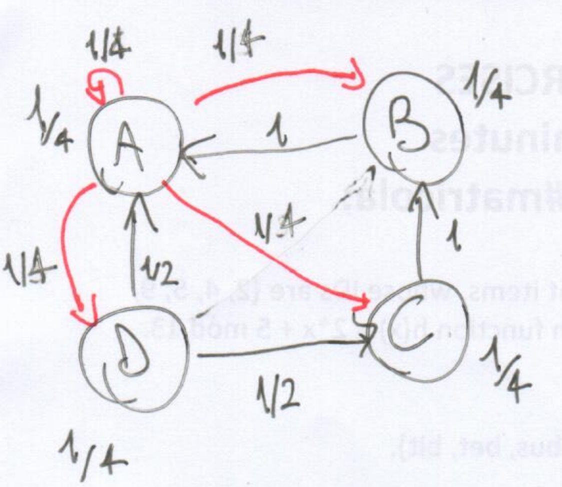
011: FOUR 3-BITS NUMBERS (1 BIT IS WASTED)

100: SIX 2-BITS NUMBERS (1 BIT IS WASTED)

101: THIRTEEN 1-BIT NUMBERS

110: UNUSED CONFIG

111: UNUSED CONFIG.



ADDED EDGES BECAUSE (A) IS A SINK NODE

$$\alpha = \frac{1}{3}$$

$$(1-\alpha)\ \frac{1}{n}$$

$$r(A) = \frac{1}{3}\left(\frac{1}{4}\frac{1}{4} + \frac{1}{4}\cdot 1 + \frac{1}{4}\frac{1}{2}\right) + \frac{2}{3}\cdot\frac{1}{4}$$

$$= \frac{1}{3}\left(\frac{1+4+2}{16}\right) + \frac{2}{12} = \frac{7}{48} + \frac{2}{12} = \frac{7+8}{48} = \frac{15}{48}$$

$$r(B) = \frac{1}{3}\left(\frac{1}{4}\frac{1}{4} + \frac{1}{4}1\right) + \frac{2}{12}$$

$$= \frac{1}{3}\left(\frac{1+4}{16}\right) + \frac{2}{12} = \frac{5}{48} + \frac{2}{12} = \frac{5+8}{48} = \frac{13}{48}$$

$$r(C) = \frac{1}{3}\left(\frac{1}{4}\cdot\frac{1}{4} + \frac{1}{4}\frac{1}{2}\right) + \frac{2}{12}$$

$$= \frac{1}{3}\ \frac{3}{16} + \frac{2}{12} = \frac{3+8}{48} = \frac{11}{48}$$

$$r(D) = \frac{1}{3}\left(\frac{1}{4}\frac{1}{4}\right) + \frac{2}{12} = \frac{1+8}{48} = \frac{9}{48}$$