

COMP9315 Sample Exam, Q6 Sample Solution

(a)

(i) $\text{Sel}[a=5] \dots 1000/16 = 63$ (ii) $\text{Sel}[b=\text{green}] \dots 1000/8 = 125$ (iii) $\text{Sel}[c>80] \dots 1000*20/100 = 200$ (iv) $\text{Sel}[\text{null}(a)] = 0$

(b)

(i)

For 128 pages, $d = 7$

(ii)

 $\max(d_a) = 4$, limited by domain(0..15) $\max(d_b) = 3$, limited by domain(Colours) $\max(d_c) = 7$, limited by domain(1..100)

(iii)

Possible min cost allocation(s):

 $d_a = 3, d_b = 3, d_c = 1$ $d_a = 4, d_b = 3, d_c = 0$ $d_a = 3, d_b = 4, d_c = 0 \dots$ but over-allocates to d_b

(iv)

Cost for bit allocations:

 $Q1 = (a,?,?) \ 0.3 \quad Q2 = (?,b,?) \ 0.2 \quad Q3 = (a,b,?) \ 0.3 \quad Q4 = (?,b,c) \ 0.2$ $d(a,b,c) = (3,3,1) \quad \text{Cost} = 0.3*2^4 + 0.2*2^4 + 0.3*2^1 + 0.2*2^3 = 10.2$ $d(a,b,c) = (4,3,0) \quad \text{Cost} = 0.3*2^3 + 0.2*2^4 + 0.3*2^0 + 0.2*2^4 = 9.1$ $d(a,b,c) = (3,4,0) \quad \text{Cost} = 0.3*2^4 + 0.2*2^3 + 0.3*2^0 + 0.2*2^3 = 8.3$