

# Série 7

## Problème 1 :

(a) Huffman modifier

ligne 1  $\left[ \begin{array}{l} u(16) \rightarrow 101010 \\ u(4) \rightarrow 1011 \\ b(4) \rightarrow 010 \\ u(2) \rightarrow 0111 \end{array} \right.$

ligne 2  $\left[ \begin{array}{l} b(1) \rightarrow 010 \\ u(1) \rightarrow 000111 \\ b(1) \rightarrow 010 \\ u(6) \rightarrow 1110 \end{array} \right.$

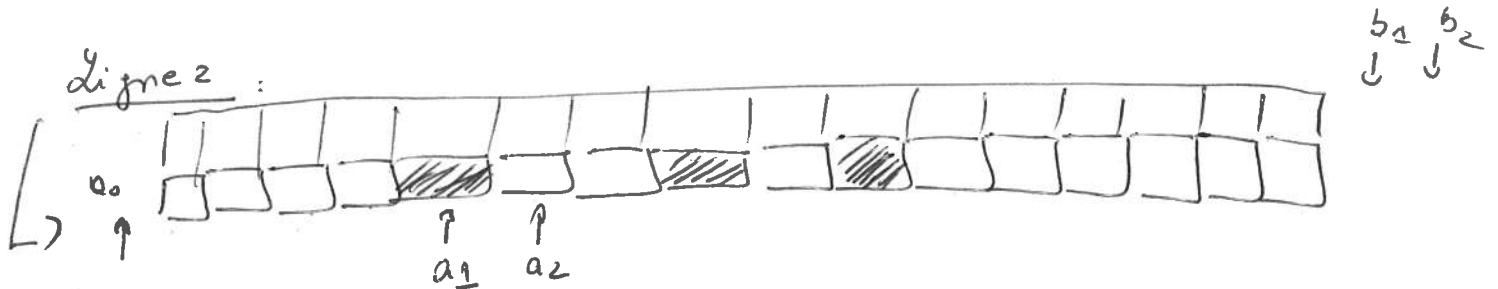
ligne 3  $\left[ \begin{array}{l} u(4) \rightarrow 1011 \\ b(1) \rightarrow 010 \\ u(2) \rightarrow 0111 \\ b(1) \rightarrow 010 \\ u(8) \rightarrow 10011 \end{array} \right.$

ligne 4  $\left[ \begin{array}{l} u(4) \rightarrow 1011 \\ b(4) \rightarrow 011 \\ u(1) \rightarrow 00011 \\ b(1) \rightarrow 010 \\ u(6) \rightarrow 1110 \end{array} \right.$

ligne 5 = ligne 2  
 ligne 6 = ligne 2  
 ligne 7 =  $u(16) \rightarrow 101010$   
 ligne 8 =  $u(16) \rightarrow 101010$

(b) Read modifier  $K=2$

ligne 1 :  $m(16) \xrightarrow{HM} \boxed{10 \ 10 \ 10}$



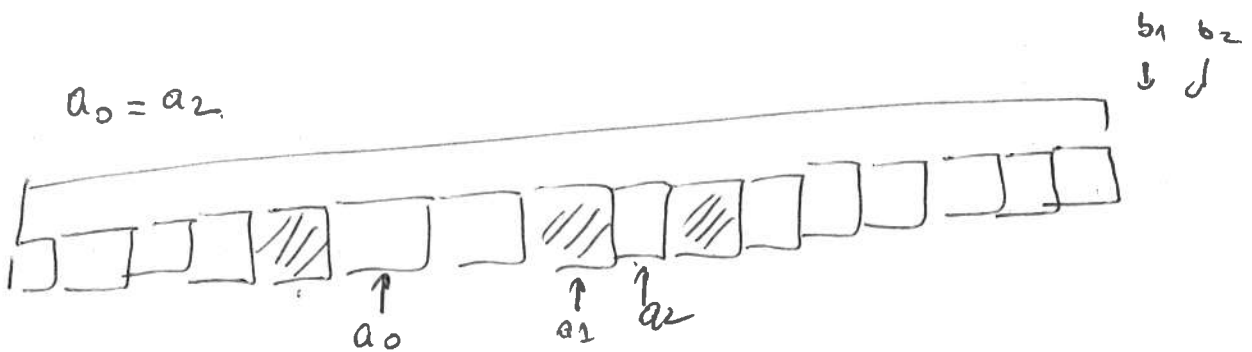
$b_2$  left of  $a_1 \rightarrow$  non.

$|a_1 - b_1| = 12 \geq 3 \Rightarrow$  Mode Horizontal.

$$001 + \pi(a_0 a_1) + \pi(a_1 a_2)$$

$$001 + \pi(10(1)) + \pi(10(1))$$

$$\Rightarrow \boxed{001 + 1011 + 010}$$



$b_2$  left  $a_1 \rightarrow$  non

$|a_1 - b_1| = 9 \geq 3 \Rightarrow$  Mode Horizontal:

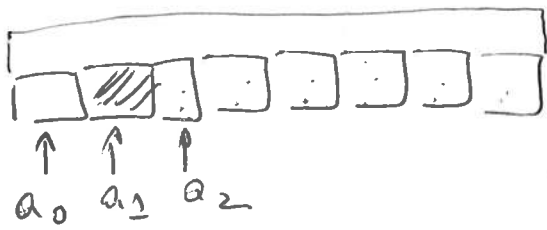
$$001 + \pi(a_0 a_1) + \pi(a_1 a_2)$$

$$001 + \pi(11(1)) + \pi(11(1))$$

$$001 + 000111 + 010$$

$$a_0 = a_2$$

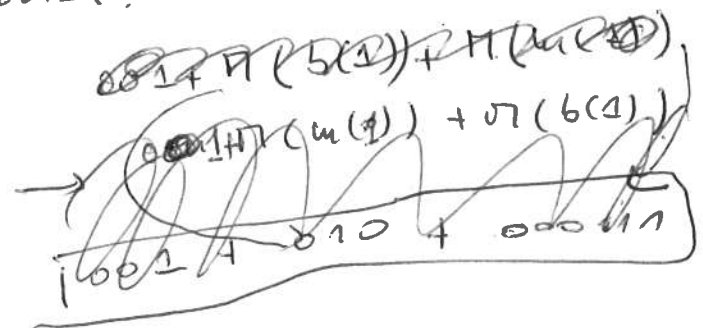
3



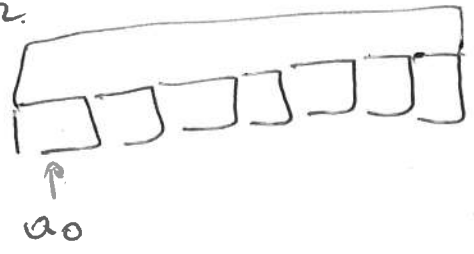
$b_2$  left  $a_1 \rightarrow$  mm  
 $|a_2 - b_1| = 7 \geq 3 \Rightarrow$  Mode Horizontal:  $001 + \Pi(a_0 a_1) + \Pi(a_1 a_2)$

$001 + u(1) + b(1)$   
 $001 + 000111 + 010$

~~001 + 000111 + 010~~  
~~001 + 000111 + 010~~



$a_0 = a_2$



$b_2$  left  $a_1 \rightarrow$  mm.  
 $|a_2 - b_1| = 0 \leq 3 \Rightarrow$  mode vertical.

$a_1$  below  $b_1 \Rightarrow$   $\boxed{1}$

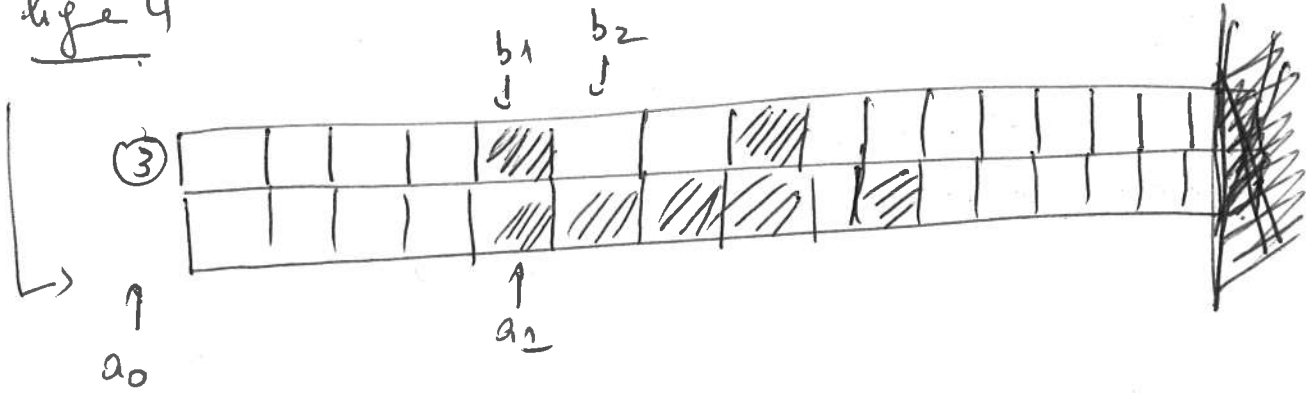
Fin lige 2

ligne 3

(4)

1011, 010, 0111, 010, 10011

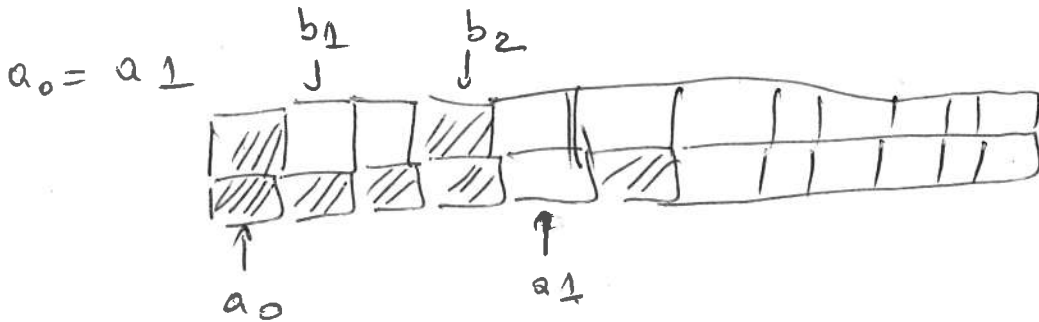
ligne 4



$b_2$  left  $a_1 \rightarrow$  non

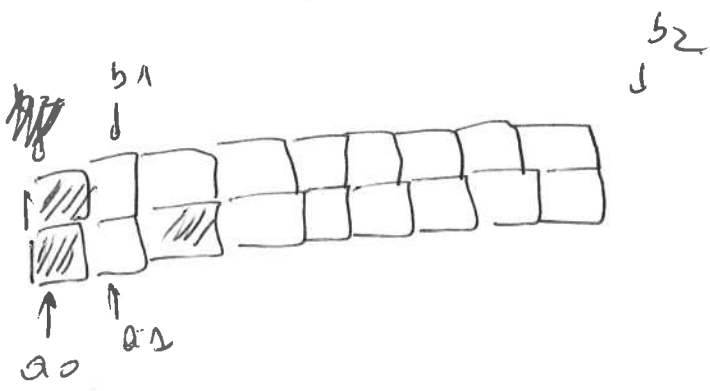
$|a_1 - b_1| = 0 \leq 3 \Rightarrow$  mode vertical

$a_1$  below  $b_1 \Rightarrow$  [1]



$b_2$  left  $a_1 \rightarrow$  yes  $\Rightarrow$  Pass mode  $\Rightarrow$  0001

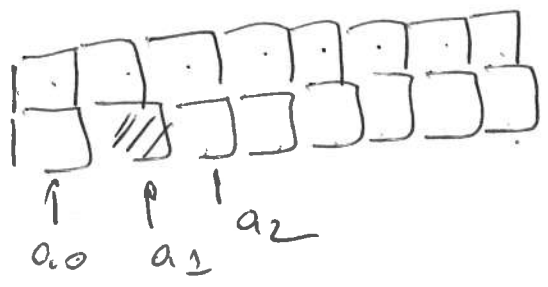
$a_0$  under  $b_2$



$b_2$  left  $a_1 \rightarrow$  mm.

$|a_1 - b_2| = 0 \leq 3 \Rightarrow$  vertical mode  
 $a_1$  below  $b_1 \Rightarrow$  1

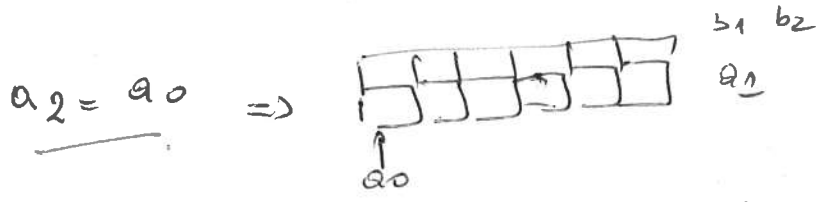
$a_0 = a_1$   $b_1$   
↓  
 $b_2$   
↓



$b_2$  left  $a_1 \Rightarrow$  mm

$|a_1 - b_2| = 7 > 3 \Rightarrow$  mode horizontal

$001 + \sigma_1(a_0 a_1) + \sigma_2(a_1 a_2)$   
 $001 + \sigma_1(b_1) + \sigma_2(b_2)$   
 $001 + 000111 + \text{~~000111~~}$



$b_2$  left  $a_1 \Rightarrow$  mm

$(a_1 - b_2) = 0 \Rightarrow$  mode vertical

$a_1$  below  $b_1 \Rightarrow$  1

## Problème 2

(6)

Image:  $512 \times 512 \times 8 = 2.097.152$  bits

(a) débit: 9600 bits / seconde

après 15 seconde  $\Rightarrow 9600 \times 15 = 144000$

nombre de ligne transmis au bout de 15 secondes:

$$144000 / (512 \times 8) = 35,156 \text{ lignes.}$$

Pourcentage  $\frac{35,156}{512} \times 100 = 6,86\%$

(b) Taille de la 1<sup>re</sup> approximation de 1pix / (8x8)

$$512 \times 512 \times 8 / 64 = 32768$$

durée de transmission:

$$32768 / 9600 = 3,41 \text{ seconde.}$$

(c) 2<sup>de</sup> approximation. est de Taille 4 fois la 1<sup>re</sup> approx.

1<sup>re</sup> approximation déjà envoyée en 3,41 seconde

il faut attendre  $(3,41 \times 3) = \underline{\underline{10,23 \text{ seconde}}}$