UNIDAD TEMATICA NRO 4 - RESPUESTAS

5.

$$I(x_i) = \log_2 1 / P(x_i)$$

P(alf) = 1/32

I(carácter)= log 2 32 = 5 Sh

Rta= I(total)= 20 Sh

6. **Secuencia: 0 1 0 1 0 1 0 0 0 0 1**

$$H = -\sum_{k=1}^{n} \log_2 P(x_k) p(x_k)$$

H = Σ (P(xk) * Log 2 1/(P(xk)

$$I(x_i) = \log_2 1 / P(x_i)$$

P(0) = 2/3 ; P(1) = 1/3

I(0)= log 2 3/2 = 0,585 Sh

I(1)= log 2 1/3 = 1,585 Sh

>P(x) ⇒ < I (x)

H = Σ (P(xk) * Log 2 1/(P(xk)

H =(2/3* 0,585Sh) + (1/3* 1,585 Sh) = **Rta= H=0,92 Sh/simbolo**

7. **P(m1) = 0,2 ; P(m2) = 0,5 ; P(m3) = 0,3**

$$I(x_i) = \log_2 1 / P(x_i)$$

I(m1)= log 2 1/0,2 = 2,321 Sh

I(m2)= log 2 1/0,5 = 1 Sh

I(m3)= log 2 1/0,3 = 1,737 Sh

$$H = \sum (P(x_k) * \text{Log}_2 \ 1/(P(x_k))$$

H =(0,2* 2,321Sh) + (0,5* 1Sh) + (0,3* 1,737Sh) = **Rta= H=1,4855 Sh/simbolo**

9.

$$I(x_i) = \log_2 1 / P(x_i)$$

I(A)= log 2 4 = 2 Sh

I(B)= log 2 4 = 2 Sh

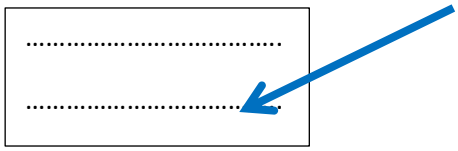
I(C)= log 2 8 = 3 Sh

I(E)= log 2 4 = 2 Sh

I(L)= log 2 3 = 3 Sh

I(CABLE)= 3+2+2+3+2 = 12 Sh Rta: I(CABLE)=12 Sh

11.



Pixel Imagen: 600x300

a. IMAGEN:

I(pixel)= log 2 8 = 3 Sh

I(imagen)= 3*300*600= 540.000 Sh

b. 1000 palabras:
P(voc)= 1/100000

I(palabra)= log 2 100000 = 16,60 Sh

I(1000 palabras)= 16600 Sh

c. Comparación: **540000 Sh > 16600 Sh** , **Rta: Quedo demostrado el proverbio**

12.

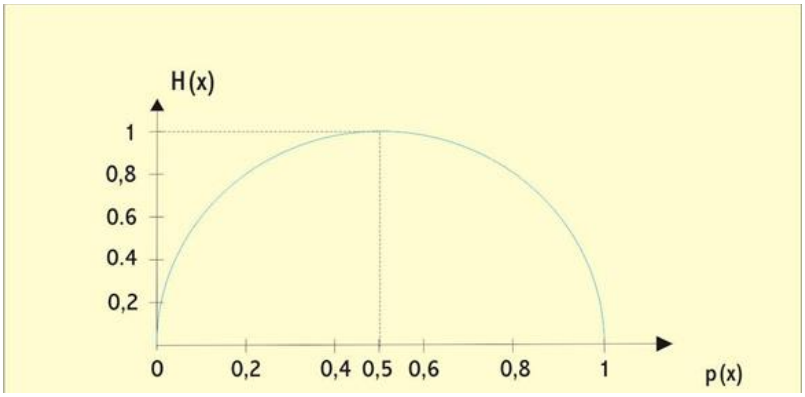
$$H = \sum (P(x_k) * \text{Log}_2 \ 1/(P(x_k))$$

P(0) = 1/2 ; P(1) = 1/2

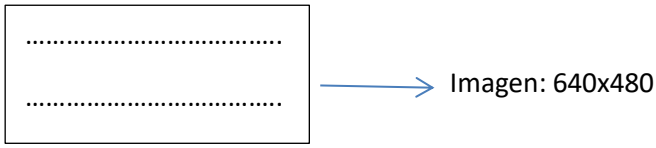
I(0)= log 2 2 = 1 Sh

I(1)= log 2 2 = 1 Sh

H =(0,5*1Sh) + (0,5* 1Sh) = **Rta= H=1 Sh/simbolo**



13.



P(.) = 1/256

I(.)= log 2 256 = **8 Sh**

I(imagen)= 8*480*640**=2.457.600 Sh**

T(total Tx)=2.457.600 Sh / 33.600Sh/seg**=73,143 seg; Rta: 73,143 seg**

Comparación:

Imagen: 25x80 Codigo ASCII de 8 bits $\Rightarrow 2^8$ = 256 niveles ; P(.) = 1/256

I(texto)= log 2 256 = 8 Sh

I(m texto)= 8*25*80**= 16.000 Sh**

T(total Tx)=16.000 Sh / 33.600Sh/seg**=0,476 seg; Rta: 0,476 seg**

14.

$$\Gamma = \frac{H(x)}{\tau}$$

$$H = \sum (P(x_k) * \text{Log}_2\ 1/(P(x_k))$$ **Sh/simbolo**

$$\tau = \sum (P.*t)$$ **Seg/simbolo**

I(.)= $\log_2 3/2$ **= 0,585 Sh**

I(-)= $\log_2 3$ **= 1,585 Sh**

H =(2/3*0,585 Sh) + (1/3* 1,585 Sh) = 0,92 Sh/simb

τ= (2/3*0,2seg)+(1/3*0,4seg)=0,266 seg/simb

T = 0,92 Sh/simb / 0,266 seg/simb= 3,459 Sh/seg ; **Rta: 3,459 Sh/seg**

15. Imagen TV: 625x500

P(.) = 1/128

I(.)= $\log_2 128$ **= 7 Sh**

I(imagen)= 7*625*500**=2.187.500 Sh**

T = 20 imagenes*2.187.500 Sh= 4.375.000 Sh/seg

Ahora bien la relación debe ser: T <= C (caso contrario se genera más información que la que puede viajar por un canal, implica perdida de información).

Entonces Si de máxima T = C C= 4.375.000 bps

Rta: T=4.375.000 Sh/seg y C=4.375.000 bps