

Advanced Coding Assignment 4

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5) Repeat the encoding using $m=6$

Count (1) = 40	Cum_Count (0) = 0	Scales = 0
Count (2) = 1	Cum_Count (1) = 40	
Count (3) = 9	Cum_Count (2) = 41	
Total_Count = 50	Cum_Count (3) = 50	

If $m=6$: $t^{(0)} = 000000$; $u^{(0)} = 111111 = 63$

The first element of the sequence to be encoded is 1.

$$t^{(1)} = 0 + \left\lceil \frac{64 \times 0}{50} \right\rceil = 0000000_2$$

$$u^{(1)} = 0 + \left\lceil \frac{64 \times 40}{50} \right\rceil - 1 = 50 = 1100010_2$$

\therefore The next element of the sequence is 3

$$t^{(2)} = 0 + \left\lceil \frac{51 \times 41}{50} \right\rceil = 41 = 101001_2$$

$$u^{(2)} = 0 + \left\lceil \frac{51 \times 50}{50} \right\rceil - 1 = 50 = 110010_2$$

The MSBs of $t^{(2)}$ and $u^{(2)}$ are both 1.

After shifting: $t^{(2)} = 010010_2 = 18$

$$u^{(2)} = 100101_2 = 37$$

The LSB of $t^{(2)}$ and $u^{(2)}$ \Rightarrow

$$t^{(2)} = 000100_2 = 4$$

$$u^{(2)} = 101011_2 = 43$$

The increment scales value is 1

Next element is 2:

$$l^{(3)} = 4 + \left\lfloor \frac{40 \times 40}{50} \right\rfloor = 36 \Rightarrow 100100_2$$

$$u^{(3)} \Rightarrow 4 + \left\lfloor \frac{40 \times 41}{50} \right\rfloor - 1 = 35 = 100011_2$$

we have seen that the lower limit is greater than the upper limit; therefore we cannot use $m=6$.