- ***Build a Table for GF(2^6)***

Table 1. GF(2^6) with primitive polynomial $p(X) = 1 + X + X^6$

GF	Binary Representation						Decimal
α^{0}	0	0	0	0	0	0	0
α^{1}	0	0	0	0	0	1	1
α^{2}	0	0	0	0	1	0	2
α^{3}	0	0	0	1	0	0	4
α^{4}	0	0	1	0	0	0	8
α^{5}	0	1	0	0	0	0	16
α^{6}	1	0	0	0	0	0	32
α^{7}	0	0	0	0	1	1	3
α^{8}	0	0	0	1	1	0	6
α^{9}	0	0	1	1	0	0	12
α^{10}	0	1	1	0	0	0	24
α^{11}	1	1	0	0	0	0	48
α^{12}	1	0	0	0	1	1	35
α^{13}	0	0	0	1	0	1	5
α^{14}	0	0	1	0	1	0	10
α^{15}	0	1	0	1	0	0	20
α^{16}	1	0	1	0	0	0	40
α^{17}	0	1	0	0	1	1	19
α^{18}	1	0	0	1	1	0	38
α^{19}	0	0	1	1	1	1	15
α^{20}	0	1	1	1	1	0	30
α^{21}	1	1	1	1	0	0	60
α^{22}	1	1	1	0	1	1	59
α^{23}	1	1	0	1	0	1	53
α^{24}	1	0	1	0	0	1	41
α^{25}	0	1	0	0	0	1	17
α^{26}	1	0	0	0	1	0	34
α^{27}	0	0	0	1	1	1	7
α^{28}	0	0	1	1	1	0	14

α^{29}	0	1	1	1	0	0	28
α^{30}	1	1	1	0	0	0	56
α^{31}	1	1	0	0	1	1	51
α^{32}	1	0	0	1	0	1	37
α^{33}	0	0	1	0	0	1	9
α^{34}	0	1	0	0	1	0	18
α^{35}	1	0	0	1	0	0	36
α^{36}	0	0	1	0	1	1	11
α^{37}	0	1	0	1	1	0	22
α^{38}	1	0	1	1	0	0	44
α^{39}	0	1	1	0	1	1	27
α^{40}	1	1	0	1	1	0	54
α^{41}	1	0	1	1	1	1	47
α^{42}	0	1	1	1	0	1	29
α^{43}	1	1	1	0	1	0	58
α^{44}	1	1	0	1	1	1	55
α^{45}	1	0	1	1	0	1	45
α^{46}	0	1	1	0	0	1	25
α^{47}	1	1	0	0	1	0	50
α^{48}	1	0	0	1	1	1	39
α^{49}	0	0	1	1	0	1	13
α^{50}	0	1	1	0	1	0	26
α^{51}	1	1	0	1	0	0	52
α^{52}	1	0	1	0	1	1	43
α^{53}	0	1	0	1	0	1	21
α^{54}	1	0	1	0	1	0	42
α^{55}	0	1	0	1	1	1	23
α^{56}	1	0	1	1	1	0	46
α^{57}	0	1	1	1	1	1	31
α^{58}	1	1	1	1	1	0	62
α^{59}	1	1	1	1	1	1	63
α^{60}	1	1	1	1	0	1	61
α^{61}	1	1	1	0	0	1	57
α^{62}	1	1	0	0	0	1	49

α^{63}	1	0	0	0	0	1	33

- ***Berlekamp – Massey Algorithm***

Table 2. Each steps for finding error-location polynomial

r	B(X)	Λ(X)	L
α^{48}	α^{15}	$1+\alpha^{48}X$	1
α^{8}	$\alpha^{15}X$	$1+\alpha^{34}X$	1
α^{38}	$\alpha^{25}+\alpha^{59}X$	$1+\alpha^{34}X+\alpha^{53}X^2$	2
α^{42}	$\alpha^{25}X+\alpha^{59}X^2$	$1+\alpha^{50}X+\alpha^{61}X^2$	2
α^{55}	$\alpha^{8}+\alpha^{58}X+\alpha^{6}X^3$	$1+\alpha^{50}X+\alpha^{54}X^2+\alpha^{51}X^3$	3
α^{10}	$\alpha^{8}X+\alpha^{58}X^2+\alpha^{6}X^3$	$1+\alpha^{21}X+\alpha^{43}X^2+\alpha^{19}X^3$	3
α^{26}	$\alpha^{37}+\alpha^{58}X+\alpha^{17}X^2+\alpha^{3}X^3$	$1+\alpha^{21}X+\alpha^{16}X^2+\alpha^{6}X^3+\alpha^{32}X^4$	4
α^{50}	$\alpha^{37}X+\alpha^{58}X^2+\alpha^{17}X^3+\alpha^{3}X^4$	$1+\alpha^{53}X+\alpha^{13}X^2+\alpha^{16}X^3+\alpha^{11}X^4$	4
α^{28}	$\alpha^{35}+\alpha^{25}X+\alpha^{48}X^2+\alpha^{51}X^3+\alpha^{46}X^4$	$1+\alpha^{53}X+\alpha^{27}X^2+\alpha^{42}X^3+\alpha^{42}X^4+\alpha^{31}X^5$	5
α^{30}	$\alpha^{35}X+\alpha^{25}X^2+\alpha^{48}X^3+\alpha^{51}X^4+\alpha^{46}X^5$	$1+\alpha^{55}X+\alpha^{5}X^2+\alpha^{33}X^3+\alpha^{22}X^4+\alpha^{40}X^5$	5

The **Error-Location Polynomial** is

$$\Lambda(X) = 1+\alpha^{55}X+\alpha^{5}X^2+\alpha^{33}X^3+\alpha^{22}X^4+\alpha^{40}X^5$$

$$= (1+\alpha^{51}X)(1+\alpha^{35}X)(1+\alpha^{8}X)(1+\alpha^{7}X)(1+\alpha^{2}X)$$

The **Error Evaluator Polynomial** is

$$\Omega(\mathrm{X}) = \alpha^{48}+\alpha^{61}X+\alpha^{29}X^2+\alpha^{56}X^3+\alpha^{34}X^4$$

So the **Error Pattern** is

$$\mathrm{e}(\mathrm{X}) = \alpha^{6}X^2+\alpha^{20}X^7+\alpha^{3}X^8+\alpha^{62}X^{35}+\alpha^{15}X^{51}$$

Table 3. Error locations and error magnitudes

Error Location	Error Magnitude
Y_{51}	α^{15}
Y_{35}	α^{62}
Y_{8}	α^{3}
Y_{7}	α^{20}
Y_{2}	α^{6}

- ***Euclidean Algorithm***

Table 4. Each steps for finding error-location polynomial and error-value evaluator

i	$Z_0^{(i)}(X)$	$q_i(X)$	$\sigma_i(X)$
-1	X^{10}		0
0	$\alpha^{48} + \alpha^{19}X + \alpha^{61}X^2 + \alpha^{51}X^3 + \alpha^3X^4 + \alpha^{42}X^5 + \alpha^{33}X^6 + \alpha^{29}X^7 + \alpha^{38}X^8 + \alpha^{53}X^9$		1
1	$\alpha^{43} + \alpha^{51}X + \alpha^{47}X^2 + \alpha^{57}X^3 + \alpha^{17}X^5 + \alpha^{32}X^6 + \alpha^{17}X^7 + \alpha^{34}X^8$	$\alpha^{58} + \alpha^{10}X$	$\alpha^{58} + \alpha^{10}X$
2	$\alpha^{30} + \alpha^{21}X + \alpha^7X^2 + \alpha^{40}X^3 + \alpha X^4 + \alpha^{56}X^5 + \alpha^{39}X^6 + \alpha^{39}X^7$	$\alpha^{14} + \alpha^{19}X$	$\alpha^{45} + \alpha^{12}X + \alpha^{29}X^2$
3	$\alpha^{45} + \alpha^{21}X + \alpha^{59}X^2 + \alpha^{57}X^3 + \alpha^8X^4 + \alpha^{14}X^5 + \alpha^5X^6$	$\alpha^{25} + \alpha^{58}X$	$\alpha^{60} + \alpha^{30}X + \alpha^{24}X^2 + \alpha^{24}X^3$
4	$\alpha + \alpha^2X + \alpha^{44}X^2 + \alpha^{37}X^3 + \alpha^{18}X^4 + \alpha^{36}X^5$	$\alpha^{16} + \alpha^{34}X$	$\alpha^{16} + \alpha^{33}X + \alpha^{52}X^2 + \alpha^4X^3 + \alpha^{58}X^4$
5	$\alpha^{35} + \alpha^{48}X + \alpha^{16}X^2 + \alpha^{43}X^3 + \alpha^{21}X^4$	$\alpha^{32} + \alpha^{32}X$	$\alpha^{50} + \alpha^{42}X + \alpha^{55}X^2 + \alpha^{20}X^3 + \alpha^9X^4 + \alpha^{27}X^5$

The error pattern is same as the results done by Berlekamp-Massey Algorithm.