Cyclic Redundancy Check (CRC)

JUL '23

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It is based on the concept of Binary Division.

CRC Generator:-

i) Append string of n 0's to the data unit.

ii) Divide newly generated data unit (i) by the divisor (Polynomial)

iii) Remainder after (ii) is n bit CRC.

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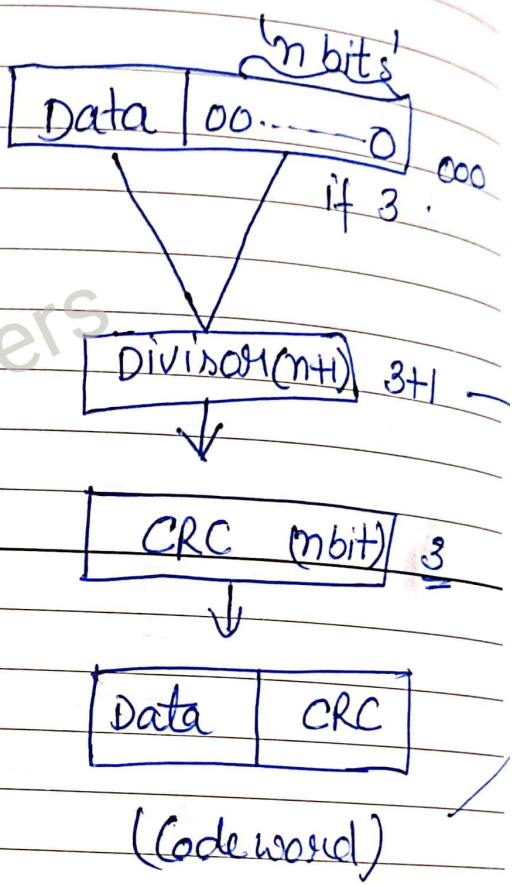
iv) The CRC will replace n 0's to get codeword to be transmitted.



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$x^4 + x^3 + 1$ = divisor polynomial

Max power.

$1 \cdot x^4 + 1 x^3 + 0 \cdot x^2 + 0 \cdot x^1 + x^0 \cdot 1$

1 1 0 0 1

CRC Checker:- Here the receiver divides the data unit by same divisor which was used by the transmitter. The remainder of the divison is then checked

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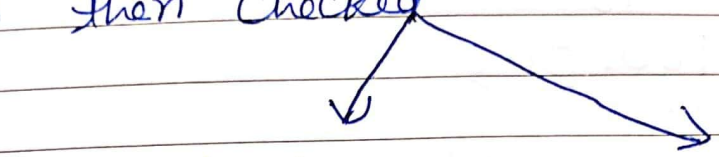

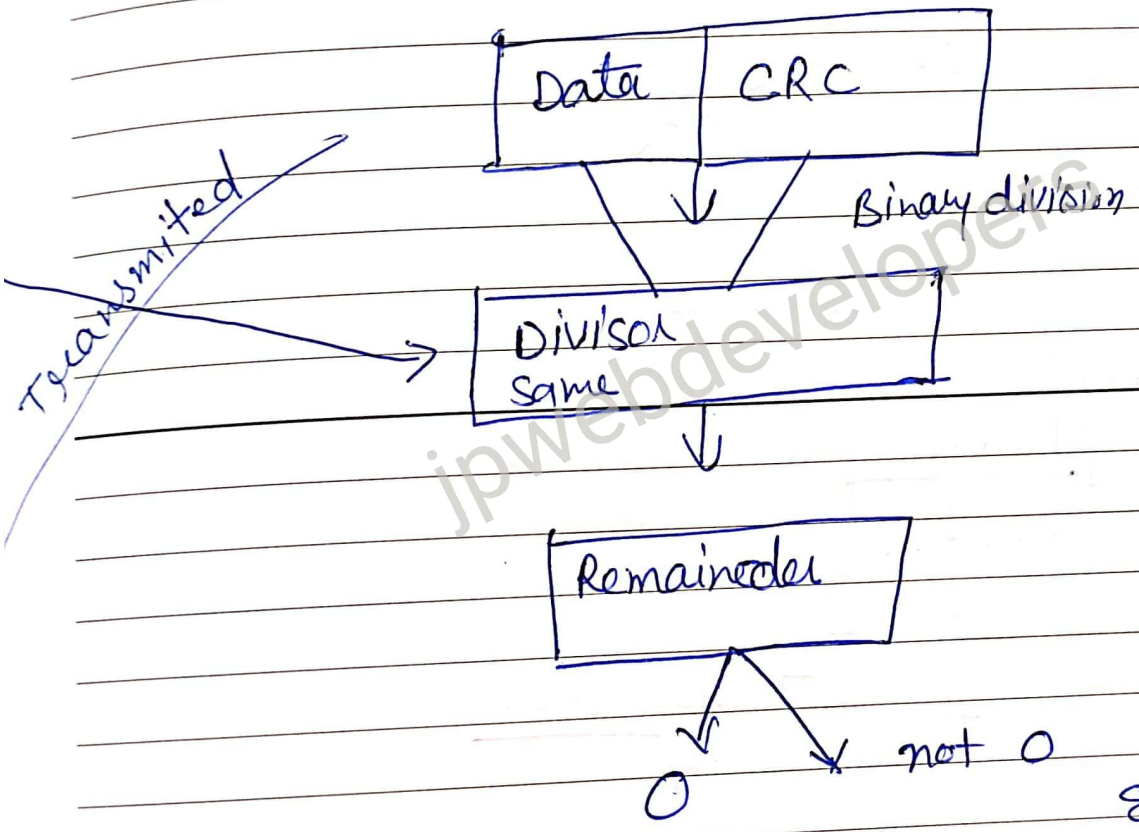

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eg:-

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Dataset = 1001
Divisor = 1011 (n+1)

0 ⊕ 0 = 0
0 ⊕ 1 = 1
1 ⊕ 0 = 1
1 ⊕ 1 = 0

```
          10
1011 ) 1001000
       1011
       001000
         1011
         00110  Remainder
                CCRC
```

Receiverside - 1001110

```
1011 ) 1001110
       1011
       001011
         1011
         00000 → no error
```


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(1) eg:- CRC generator $x^7 + x^6 + x^4 + x^3 + x + 1$

$1x^7 + 1x^6 + 0x^5 + 1x^4 + 1x^3 + 0x^2 + 1x^1 + 1x^0$ 1

1 1 0 1 1 0 1 1

(2) Bit 1101011011 divisor $x^4 + x + 1$ (10011)

Remain : 1110

(3) 10011101 — $x^3 + 1$ (1001)