

Program for error detecting code using CRC-CCITT

CRC-CCITT \rightarrow cyclic redundancy check -

- consultative committee for International Telephony and Telegraphy.

PROCESS :

Step-1 : DATA

Step-2 : CRC-generator

Step-3 : CRC bits

CRC-generator $\rightarrow n$ bits

CRC-bits $\rightarrow (n-1)$ bits

Step-4 : CRC bit = $\frac{\text{DATA} + (n-1) \text{ zeros}}{\text{CRC generator}}$
(remainder)

Step-5 : checksum = DATA + CRC

Step-6 : $\frac{\text{checksum}}{\text{CRC generator}} \Rightarrow \text{remainder} = 0$

NOTE : If remainder is not zero, then it will show error detection

it is polynomial like $x^3 + x^2 + x^1 + x^0$

but we are given

input as bits

Example :

1) DATA = 1101011011

2) CRC generator = 10011 (5 bits)

3) CRC bits = $(5-1) = (4 \text{ bits})$

* so we are adding 4 bits of zeros to data

11010110110000

11000010010

4)

(XOR)

A	B	output
0	0	0
0	1	1
1	0	1
1	1	0

10011) 11010110110000

10011

010011

000011

000001

000000

000100

000000

001001

000000

010011

000000

101100

100111

010100

000000

101000

100111

011100

000000

1110

5) checksum = DATA + CRC bit (remainder)

$$= 11010110111110$$

(1110 replaced by 0000)

6) Receiver side :

$$\begin{array}{r}
 110000010110 \\
 10011 \overline{) 11010110111110} \\
 \underline{10011} \\
 10011 \\
 \underline{10011} \\
 00001 \\
 00000 \\
 \underline{00000} \\
 00010 \\
 00000 \\
 \underline{00000} \\
 00101 \\
 00000 \\
 \underline{00000} \\
 01011 \\
 00000 \\
 \underline{00000} \\
 10111 \\
 10011 \\
 \underline{10011} \\
 01001 \\
 00000 \\
 \underline{00000} \\
 10011 \\
 10011 \\
 \underline{10011} \\
 00000 \\
 \underline{00000} \\
 0
 \end{array}$$

it is valid, because
remainder is "0"