Branch : CSE & IT Batch : Hinglish

Computer Network

Error Control

DPP 02

[MCQ]

1. The message 1011010110 is to be transmitted using to CRC polynomial $x^3 + x^2 + 1$ to protect it from errors. The code ward that should be transmitted will be.

(a) 1011010110000 (b) 1011010110011

(c) 1011010110100 (d) 1011010110111

[MSQ]

2. Which of the following is not false regarding cyclic redundancy check (CRC)?

(a) CRC is an error correction method.

(b) CRC is an error detection method.

(c) CRC is an error correction & detection method.

(d) CRC is based on binary division.

[MCQ]

3. Given generator function G(x) and the message function m(x) as follows.

$G(x) = x^4 + x + 1$

$M(x) = x^9 + x^8 + x^6 + x^4 + x^3 + x + 1$

What will be transmitted function among the following options.

(a) $x^{13} + x^{12} + x^{11} + x^8 + x^7 + x^6 + x^5 + x^3 + x^2 + 1$

(b) $x^{13} + x^{12} + x^{10} + x^8 + x^7 + x^5 + x^4 + x^3 + x^2 + x$

(c) $x^{13} + x^{12} + x^{11} + x^8 + x^7 + x^6 + x^5 + x^3 + x^2 + x$

(d) $x^{13} + x^{12} + x^{11} + x^{10} + x^7 + x^6 + x^5 + x^3 + x^2 + 1$

[MCQ]

4. A d(x) is $x^7 + x^5 + x^4 + x^2 + 1$ transmitted using CRC polynomial method. The g(x) is $x^3 + 1$. What is the polynomial of CRC remainder?

(a) $x + x^0$ (b) x^0

(c) $x2 + x^0$ (d) $x2 + x + x^0$

[NAT]

5. For the given bits 10101011 and generator polynomial $x^3 + 1$ calculate the CRC remainder.

Note: If you are getting 1101 as the answer write it in the decimal. (for example $(1101)_2 = 13$).

Answer Key

1. **(d)**
2. **(b, d)**
3. **(b)**
4. **(b)**
5. **(4 to 4)**

Hints & Solutions

1. (d)

Given message = 1011010110

$g(x) = x^3 + x^2 + 1$

$\Rightarrow 1 \times x^3 + 1 \times x^2 + 0 \times x^1 + 1 \times x^0$

$\Rightarrow$ 1101

1101) 1011010110000(110010011
1101
×1100
1101
×0011
0000
×0110
0000
×1101
1101
×0001
0000
×0010
0000
×0100
0000
×1000
1101
×1010
1101
×111

Code word: 1011010110111

2. (b, d)

The CRC is used to detect the errors in the data and information transmitted over the network. This is performing a binary solution on the transmitted data at the sender's side and verifying the same at the receiver's side.

3. (b)

$G(x) = x^4 + x + 1$

$\Rightarrow 1 \times x^4 + 0 \times x^3 + 0 \times x^2 + 1 \times x^1 + 1 \times x^0$

$\Rightarrow$ 10011

$M(x) = x^9 + x^8 + x^6 + x^4 + x^3 + x + 1$

$\Rightarrow 1 \times x^9 + 1 \times x^8 + 0 \times x^7 + 1 \times x^6 + 0 \times x^5 + 1 \times x^4 + 1 \times x^3 + 0 \times x^2 + 1 \times x^1 + 1 \times x^0$

$\Rightarrow$ 1101011011

10011) 11010110110000(1100001010
10011
×10011
10011
× 00001
00000
×00010
00000
×00101
00000
×01011
00000
×10110
10011
×01010
00000
×10100
10011
×01110
00000
×1110

Code word: 11010110111110

Transmitted function: $x^{13} + x^{12} + x^7 + x^5 + x^3 + x^2 + x^1$

4. (b)

$d(x) = x^7 + x^5 + x^4 + x^2 + 1$

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

$\Rightarrow$ 10110101

$g(x) = x^3 + 1$

$\Rightarrow 1 \times x^3 + 0 \times x^2 + 0 \times x^1 + 1 \times x^0$

$\Rightarrow$ 1001

1001) 10110101000(10100001
1001
×0100
0000
×1001
1001
×0000
0000
×0001
0000
×1010
0000
×0100
0000
×1000
1001
×001 $\Rightarrow$ 001 $\Rightarrow x^0$

5. (4 to 4)

$g(x) = x^3 + 1$

$\Rightarrow 1 \times x^3 + 0 \times x^2 + 0 \times x^1 + 1 \times x^0$

$\Rightarrow 1001$

1001) 10101011000(10111100

1001

×0111

0000

×1110

1001

×1111

1001

×1101

1001

×1000

1001

×0010

0000

×0100

0000

100

CRC remainder = 100

Hence $(100)_2 = (4)_{10}$

Any issue with DPP, please report by clicking here:- https://forms.gle/t2SzQVvQcs638c4r5

For more questions, kindly visit the library section: Link for web: https://smart.link/sdfez8ejd80if

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