- A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, collide, and A wins the first backoff race. At the end of this successful transmission by A, both A and B attempt to transmit and collide. The probability that A wins the second backoff race is:
  (A) 0.5
  (B) 0.625
  (C) 0.75
  (D) 1.0

- 1st attempt: Value of ‘k’ would be k=0 or k=1 (0 <= k <= (2^n)-1; where n=nth attempt). Since A won the first race, A must have chosen k=0 and B must have chosen k=1 (A wins here with probability 0.25). As A won, A will again choose k=0 or k=1 for its 2nd frame, but B will choose k=0,1,2 or 3 as B failed to send its first frame in the first attempt.

- 2nd attempt: Let kA= value of k chosen by A and kB = value of k chosen by B. We will use notation (kA,kB) to show the possible values. Now the sample space for the 2nd attempt is (kA,kB) = (0,0),(0,1),(0,2),(0,3),(1,0),(1,1),(1,2) or (1,3) i.e. 8 possible outcomes. For A to win, kA should be less than kB (kA < kB). Thus, our event space is (kA, kB) = (0,1),(0,2),(0,3),(1,2),(1,3) i.e. 5 possible outcomes.
- Thus the probability that A wins the 2nd back-off race = 5/8 = 0.625

Detailed Solution

Download Sol

A	B	win
0	0	Collision
0	1	A
0	2	A
0	3	A
1	0	B
1	1	Collision
1	2	A
1	3	A

Consider the following message M = 1010001101. The cyclic redundancy check (CRC) for this message using the divisor polynomial $x^5 + x^4 + x^2 + 1$ is

- M = 1010001101 Divisor polynomial: $1\mathbf{x}^5+1\mathbf{x}^4+0\mathbf{x}^3+1\mathbf{x}^2+0\mathbf{x}^1+1\mathbf{x}^0$ Divisor polynomial bit= 110101 Bits to be appended to message= (divisor polynomial bits – 1) = 5 Append 5 zeros to message bits, modified message: 101000110100000

```
         1101010110
110101 ) 101000110100000
         110101
          111011
          110101
          011101
          000000
           111010
           110101
            011111
            000000
             111110
             110101
              010110
              000000
               101100
               110101
                110010
                110101
                 001110
                 110101
                  11011
```

CRC: 11011

Q: Consider the following two cases when g denotes generator polynomial & m denotes the received message.

Case I: g = 1001 , m = 10101

Case II: g = 110011 , m = 11100011111010

Which of the following cases transmission errors occurs —

(A) I only.

(B) II only.

(C) (I & II) only.

(D) Neither I nor II.

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Sol:- Case I :

```
1001 ) 10101 ( 10
       1001
       ----
       0111
       0000
       ----
        111
```

110011) 111000 1111010 (10110110

110011

010111

000000

101111

110011

111001

110011

010101

000000

101010

110011

110011

110011

000000

000000

x

∴ (A) I only ,