ECE 358: Computer Networks

Practice questions about parity bits

Q1. Compute the even parity bits for the data bits: 1 1 0 1 0 1 1 1 and 1 0 0 0 1 0 1 0

Solution:

The data bits: 1 1 0 1 0 1 1 1 has Even Parity = 0

The data bits: 1 0 0 0 1 0 1 0 has Even Parity = 1

Q2. Compute the odd parity bits for the data bits: 1 1 0 1 0 1 1 1 and 1 0 0 0 1 0 1 0

Solution:

The data bits: 1 1 0 1 0 1 1 1 has Odd Parity = 1

The data bits: 1 0 0 0 1 0 1 0 has Odd Parity = 0

Q5. Referring to Q3, if a sender transmits <D, EDC>, try to introduce two-bit errors in the received

<D', EDC'>, so that the receiver cannot detect it.

Solution:

This will never happen because the two-dimensional parity EDC bits algorithm can detect all possible two bits of error that could happen on the transmit frame.

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Practice questions about CRC computation

Q1. Add the pairs of A and B given below using modulo-2 arithmetic. Let the result be C.

Solution:

(a) A = 1 0 1 1
B = 0 1 0 1

C = 1 1 1 0

(b) A = 1 1 1 0
B = 0 1 0 1

C = 1 0 1 1

Q2. Using the binary strings from Q1, subtract B from C in part (a) and A from C in part (b) using modulo-2 arithmetic.

Solution:

(a) C = 1 1 1 0
B = 0 1 0 1

D = 1 0 1 1

(b) C = 1 0 1 1
A = 1 1 1 0

D = 0 1 0 1

Q4. Consider the following D and G bit-strings

D = 1 1 0 1 0 1 1 0 1 1 G = 1 0 0 1 1

Compute the frame to be transmitted by the sender

Solution:

Generator (G) is consists of (r+1) Bit pattern. Then, r = 4

The bit string D.2r is equal to: 1 1 0 1 0 1 1 0 1 1 0 0 0 0

We divide D.2r by G, where remainder R is the ED

```
          1 1 0 0 0 0 1 0 1 0
      ---------------------------
1 0 0 1 1 | 1 1 0 1 0 1 1 0 1 1 0 0 0 0
            1 0 0 1 1
            ---------
              1 0 0 1 1
              1 0 0 1 1
              ---------
                0 0 0 0 1
                0 0 0 0 0
```

```
0 0 0 1 0
0 0 0 0 0
  0 0 1 0 1
  0 0 0 0 0
    0 1 0 1 1
    0 0 0 0 0
      1 0 1 1 0
      1 0 0 1 1
        0 1 0 1 0
        0 0 0 0 0
          1 0 1 0 0
          1 0 0 1 1
            0 1 1 1 0
            0 0 0 0 0
              1 1 1 0
```

EDC = 1 1 1 0 So, The frame to be transmitted by the sender "1 1 0 1 0 1 1 0 1 1 1 1 1 0"