

Chapter 10

Block Coding:

1. If the 2 bit datawords are converted to the following codewords, for how many bits of error can we successfully detect and correct for this scheme?

| Dataword Codeword |
|-------------------|
| 00 11100000 |
| 01 00011101 |
| 10 10101010 |
| 11 01010111 |

2. Suppose two channels are using the following block coding scheme for error detection and correction. The receiver received the codeword 10101010 that contains error. Determine if the original dataword can be retrieved from it or not?

| Dataword Codeword |
|-------------------|
| 00 11110000 |
| 01 00001101 |
| 10 10111010 |
| 11 01110111 |

Cyclic Redundancy Check (CRC):

1. Suppose you want to transmit the message 1011101000 and protect it from errors using the CRC generator polynomial 11011. Using binary division, show the message that should be transmitted.

Later, corrupt the right-most sixth bit of the transmitted message and show that the error is detected by the receiver using CRC technique.

2. Suppose you want to transmit the message $x^8 + x^7 + x^5 + x^4 + x + 1$ and protect it from errors using the CRC generator polynomial $x^4 + 1$. Using **polynomial** division, show the message that should be transmitted.

Later, corrupt the right-most fifth bit of the transmitted message and show that the error

is detected by the receiver using CRC technique.

3. The following codeword is received by a receiver X. Receiver X uses CRC technology to detect errors. Determine whether there is any error in the received codeword or not.

[The first 2 bits in the divisor are 1, rests are 0]

