COMP 30650 Exercise Sheet 3

The Link Layer

Error Detection

1. Using the Cyclic Redundancy Check (CRC), calculate the generated message for the following original messages.

    a) 100011000101 – with generator of 1101
    b) 11101111001001010 – with generator of 11001

2. Given the following message that has been transmitted using a CRC, determine if the messages contains an error? Is it possible to determine what bit has an error?

    a) 110011010101001 – with generator of 11101
    b) 1111100001010110 – with generator of 1011

Error Correction

3. Generate the Hamming Codes to enable 1-bit error correction in the following messages. (Convert each hex to 4 bit binary first.)

    a) B C 5 F 4
    b) D 6 E 9 0

4. The following messages contain 1 bit errors. Using the Hamming Code approach, determine which bit is an error and calculate the original message.

    a) 0111010101101
    b) 1000111110010111010

Physical Addresses

MAC (Media Access Control) Addresses (also called Physical Addresses) are a unique address for to each device capable of accessing a network. It is assigned when the Network Interface Card (NIC) is manufactured. MAC addresses are used in the Link Layer to pass

messages between neighbouring nodes. We will look at how this works later. For now, do some research and find the Physical Address of your:

Laptop's NIC(s). An Ethernet port would have a unique address and a Wi-Fi adaptor would have a different one.

Phone's NIC(s). The Wi-Fi adaptor and the Bluetooth adaptor will have unique Physical addresses.

What other devices have a physical address?