COSC 290

Class Exercises #5

1. Using the CRC polynomial 1011 (= x3 + x + 1),
   1. How many bits a sender append to this information before computing CRC code word?

**3**

* 1. compute the CRC code word for the information word 1011101

1011101000 + 100 = **1011101100**

* 1. Check the division performed at the receiver with the cord word of the result of b.

1011101100 XOR 1011 = **1000100 Remainder 000**

1. Using the CRC polynomial 10101 (= x4 + x3 + 1),
   1. How many bits a sender append to this information before computing CRC code word?

**4**

* 1. compute the CRC code word for the information word 101101001

1011010010000 + 1001 = **1011010011001**

* 1. Check the division performed at the receiver with the cord word of the result of b.

1011010011001 XOR 10101 = **100110111 Remainder 0000**

* 1. If a receiver received a code word, 1011011001010112, does an error in the transmission of information? (Show your work.)

101101100101011 XOR 10101 = **10011001101 Remainder 10 implies there is an error**

(work attached at bottom)

1. Suppose we want an error-correcting code that will allow all single-bit errors to be corrected for memory words of length 10.
   1. How many parity bits are necessary?

**4**

* 1. Assuming we are using the Hamming algorithm presented in this chapter to design our error-correcting code and an **odd** parity , find the code word to present the 10-bit information word:

1 0 0 1 1 0 0 1 1 1

**10011000110100** to have odd parity across all 4 parity groups

* 1. We now receive the following code word:

1 0 1 0 1 1 0 0 0 0 1 0 1 1

Is this a legal code word, assuming an **odd** parity? If not, what is the corrected code word? (Which bit is the error bit?)

**No, this is not a legal code word, there is an error in bit 9. The corrected code word is**

**10101000001011**

WORK

A paper with numbers and lines

Description automatically generated

A paper with writing on it

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A white board with black writing

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