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| **Networks Exercises – Error Detection** |  |
|  | **Elm** |

1. The three letters printed at the top right of this sheet are sent synchronously using 7 bit ASCII characters with **even parity**. The BCC is constructed to give **even parity** for the bits in each **row** of the block. Write down the bit stream that is sent, beginning with the **LSB** of the first character. **Indicate the direction of the bit stream**.

ASCII to binary tables are available at: <https://www.rapidtables.com/convert/number/ascii-to-binary.html> or many other sites.

BCC

MSB

LSB

(

Parity bit

)

**Bit stream sent:**

1. The following bit stream is received consisting of three characters and a block check character. If **odd parity** is used, again with the MSB of the BCC determined by the parity

bits of the three characters, determine if the presence of any errors would be detected?

11011100

LSB

MSB

000100111100011111101111

BCC

BCC

MSB

LSB

(

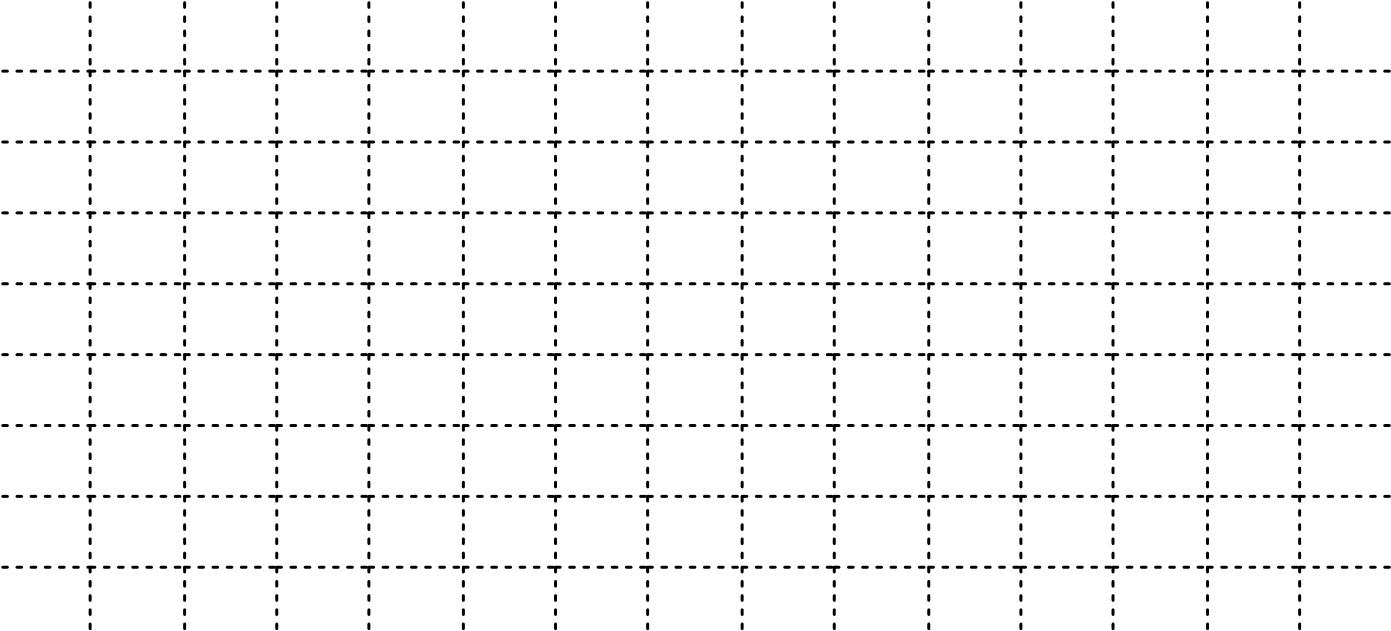
Parity bit

)

1

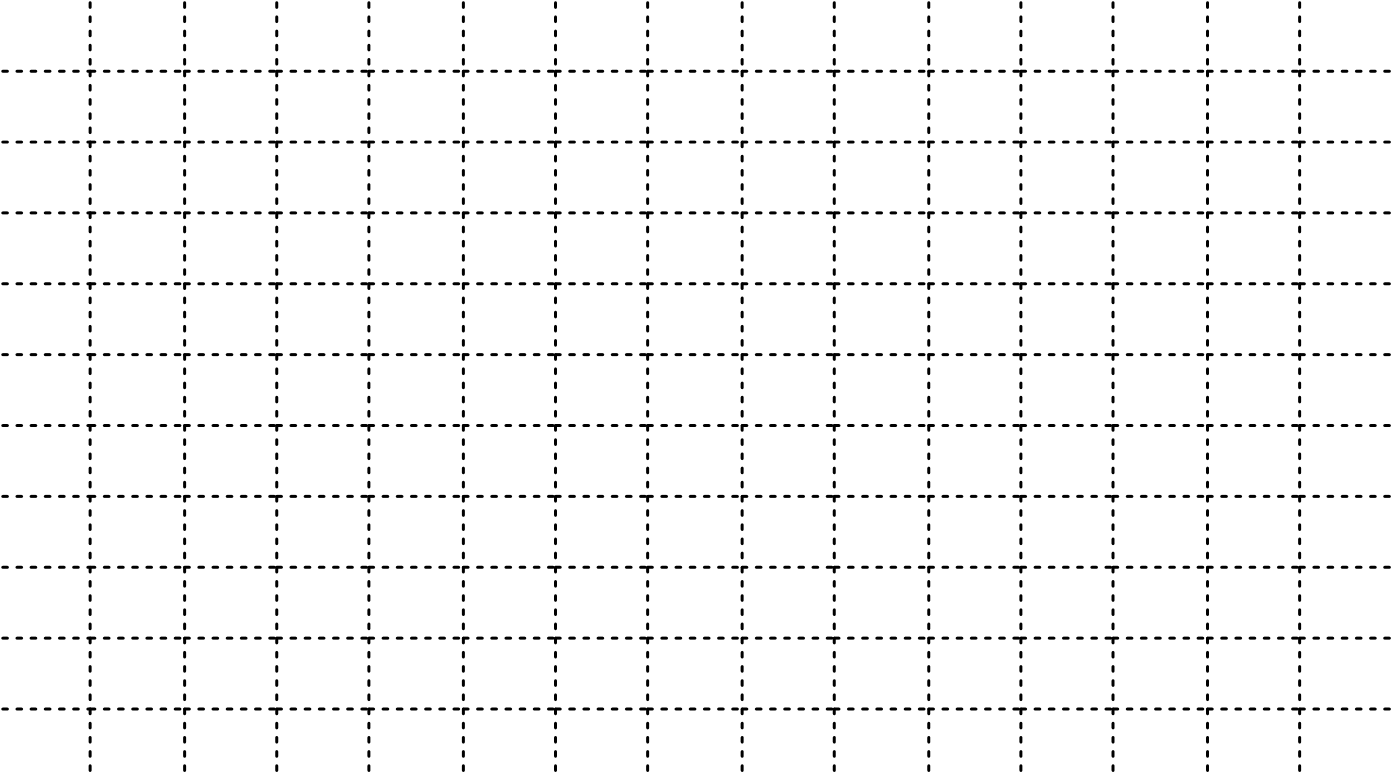
1. In a bit-oriented transmission protocol, the message 1101010 is to be transmitted across a network using the CRC error detection technique. The generator polynomial used is *X*3 + *X*2 + *X*.

Determine the content of the transmitted frame.



**Content of frame transmitted:**

1. The frame 1101010 is received. If the generator polynomial is *X*3 + *X*2 + *X* determine the remainder and hence if the message is in error, assuming that the CRC is not in error.



**Remainder:**

**Does the message contain errors?**

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