Name: Class: Mark:

1. The ASCII codes for J and K are 1001010 and 1001011 respectively.

(a) In an even parity system, what would be the value of the parity bit for the   
characters J and K? [2]

‘J’ parity bit:

‘K’ parity bit:

(b) Characters L, M and N are transmitted serially using odd parity. The parity bits   
are indicated within the bold border. Part of the transmission was corrupted by interference. Which of these bytes would fail the parity check? [1]

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Byte 3 | | | | | | | |  | Byte 2 | | | | | | | |  | Byte 1 | | | | | | | |  |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |  | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |  | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |  |

(c) What would the computer system do to correct this transmission error? [1]

2. Draw a line to match each file type to its appropriate description. [4]

|  |  |  |
| --- | --- | --- |
| Checksum |  | The last digit of a sequence used to check all other digits are correct and in the correct order |
| Check digit | Used to check that data has been successfully sent by waiting for an acknowledgement of receipt |
| Automatic repeat request | An algorithm is applied to the transmitted data resulting in additional data which is appended to the transmission. When received, the same algorithm is applied, and the output is compared with that which was sent. |
| Parity check | Used to make the total number of 1s sent either even or odd |

3. An internet protocol uses a checksum algorithm to ensure that the data within each data packet is received without error.

(a) The check sum is calculated by adding the value of each byte, dividing by 255 and taking the remainder.

Calculate the checksum value in binary for the following transmission:

Show your working. [4]

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Byte 3 | | | | | | | |  | Byte 2 | | | | | | | |  | Byte 1 | | | | | | | |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |  | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |  | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |

(b) A check digit is a type of checksum. Suggest **two** uses of check digits. [2]

(c) An alternative method of sending data without error is for the receiver to send   
back exactly the same data that was sent. The sender can then check this to see   
it matches the data that was originally sent. [1]

[Total 15 Marks]