# Worksheet 2 Number systems, ASCII and Unicode

**Task 1**

1. Convert the following decimal values into 8-bit binary bytes:
2. 1010

00001010

1. 10410

01101000

1. 25510

11111111

1. A single byte can be used to represent the decimal values 010 to 25510. For values over 25510, bytes can be joined together. In a computer that has a 16-bit bus width, an integer would be stored in two consecutive bytes.

For example, to represent 65410 the two bytes used would be:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Byte 2** | | | | | | | | **Byte 1** | | | | | | | |
| **215** | **214** | **213** | **212** | **211** | **210** | **29** | **28** | **27** | **26** | **25** | **24** | **23** | **22** | **21** | **20** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **1** | **1** | **1** | **0** |

Convert the following denary values into 2 bytes:

1. 12710
2. 318810
3. 6553510
4. Put the following byte prefixes in order of size from smallest to largest:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **mega** | **gibi** | **kibi** | **tebi** | **kilo** | **giga** | **tera** | **mebi** |

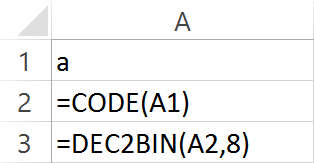
|  |  |  |
| --- | --- | --- |
| **Prefix** | **Symbol** | **Number of bytes** |
|  | k | 1,000 |
|  | Ki | 1,024 |
|  | M | 1,000,000 |
|  | Mi | 1,048,576 |
|  | G | 1,000,000,000 |
|  | Gi | 1,073,741,824 |
|  | T | 1,000,000,000,000 |
|  | Ti | 1,099,511,627,776 |

# Task 2 Representing characters

1. Using the ‘ASCII codes’ helpsheet, answer the following questions:
2. What is your forename in ASCII?
3. Convert the following ASCII sentence to text:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **01000100** | **01001110** | **01000001** | **00100000** | **01110111** | **01100001** |
|  |  |  |  |  |  |
| **01110011** | **00100000** | **01100100** | **01101001** | **01110011** | **01100011** |
|  |  |  |  |  |  |
| **01101111** | **01110110** | **01100101** | **01110010** | **01100101** | **01100100** |
|  |  |  |  |  |  |
| **00100000** | **01101001** | **01101110** | **00100000** | **00110001** | **00111001** |
|  |  |  |  |  |  |
| **00111000** | **00110100** | **00101110** |  |  |  |
|  |  |  |  |  |  |

1. Explain why when adding the characters ‘2’ + ‘3’ you don’t get 5:
2. Create a spreadsheet that can convert a word of up to 8 characters into ASCII character codes. (Use the menu option Formulas, Show formulas or press Ctrl + ` to display the formulas in a spreadsheet.. The ` character is the top leftmost key on the keyboard.)



Extend the spreadsheet to convert ASCII binary codes back to regular characters.

