# 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  00000000 01111111
2. 318810  00001100 01110100
3. 6553510  11111111 11111111
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** |
| kilo | k | 1,000 |
| kibi | Ki | 1,024 |
| mega | M | 1,000,000 |
| mebi | Mi | 1,048,576 |
| giga | G | 1,000,000,000 |
| gibi | Gi | 1,073,741,824 |
| tera | T | 1,000,000,000,000 |
| tebi | 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?

68 97 105 99 104 101 110

D a i c h e n

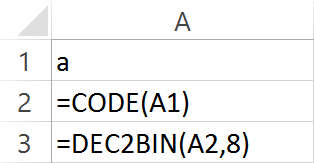
1. Convert the following ASCII sentence to text:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **01000100** | **01001110** | **01000001** | **00100000** | **01110111** | **01100001** |
| D | N | A | space | w | a |
| **01110011** | **00100000** | **01100100** | **01101001** | **01110011** | **01100011** |
| s | space | d | i | s | c |
| **01101111** | **01110110** | **01100101** | **01110010** | **01100101** | **01100100** |
| o | v | e | r | e | d |
| **00100000** | **01101001** | **01101110** | **00100000** | **00110001** | **00111001** |
| space | i | n | space | 1 | 9 |
| **00111000** | **00110100** | **00101110** |  |  |  |
| 8 | 4 | . |  |  |  |

1. Explain why when adding the characters ‘2’ + ‘3’ you don’t get 5:

Theres quotation marks around the ‘2’ and ‘3’ meaning both are strings, if you add them you just concatenate them giving ‘23’. You have to cast both to integer first then you can add them otherwise computer just treats it like 2 strings and assumes you want to put them next to each other.

1. 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.

