**Number Systems – Binary and Hexadecimal**

1. Convert the following binary numbers to decimal:

1. 10111011

1\*128+1\*32+1\*16+1\*8+1\*2+1\*1

= 128+32+16+8+2+1 = 187

1. 11111111

1\*128+1\*64+1\*32+1\*16+1\*8+1\*4+1\*2+1\*1

= 128+64+32+16+8+4+2+1 = 255

1. 00100000

1\*32 = 32

1. 01010101

1\*64+1\*16+1\*4+1\*1

64+16+4+1 = 85

1. 01011100

1\*64+1\*16+1\*8+1\*4

64+16+8+4 = 92

2. Convert the following decimal numbers to binary:

a) 32

00100000

b) 73

|  |
| --- |
|  |
|  |

01001001

c) 1025

0000010000000001

3. Complete the following tables:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Decimal to Binary** | |  | **Binary to Decimal** | |
| 41 | 00101001 |  | 00001111 | 15 |
| 30 | 00011110 |  | 00001101 | 13 |
| 5 | 00000101 |  | 00100101 | 37 |
| 10 | 00001010 |  | 00000010 | 2 |
| 99 | 01100011 |  | 00111100 | 60 |
| 123 | 01111011 |  | 00000100 | 4 |
| 244 | 11110100 |  | 00000110 | 6 |
| 13 | 00001101 |  | 11111101 | 253 |
| 78 | 01001110 |  | 01000100 | 68 |
| 143 | 10001111 |  | 00100001 | 33 |
| 94 | 01011110 |  | 00011010 | 26 |
| 58 | 00111010 |  | 10101011 | 171 |
| 190 | 10111110 |  | 10011001 | 153 |
| 202 | 11001010 |  | 01110111 | 119 |
| 6 | 00000110 |  | 00011111 | 31 |

4. Convert the following hexadecimal numbers to decimal.

a) 7DE

7\*162+13\*161+14\*160

1792+208+14 = 2014

b) 80E1

8\*16^3+0\*16^2+14\*16^1+1\*16^0

32768+0+224+1 = 32993

c) FFFFFF

15\*16^5+15\*16^4+15\*16^3+15\*16^2+15\*16^1+15\*16^0

15,728,640 + 983,040 + 61,440 + 3840 + 240 + 15

= 16,777,215

Does question c) look at all familiar to you?

FFFFFF looks like a code to a color on a color wheel, the colour is white