Hexadecimal – Base 16

Hexadecimal, or Hex, is a number system based on 16 digits. The first ten are the same as our normal digits but for the remaining six digits, it uses the capital letters A to F

|  |  |  |  |
| --- | --- | --- | --- |
| Denary digits | Binary Digits | Octal | Hex |
| 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 | 0, 1 | 0, 1, 2, 3, 4, 5, 6, 7 | 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F |

In both systems you can count things:

|  |  |  |  |
| --- | --- | --- | --- |
| Denary | Binary | Octal | Hex |
| 0 | 0 | 0 | **0** |
| 1 | 1 | 1 | **1** |
| 2 | 10 | 2 | **2** |
| 3 | 11 | 3 | **3** |
| 4 | 100 | 4 | **4** |
| 5 | 101 | 5 | **5** |
| 6 | 110 | 6 | **6** |
| 7 | 111 | 7 | **7** |
| 8 | 1000 | 10 | **8** |
| 9 | 1001 | 11 | **9** |
| 10 | 1010 | 12 | **A** |
| 11 | 1011 | 13 | **B** |
| 12 | 1100 | 14 | **C** |
| 13 | 1101 | 15 | **D** |
| 14 | 1110 | 16 | **E** |
| 15 | 1111 | 17 | **F** |
| 16 | 10000 | 20 | **10** |
| 17 | 10001 | 21 | **11** |

|  |  |  |  |
| --- | --- | --- | --- |
| Denary | Binary | Octal | Hex |
| 18 | 10010 | 22 | **12** |
| 19 | 10011 | 23 | **13** |
| 20 | 10100 | 24 | **14** |
| 21 | 10101 | 25 | **15** |
| 22 | 10110 | 26 | **16** |
| 23 | 10111 | 27 | **17** |
| 24 | 11000 | 30 | **18** |
| 25 | 11001 | 31 | **19** |
| 26 | 11010 | 32 | **1A** |
| 27 | 11011 | 33 | **1B** |
| 28 | 11100 | 34 | **1C** |
| 29 | 11101 | 35 | **1D** |
| 30 | 11110 | 36 | **1E** |
| 31 | 11111 | 37 | **1F** |
| 32 | 100000 | 40 | **20** |
| 33 | 100001 | 41 | **21** |
| 34 | 100010 | 42 | **22** |
| 35 | 100011 | 43 | **23** |
| etc | etc | etc |  |

## Hex

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | 256’s  **162** | 16’s  **161** | 1’s  **160** | Denary equivalent |
| 61016  OR  &610 | 6 | 1 | 0 | (6x256)+(1x16)+(0x1) = 1536 + 16 + 0  =155210 |
| &DA3 | D | A | 3 | (13x256)+(10x16)+(3x1) = 3328 + 160 + 3  =349110 |
|  | F | A | B | (15x256)+(10x16)+(11x1) = 3840 + 160 + 11  = |
|  |  |  |  | =390510 |