Binary

Humans count using a number system based on tens, probably because we have ten digits, but because computers are two state devices, it prefers a number system based on two digits, the binary number system.

|  |  |
| --- | --- |
| Denary digits | Binary Digits |
| 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 | 0, 1 |

In both systems you can count things:

|  |  |  |
| --- | --- | --- |
| Objects | Denary | Binary |
|  | 0 | 0 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 1 | 1 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 2 | 10 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 3 | 11 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 4 | 100 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 5 | 101 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 6 | 110 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 7 | 111 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 8 | 1000 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 9 | 1001 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 10 | 1010 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 11 | 1011 |
| http://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpghttp://anonymousradioshow.files.wordpress.com/2009/05/ladybird.jpg | 12 | 1100 |
| etc | etc | etc |

## 

## Denary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | 1000’s **- 103** | 100’s **- 102** | 10’s **- 101** | 1’s **- 100** |
| 5672 | 5 thousand | 6 hundred | 7 seventy | 2 two |
| 2013 |  |  |  |  |
| 465 |  |  |  |  |
|  | 9 thousand | 9 hundred | 0 tens | 3 three |

## Binary

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number | 128’s  **27** | 64’s  **26** | 32’s  **25** | 16’s  **24** | 8’s  **23** | 4’s  **22** | 2’s  **21** | 1’s  **20** | Denary equivalent |
| 10110101 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 128+32+16+4+1  =181 |
|  | 1 |  |  |  | 1 |  | 1 |  | 128+8+2  =138 |
| 01011110 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | =99 |

Binary Tasks

### Task 1

Complete the Denary and Binary tables on the Binary notes page.

### Task 2

Can you count? See if you can get the highest score in the Binary Game.

<http://forums.cisco.com/CertCom/game/binary_game_page.htm>

### Task 3

Find definitions of:

Bit, Nibble, Byte, kilobyte, gigabyte, megabyte, terabyte, petrabyte