# **CP1402/1802/5631 - Binary and Revision**

## Converting binary to decimal

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| bits | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| power | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| to add | 128 | 0 | 32 | 16 | 0 | 4 | 0 | 1 |

128 + 32 + 16 +4 + 1 = 181

#### Task 1

1. Fill in the powers of two, left to right
2. Write down the powers of two for each 1 bit

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| bits | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| power | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| to add | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

#### Task 2

Your turn. Without referring back to the table, convert the following binary numbers:

1. 11001110 : 206
2. 00100111 : 39
3. 10010101 : 149

## Converting decimal to binary

### Subtraction method

|  |  |  |  |
| --- | --- | --- | --- |
| **Number** | **Power of two** | **Difference** | **Bit** |
| 355 | 256 fits | 355 - 256 = 99 | 1 |
| 99 | 128 doesn’t fit |  | 0 |
| 99 | 64 fits | 99 - 64 = 35 | 1 |
| 35 | 32 fits | 35 - 32 = 3 | 1 |
| 3 | 16 doesn’t fit |  | 0 |
| 3 | 8 doesn’t fit |  | 0 |
| 3 | 4 doesn’t fit |  | 0 |
| 3 | 2 fits | 3 - 2 = 1 | 1 |
| 1 | 1 fits | 1 - 1 = 0 | 1 |

Read top to bottom: 101100011

### Remainder method

|  |  |  |
| --- | --- | --- |
| **Number** | **Remainder** | **Division** |
| 152 |  | 153 / 2 = 76 r 0 |
| 76 | 0 | 76 / 2 = 38 r 0 |
| 38 | 0 | 38 / 2 = 19 r 0 |
| 19 | 0 | 19 / 2 = 9 r 1 |
| 9 | 1 | 9 / 2 = 4 r 1 |
| 4 | 1 | 4 / 2 = 2 r 0 |
| 2 | 0 | 2 / 2 = 1 r 0 |
| 1 | 0 | 1 / 2 = 0 r 1 |
| 0 | 1 | done |

Read bottom to top: 10011000

#### Task 3

Use the subtraction method to convert the following numbers:

1. 219 : 11011011
2. 140 : 10001100
3. 319 : 000100111111

Check your answers by converting back to decimal from the binary representation.

#### Task 4

Use the remainder method to convert the following numbers:

1. 133 : 10000101
2. 248 : 11111000
3. 91 : 01011011

Check your answers by converting back to decimal from the binary representation.

Which method do you find easier to use?

## Review

#### Answer the following

1. Fill out the seven layers of the OSI model:
2. Physical Layer
3. Data Link Layer
4. Network Layer
5. Transport Layer
6. Session Layer
7. Presentation Layer
8. Application Layer
9. Which layer defines the standards for logical addressing?  
   Data Link Layer
10. Which of the following devices separate networks into multiple collision domains?

* Repeaters
* Switches
* Hubs
* Routers
* Amplifiers

1. Which of the following devices separate networks into multiple broadcast domains?

* Repeaters
* Switches
* Hubs
* Routers
* Amplifiers

1. Match the following descriptions to the correct cable type:  
     
   A relatively short length of cabling with Backbone cabling  
   connectors at both ends.  
     
   Cables or wireless links that provide Horizontal cabling  
   interconnection between the entrance  
   facility and MDF and between MDF and  
   IDFs.  
     
   Connects workstations to the closest Patch cable  
   data room and to switches housed in  
   the room.
2. Define the following network infrastructure terms:
   * Demarc
     1. Device that marks where a telecommunications service provider’s network ends and the organization’s network begins
   * Patch panel
     1. A relatively short length of cabling with connectors at both ends.
   * MDF
     1. Centralized point of interconnection for an organization’s LAN or WAN
   * IDF
     1. Intermediate distribution frame between the user and the MDF