

* Data Representation Computers can sense when an electrical signal being sent is either on or off. This is represented by a '1' (on) or a '0' (off). Each individual 1 or 0 is called a binary digit or bit and it is the smallest piece of data that a computer system can

Work with.

* One byte provides enough codes (256) to represent all of the characters that appear on a standard keyboard. A byte is the basic unit used to measure computer memory size.

|  |  |
| --- | --- |
| Bit | 1 or 0 |
| Byte | 8 Bits |
| Kilobyte (Kb) | 1024 bytes |
| Megabyte (Mb) | 1024 kilobytes |
| Gigabyte (Gb) | 1024 megabytes |
| Terabyte (Tb) | 1024 gigabytes |
|  |  |

* We can represent any number, however large, in binary. Remember we can only store numbers between 0 and 255 in one byte. This is obviously rather restrictive since it's not dealing with large integers, negative numbers or decimal numbers.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **27** | **26** | **25** | **24** | **23** | **22** | **21** | **20** | first eight binary powers |
| **128** | **64** | **32** | **16** | **8** | **4** | **2** | **1** |  |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | =67 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | =255: the largest number represented in just one byte |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | =12 |

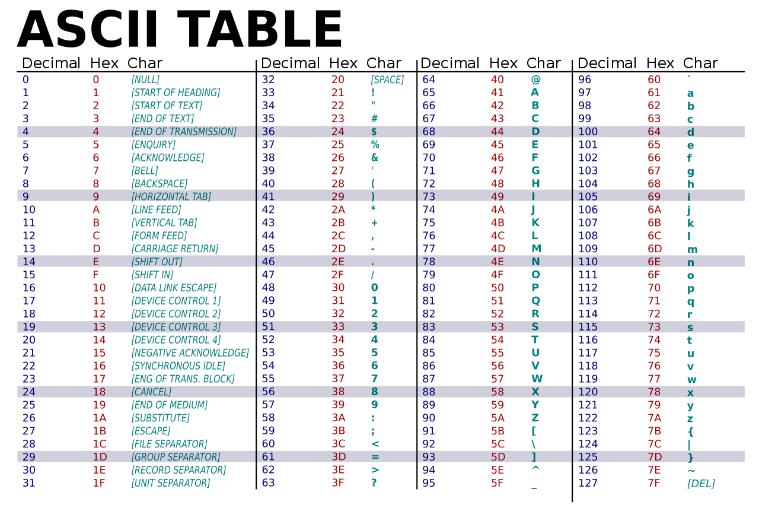
Floating point

As the name implies the floating point numbers are numbers that contain floating decimal points. For example, the numbers 5.5, 0.001 and -2,345.6789 are floating point numbers. Numbers that do not have decimal places are called integers (whole numbers).

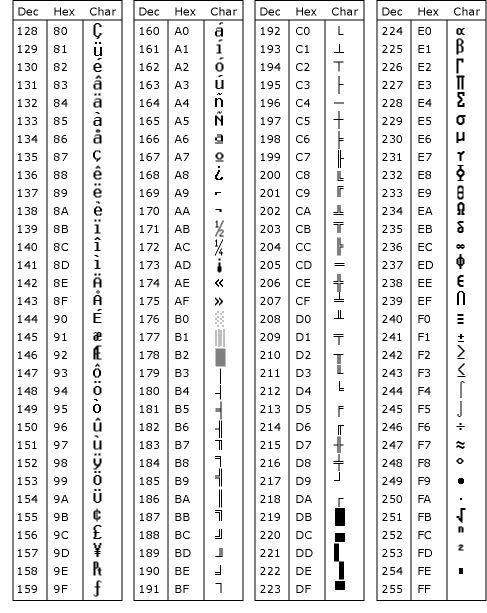
 The first bit defines the non-zero part of the number and is called the Mantissa the second part defines how many positions we want to move the Decimal point this is known as the Exponent and can be positive when moving the decimal point to the right and negative when moving to the left.

Extended ASCII code (8-bit)

Switches and uses two digits (0 and 1). Originally developed in the 1960's using a 7-bit system that represented 128 characters and included English alphabet symbols. Later expanded to 8-bit and with 256 characters



This is 7-bit



This is 8-bit