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Robert F. Woods

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2.1 Prefixes for binary multiples

http://physics.nist.gov/cuu/Units/binary.html

Prefixes for binary multiples

In December 1998 the International Electrotechnical Commission (IEC), the leading international organization for worldwide standardization in electrotechnology, approved as an IEC International Standard names and symbols for prefixes for binary multiples for use in the fields of data processing and data transmission. The prefixes are as follows: Prefixes for binary multiples

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 Factor   Name   Symbol   Origin  Derivation
 210  kibi  Ki  kilobinary: (210)1  kilo: (103)1
 220  mebi  Mi  megabinary: (210)2   mega: (103)2
 230  gibi  Gi  gigabinary: (210)3  giga: (103)3
 240  tebi  Ti  terabinary: (210)4  tera: (103)4
 250  pebi  Pi  petabinary: (210)5  peta: (103)5
 260  exbi  Ei  exabinary: (210)6  exa: (103)6
Examples and comparisons with SI prefixes
one kibibit   1 Kibit = 210 bit = 1024 bit
one kilobit   1 kbit = 103 bit = 1000 bit
one mebibyte   1 MiB = 220 B = 1 048 576 B
one megabyte   1 MB = 106 B = 1 000 000 B
one gibibyte   1 GiB = 230 B = 1 073 741 824 B
one gigabyte   1 GB = 109 B = 1 000 000 000 B
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It is suggested that in English, the first syllable of the name of the binary-multiple prefix should be pronounced in the same way as the first syllable of the name of the corresponding SI prefix, and that the second syllable should be pronounced as "bee."

It is important to recognize that the new prefixes for binary multiples are not part of the International System of Units (SI), the modern metric system. However, for ease of understanding and recall, they were derived from the SI prefixes for positive powers of ten. As can be seen from the above table, the name of each new prefix is derived from the name of the corresponding SI prefix by retaining the first two letters of the name of the SI prefix and adding the letters "bi," which recalls the word "binary." Similarly, the symbol of each new prefix is derived from the symbol of the corresponding SI prefix by adding the letter "i," which again recalls the word "binary." (For consistency with the other prefixes for binary multiples, the symbol Ki is used for 210 rather than ki.)

2.1.1 Official publicatioan

These prefixes for binary multiples, which were developed by IEC Technical Committee (TC) 25, Quantities and units, and their letter symbols, with the strong support of the International Committee for Weights and Measures (CIPM) and the Institute of Electrical and Electronics Engineers (IEEE), were first adopted by the IEC as Amendment 2 to IEC International Standard IEC 60027-2: Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics. The full content of Amendment 2, which has a publication date of 1999-01, is reflected in the tables above and the suggestion regarding pronunciation. Subsequently the contents of this Amendment were incorportated in the second edition of IEC 60027-2, which has a publication date of 2000-11 (the first edition was published in 1972). The complete citation for this revised standard is IEC 60027-2, Second edition, 2000-11, Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics.

2.1.2 Historical context*

Once upon a time, computer professionals noticed that 210 was very nearly equal to 1000 and started using the SI prefix "kilo" to mean 1024. That worked well enough for a decade or two because everybody who talked kilobytes knew that the term implied 1024 bytes. But, almost overnight a much more numerous "everybody" bought computers, and the trade computer professionals needed to talk to physicists and engineers and even to ordinary people, most of whom know that a kilometer is 1000 meters and a kilogram is 1000 grams.

Then data storage for gigabytes, and even terabytes, became practical, and the storage devices were not constructed on binary trees, which meant that, for many practical purposes, binary arithmetic was less convenient than decimal arithmetic. The result is that today "everybody" does not "know" what a megabyte is. When discussing computer memory, most manufacturers use megabyte to mean 220 = 1 048 576 bytes, but the manufacturers of computer storage devices usually use the term to mean 1 000 000 bytes. Some designers of local area networks have used megabit per second to mean 1 048 576 bit/s, but all telecommunications engineers use it to mean 106 bit/s. And if two definitions of the megabyte are not enough, a third megabyte of 1 024 000 bytes is the megabyte used to format the familiar 90 mm (3 1/2 inch), "1.44 MB" diskette. The confusion is real, as is the potential for incompatibility in standards and in implemented systems.

Faced with this reality, the IEEE Standards Board decided that IEEE standards will use the conventional, internationally adopted, definitions of the SI prefixes. Mega will mean 1 000 000, except that the base-two definition may be used (if such usage is explicitly pointed out on a case-by-case basis) until such time that prefixes for binary multiples are adopted by an appropriate standards body.

2.2 Megabits and Bytes

`Reference: http://wiki.answers.com/Q/What_are_megabytes_and_megabits`

What are megabytes and megabits? In: Computer Terminology
Answer

Bit: short form for binary digit. It is either a 0 or a 1 (binary code).

```
1 byte= 8 bits.
1 kilobyte = 1024 bytes.
1 megabyte = 1024 kilobytes.
```

Answer

So if 1 megabyte=1024*1024=1,048,576 bytes and 1 byte=8 bits, and 1 megabyte (1048576) is just 8,388,608 bits, then 1 megabit is approximately .125 megabytes.

Answer

Generally - Bits are used to talk about data transfer rates (1 kilobit = 1000 bits), while bytes are used to talk about storage size calculations (1 kilobyte = 1024 bytes). So when your Internet provider offers you a 1Mb connection, its megaBits not MegaBytes. So for a rough guide of how MUCH you can download, divide by eight. i.e. 1Mb speed = 128KB of data.

Answer

Computers are electronic devices so they view everything as either being ON or OFF. By stringing together groups of on and off messages, computers can store and process information.

The code for ON and OFF are represented numerically as either a one (1) or a zero (0). 1=ON, 0=OFF. Individually, each one or zero is called a Binary Digit or BIT for short.

A collection of 8 BITS (or eight zeros and ones) is equal to 1 BYTE

In human terms, 1 BYTE is equal to one character (a letter, number, space, dash, etc.)

For example, when you type the letter "A" your computer sees "01000001" and if you type the letter "a" in lowercase it sees "01100001." Each zero and one by itself is a BIT; each collection of eight BITS makes up one BYTE.

```
1 Bit = 1 Binary Digit (either a 0 or a 1)
8 Bits = 1 Byte (1 Byte = 1 CHARACTER)
1,024 Bytes = 1 Kilobyte (KB)
1,024 Kilobytes (KB) = 1 Megabyte (MB)
1,024 Megabytes (MB) = 1 Gigabyte (GB)
1,024 Gigabytes (GB) = 1 Terabyte (TB)
1,024 Terabytes (TB) = 1 Petabyte (PB)
1,024 Petabytes (PB) = 1 Exabyte (EB)

1 Bit = 1 Binary Digit (either a 0 or a 1)
1 Kilobit (Kb)= 1,024 bits (128 Bytes)
1 Megabit (Mb)= 1,024 kilobits (128 Kilobytes)
1 Gigabit (Gb) = 1,024 Megabits (128 Megabytes)
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