

CS & IT ENGINEERING



Basics of Computer System

Units and Conversions

Lecture No.- 06

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Recap of Previous Lecture



Topic

Binary Numbers

Topic

Conversion to Decimal

Topic

Decimal To Binary

Topic

Power of 2

Topics to be Covered



Topic

Power of 2

Topic

Units of Time

Topic

Unit Conversion



Power of 2

Unit	Power of 2
K (Kilo)	2^{10}
M (Mega)	2^{20}
G (Giga)	2^{30}
T (Tera)	2^{40}

Time

10^3

10^6

10^9

$$\text{milli} = 10^{-3} = \frac{1}{10^3} = \frac{1}{K}$$

$$\text{micro} = 10^{-6} = \frac{1}{M}$$

$$\text{nano} = 10^{-9} = \frac{1}{G}$$

Representations of Power of 2

$$k = 2^{10}$$

$$1k = 2^{10}$$

$$2k = 2 * 1k = 2 * 2^{10} = 2^{11}$$

$$4k = 2^2 * 2^{10} = 2^{12}$$

$$8k = 2^3 * 2^{10} = 2^{13}$$

$$256k = 2^8 * 2^{10} = 2^{18}$$

$$64M = 2^6 * 2^{20} = 2^{26}$$

$$4G = 2^2 * 2^{30} = 2^{32}$$

$$32G = 2^5 * 2^{30} = 2^{35}$$

$$\Rightarrow \frac{4G}{2} = 2G = 2^{31}$$

$$\Rightarrow \frac{1k}{64} = \frac{2^{10}}{2^6} = 2^{10-6} = 2^4$$

Conversions of Power of 2

$$\frac{2k}{32} = \frac{2^1 * 2^{10}}{2^5} = 2^{1+10-5} = 2^6$$

$$\frac{4k}{256} = \frac{2^2 * 2^{10}}{2^8} = 2^4$$

$$\frac{2M}{128k} = \frac{2 * 2^{20}}{2^7 * 2^{10}} = 2^{21-17} = 2^4$$

$$\frac{2G}{64k} = \frac{2^1 * 2^{30}}{2^6 * 2^{10}} = 2^{31-16} = 2^{15} = 32k$$

$$2^{15} = 2^5 * 2^{10} = 32k$$

$$2^{23} = 2^3 * 2^{20} = 8M$$

$$\rightarrow 128 * 64M = \underline{8} \text{ G ?}$$

\Downarrow

$$2^7 * 2^6 * 2^{20} = 2^{33} = 2^3 * 2^{30} \\ = 8 \text{ G}$$

$$\underline{2)} \quad \frac{2 \text{ G}}{64} = \underline{32} \text{ M ?}$$

$$\frac{2^{31}}{2^6} = 2^{25} = 2^5 * 2^{20} = 32 \text{ M}$$

Representations of Units of Time

$$\text{second} = 1 \text{ second}$$

$$\text{millisecond} \underset{\text{(ms)}}{=} = \frac{1}{1000} \text{ second} = 10^{-3} \text{ second}$$

$$\text{microsecond} \underset{\text{(}\mu\text{s)}}{=} = 10^{-6} \text{ second} \Rightarrow 1 \text{ sec} = \frac{1}{10^{-6}} \mu\text{sec} = 10^6 \mu\text{sec}$$

$$\text{nanosecond} \underset{\text{(ns)}}{=} = 10^{-9} \text{ second}$$

$$\text{picosecond} \underset{\text{(ps)}}{=} = 10^{-12} \text{ second}$$

Conversions of Units of Time

$$1 \text{ msec} = \frac{10^{-3}}{1} \text{ sec}$$

$$\frac{1 \text{ msec} \times 1000}{1000} = \frac{1}{1000} \text{ sec} \\ = 10^{-3} \text{ sec}$$

$$53 \times 10^0 = 5.3 \times 10^1$$

$$\downarrow \\ \frac{53 \times 10}{10} = 5.3 \times 10^1$$

$$1 \text{ usec} = \frac{10^{-3}}{1} \text{ msec}$$

$$1 \text{ sec} = \frac{10^6}{1} \text{ usec}$$

$$5 \text{ usec} = \frac{0.05}{1} \text{ msec}$$

$$\downarrow \\ \frac{5}{1000} \text{ msec} = 0.05 \text{ usec}$$

$$0.5 \text{ msec} = \underline{500} \text{ } \mu\text{sec}$$

↓

$$0.5 * 1000 \text{ } \mu\text{sec} = 500 \text{ } \mu\text{sec}$$

$$0.02 \text{ } \mu\text{sec} = \underline{20} \text{ nsec}$$

$$0.0004 \text{ msec} = \underline{0.4} \text{ } \mu\text{sec} = \underline{400} \text{ nsec}$$

Transfer Rate to Time Calculation

$$\begin{aligned} 1 \mu\text{sec} &= 10^{-6} \text{ sec} \\ &= \frac{1 \text{ sec}}{10^6} \\ &= \frac{1 \text{ sec}}{1 \text{ M}} \end{aligned}$$



2 mins Summary



Topic

Power of 2

Topic

Units of Time

Topic

Unit Conversion

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Happy Learning

THANK - YOU