

## Decimal to Binary Conversion

## Process of Successive Division

Divide the decimal by 2; the remainder is the LSB of the binary number.

If the quotient is 0, the conversion is complete

$$\begin{array}{r} 2 \overline{) 6} \quad r=0 \\ 13 \end{array} \quad \begin{array}{r} 2 \overline{) 3} \quad r=1 \\ 1 \end{array} \quad \begin{array}{r} 2 \overline{) 1} \quad r=1 \\ 0 \end{array}$$

$$2 \overline{) 26} \quad R=0$$

$$2 \overline{) 13} \quad R=1$$

$$2 \overline{) 6} \quad R=0$$

$$2 \overline{) 3} \quad R=1$$

$$2 \overline{) 1} \quad R=1$$

$$2 \overline{) 41} \quad R=1$$

$$2 \overline{) 20} \quad R=0$$

$$2 \overline{) 10} \quad R=0$$

$$2 \overline{) 5} \quad R=1$$

$$2 \overline{) 2} \quad R=0$$

$$2 \overline{) 1} \quad R=1$$

$$11010_2 = 26_{10}$$

$$101001_2 = 41_{10}$$

$$13_{10} = 1101_2$$

$$2 \overline{) 13} \quad r=1$$

$$2 \overline{) 6} \quad r=0$$

$$2 \overline{) 3} \quad r=1$$

$$2 \overline{) 1} \quad r=1$$

$$22_{10} = 10110_2$$

$$2 \overline{) 22} \quad r=0$$

$$2 \overline{) 11} \quad r=1$$

$$2 \overline{) 5} \quad r=1$$

$$2 \overline{) 2} \quad r=0$$

$$2 \overline{) 1} \quad r=1$$

$$158_{10} = 10011110_2$$

$$2 \overline{) 43} \quad r=1$$

$$43_{10} = 101011_2$$

$$2 \overline{) 21} \quad r=1$$

$$2 \overline{) 10} \quad r=0$$

$$2 \overline{) 5} \quad r=1$$

$$2 \overline{) 2} \quad r=0 \quad 2 \overline{) 1} \quad r=1$$

Signature

*Chaitan Jha*

Date

10/01/21

Team Members:

Witness:

Date:



## Process of Weighted Multiplication

$$\begin{array}{cccc}
 0 & 1 & 1 & 0 \\
 2^3 & 2^2 & 2^1 & 2^0 & \text{Bit Weighting Factors} \\
 8 & 4 & 2 & 1 \\
 0 + 4 + 2 + 0 = 6_{10}
 \end{array}$$

Multiply each bit of the Binary Number by its corresponding bit-weighting factor for example.

$$\begin{array}{cccc}
 1 & 0 & 0 & 1 & 0 \\
 16 & 8 & 4 & 2 & 1
 \end{array}$$

$$16 + 0 + 0 + 2 + 0 = 18_{10}$$

$$\begin{array}{cccccc}
 0 & 1 & 1 & 0 & 1 & 0 & 1 \\
 64 & 32 & 16 & 8 & 4 & 2 & 1
 \end{array}$$

$$0 + 32 + 16 + 0 + 4 + 0 + 1 = 53_{10}$$

$$0110_2 = 6_{10}$$

$$\begin{array}{cccc}
 1 & 1 & 0 & 1 & 0 \\
 16 & 8 & 4 & 2 & 1
 \end{array}$$

$$11010_2 = 26_{10}$$

$$\begin{array}{cccccc}
 0 & 1 & 1 & 0 & 1 & 0 & 1 \\
 64 & 32 & 16 & 8 & 4 & 2 & 1
 \end{array}$$

$$\begin{array}{cccccc}
 1 & 1 & 0 & 1 & 0 & 0 & 1 & 1 \\
 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1
 \end{array}$$

## Summary

Base<sub>10</sub>  
Decimal

Successive  
Division

Base<sub>2</sub>  
Binary

Base<sub>2</sub>  
Binary

Weighted  
Multiplication

Base<sub>10</sub>  
Decimal

or

Signature: *[Signature]*

Date: *[Date]*

Team Members: *[Signature]*

Witness:

Date:

Continued From Page # *24*

Continued On Page # *25*